This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

NEDL TRANSFER
HN 52L5 U

383

Cyc 350.5
KH79

HARVARD COLLEGE
LIBRARY

GIFT OF
JAMES STURGIS PRAY
Charles Eliot Professor of Landscape Architecture

To be kept in the main collection of the
College Library

CHAMBERS'S

ENCYCLOPÆDIA

CHAMBERS'S

ENCYCLOPÆDIA

A DICTIONARY

OF UNIVERSAL KNOWLEDGE FOR THE PEOPLE

ILLUSTRATED

WITH MAPS AND NUMEROUS WOOD ENGRAVINGS

REVISED EDITION

VOL. V

LONDON
W. AND R. CHAMBERS 47 PATERNOSTER ROW
AND HIGH STREET EDINBURGH
1876

All Rights are reserved

Cyc 350.5

HARVARD COLLEGE LIBRARY
GIFT OF
JAMES STURGIS PRAY
JAN 5 1924

LIST OF MAPS FOR VOL. V.

	Page
ENGLAND AND WALES, ...	66
SCOTLAND, ...	70
GRÆCIA ANTIQUA, ...	78
INDIA, OR HINDUSTAN, ...	544
IRELAND, ...	623
ITALY, ...	652

A DICTIONARY OF

UNIVERSAL KNOWLEDGE FOR THE PEOPLE

GOOD, JOHN MASON, a physician and author, was born at Epping in Essex, 1764, and died in London in 1827. He commenced practice as a surgeon in Sudbury in 1784, but meeting with little success, he removed to London in 1793, principally with the view of obtaining literary employment.

In addition to *The Book of Nature*, the work by which he is now chiefly known, and which only appeared shortly before his death, he published various poems, translations, and professional treatises. Of his original poems we need say nothing. Amongst his translations we may notice his *Song of Songs, or Sacred Idylls*, translated from the Hebrew, 1803; his translation of Lucretius, in verse, in 1805; of the Book of Job, in 1812; of the book of Proverbs, in 1821; and of the Book of Psalms, which was just completed at the time of his death. His chief professional work, his *Study of Medicine*, in four volumes, was published in 1822. It is a learned and amusing work, but by no means a trustworthy guide to the medical student. He likewise published, in conjunction with Olinthus Gregory and Bosworth, the *Pantologia, or Encyclopædia, comprising a General Dictionary of Arts, Sciences, and General Literature*, in twelve volumes, which were completed in 1813, and contributed largely to various periodicals. His friend, Dr Olinthus Gregory, published a Memoir of his Life in 1828.

GOOD BEHAVIOUR, a phrase rather popular than legal. It is used chiefly as synonymous with keeping the peace. Thus, if one person assaults another, or threatens or provokes him to a breach of the peace, the offence is punishable summarily by justices of the peace, who, besides inflicting a fine, may, and often do bind over the offending party to keep the peace, and be of good behaviour for a period of six or twelve months. The mode of doing this is by requiring the offending party to enter into his recognizances with or without sureties, which is, in fact, the giving a bond for a specified sum to the crown, and if it is broken, that is, if the recognizance is forfeited, then the party may be again punished.

GOOD-CONDUCT PAY is an addition made in the British army to the daily pay of corporals and private soldiers, in consideration of long service unaccompanied by bad behaviour. The amount awarded at one time is 1*d.* a day, with one white chevron on the arm as a badge of distinction. Successive awards of good-conduct pay may raise the total grant to 6*d.* a day, with a corresponding number of stripes on the arm. It reckons, in part, towards increase of pension when the soldier quits the service.

In each regiment there is kept a 'Regimental Defaulters' Book,' in which the commanding officer is bound to enter the name of every soldier in the corps who shall have been convicted by court-martial of any offence, or who, in consequence of misconduct, shall be subjected to forfeiture of pay, either with or without imprisonment, or to any other punishment beyond seven days' confinement to barracks. No first or subsequent 1*d.* of good-conduct pay can be awarded to a soldier, unless two continuous years have elapsed without his name being thus recorded; and if he have the misfortune to come within the provisions of this black book while actually in receipt of good-conduct pay, he loses for each offence 1*d.* per diem, which can only be restored after one uninterrupted year of good service, during which his name has not been recorded in the defaulters' book. The loss of the 1*d.* is of course accompanied by the loss of the corresponding distinguishing mark or stripe.

The first 1*d.* is obtainable after two years' service, without the name once appearing in the defaulters' book; the second, after 6 years; the third, after 12 years; the fourth, after 18 years; the fifth, after 23 years; and the sixth, after 28 years; the service being only reckoned in any case from the age of 18, and two years of uninterrupted good conduct immediately before the time at which the award is granted being requisite in every instance. As an additional inducement to continuous good behaviour, 14 uninterrupted years without an adverse entry entitles a soldier, after 16, 21, or 26 years' service, to the award for which he would only otherwise be eligible after 18, 23, or 28 years.

Non-commissioned officers do not receive good-conduct pay, an addition instead thereof of 2*d.* per diem having been made to their regular pay a few years since. A sum, however, not exceeding £4900 a year is distributed among sergeants of long service and good conduct, in the way of annuities, not over £20 each. The annuity is receivable during active service, and also in conjunction with the pension on retirement.

In the Malta Fencible Artillery, good-conduct pay is allowed to native soldiers for similar periods of service, but to only half the above amount.

A considerable increase of the army causes a large decrease in the sum payable for good-conduct pay, as the older soldiers become non-commissioned officers, and the ranks are swelled by young recruits, who have not yet had time to earn these extra rewards. The total charge in the army for good-conduct pay during the year 1873—1874 is estimated, exclusive of the annuities to sergeants, at £133,150.

Good-conduct pay and badges are also awarded in the navy to seamen of exemplary conduct; but the periods for obtaining, and the rules under which it is granted and forfeited, so nearly resemble those in force for the army, that a separate description is unnecessary. The leading differences are, that the grant is limited to three badges, and 3*d.* a day; that petty officers continue to hold it; and that it is of no account in the pension given at the expiration of active service.

GOOD FRIDAY, the Friday before Easter, sacred as the commemoration of the crucifixion of our Lord. This day was kept as a day of mourning and of special prayer from a very early period. It was one of the two paschal days celebrated by the Christian Church, and in memory of the crucifixion, was called by the Greeks *Pascha Staurosimon*, or the 'Pasch of the Cross.' That it was observed as a day of rigid fast and of solemn and melancholy ceremonial, we learn from the apostolic constitutions (b. v. c. 18), and from Eusebius (*Eccl. Hist.* b. ii. c. 17), who also tells that, when Christianity was established in the empire, Constantine forbade the holding of law-courts, markets, and other public proceedings upon this day. In the Roman Catholic Church, the service of this day is very peculiar; instead of the ordinary mass, it consists of what is called the Mass of the Presanctified, the sacred host not being consecrated on Good Friday, but reserved from the preceding day. The priests and attendants are robed in black, in token of mourning; the altar is stripped of its ornaments; the kiss of peace is omitted, in detestation of the kiss of the traitor Judas; the priest recites a long series of prayers for all classes, orders, and ranks in the church, and even for heretics, schismatics, pagans, and Jews. But the most striking part of the ceremonial of Good Friday is the so-called 'adoration of the cross,' or, as it was called in the old English popular vocabulary, 'creeping to the cross.' A large crucifix is placed upon the altar with appropriate ceremonies, in memory of the awful event which the crucifix represents, and the entire congregation, commencing with the celebrant priest and his ministers, approach, and upon their knees reverently kiss the figure of our crucified Lord. In the eyes of Protestants, this ceremony appears to partake more strongly of the idolatrous character than any other in the Roman Catholic ritual; but Catholics earnestly repudiate all such construction of the ceremony. See IDOLATRY; IMAGES. The very striking office of 'Tenebræ' is held upon Good Friday, as well as on the preceding two days: it consists of the matins and lauds of the office of Holy Saturday, and has this peculiarity, that at the close all the lights in the church are extinguished except one, which for a time (as a symbol of our Lord's death and burial) is hidden under the altar.

In the English Church, Good Friday is also celebrated with special solemnity. Anciently, a sermon was preached at St Paul's Cross on the afternoon of this day, at which the lord mayor and aldermen attended. The practice of eating upon this day 'cross buns'—cakes with a cross impressed upon them—is a relic of the Roman Catholic times, but it has lost all its religious significance. In England and Ireland, Good Friday is by law a *dies non*, and all business is suspended. In Scotland, the day meets with no peculiar attention, except from members of the Episcopal and Roman Catholic communions.

GOOD HOPE. See CAPE OF GOOD HOPE.

GOODALL, FREDERICK, an eminent English artist, the son of Edward Goodall, an engraver of reputation, was born in London, September 17, 1822. His first oil-picture was entitled, 'Finding the Dead Body of a Miner by Torchlight,' for which the Society of Arts awarded him the large silver medal. During the summers of 1838—1842, he visited Normandy and Brittany, and in 1839, when but 17 years of age, he exhibited his first picture at the Royal Academy, 'French Soldiers Playing Cards in a Cabaret.' His 'Entering Church,' as well as 'The Return from a Christening,' which received a prize of £50 from the British Institution, and others of his early pictures, were purchased by Mr Wells. 'The Tired Soldier,' exhibited in 1842, was purchased by Mr Vernon, and is now in the Vernon Gallery. Some of his French scenes are, 'Veteran of the Old Guard describing his Battles,' 'La Fête du Mariage,' 'The Wounded Soldier Returned to his Family,' 'The Conscript.' In 1844, he went for subjects to Ireland, and subsequently visited North Wales. Among his Irish scenes are, 'Irish Courtship,' 'The Irish Piper,' and the 'Departure of the Emigrant Ship.' 'The Village Festival,' one of the best of his English subjects, exhibited in 1847, was purchased by Mr Vernon. His 'Hunt the Slipper' (1849), 'Raising the Maypole' (1851), 'Arrest of a Peasant Loyalist—Brittany, 1793' (1855), 'Cranmer at the Traitor's Gate' (1856), 'Rising of the Nile,' 'Subsiding of the Nile' (1873), &c., have also added greatly to his reputation. He visited Egypt in 1858. In 1852, G. was elected an Associate of the Royal Academy, and in 1863, a Royal Academician.

GOODENIA'CEÆ, a natural order of exogenous plants, of which about 150 species are known, mostly herbaceous plants, although a few are shrubs, and mostly natives of Australia and the islands of the Southern Ocean, a few being also found in India, the south of Africa, and South America. The order is allied to *Campanulaceæ* and *Lobeliaceæ*, but is destitute of the milky juice which is found in both of these. The corolla is monopetalous, more or less irregular. A remarkable character of this order is that the summit of the style bears a little cup, in the bottom of which the stigma is placed. The flowers of some of the species are of considerable beauty. The young leaves of *Scævola taccada* are used as a salad by the Malays; and the pith furnishes a kind of *rice-paper*, which they make into artificial flowers and other ornaments.

GOODS AND CHATTELS, a legal as well as popular phrase in common use, to signify personal property. It is not unfrequently used in wills, but seldom in any other legal instrument; and when used in wills, it generally includes all the personal property of the testator. In Scotland, the corresponding phrase is goods and gear.

GOODS IN COMMUNION, the name given in the law of Scotland, France, and some other countries, to the personal property of a married couple, which is not subject to any deed, but left to the operation of the common law. In England, such a phrase is unknown, for upon marriage, all the personal property which previously belonged to the woman (which is not secured by any deed or will), as well as what was previously his own, becomes and continues the husband's absolutely—he is entire master of it, and can do what he likes with it, regardless of the wishes of his wife or children, and he may even bequeath it away to strangers. In Scotland, the theory is not so liberal towards the husband, though in practice there is not much difference. By the law of Scotland, the husband can also do what he likes with the personal property of both parties, if there is no previous marriage-contract or other deed governing the subject-matter. He can almost squander it at will. It is only at his death that the theory of a kind of partnership, or of a communion of goods, comes into play.

Until 1855, when the law was altered, this theory prevailed when the wife died, for formerly, at her death, the goods were divided into two parts, if there were no children, and one-half went to the next of kin of the wife, however distant the relationship, and not to the husband. But now, by statute 18 Vict. c. 23, s. 6, when a wife dies before the husband, her next of kin takes no interest whatever in the goods in communion; and the law in this respect is now the same as it is in England. Hence the phrase goods in communion is less appropriate than it was before 1855. If, however, the husband die, the goods in communion suffer a division on the principle of a partnership. Thus, if there are no children, half goes to the widow, and the other half to the next of kin of the husband. If there are children, then one-third goes to the widow, and is often called her *Jus Relictæ* (q. v.), and the other two-thirds to the children equally, if there is no will; or if there is a will, then one-third to them, called the *Legitim* (q. v.). The same division also takes place in England, when there is no will; but this is done in England by virtue of a statute 29 Charles II. c. 3, called the Statute of Distributions (q. v.), whereas this effect is produced in Scotland not by a statute, but by the common law. Practically, this distinction, though important to be known by lawyers, may seem immaterial to laymen.

Another more important distinction, however, both theoretically and practically, is this: The above division of the goods in communion prevails in Scotland whether the husband has left a will or not; in short, it prevails in spite of his will, and all that a husband having a wife and children can do by means of a will, is to bequeath one-third of his personal estate to strangers, and this third is usually called on that account the *Dead's Part* (q. v.). Thus, in Scotland, on the death of the husband, the wife and children have an indefeasible interest in two-thirds of his personal property, and this inchoate interest during life gave rise to the phrase 'goods in communion.' In England, on the contrary, the will, if there is one, may carry away all the personal property to strangers, regardless of the wife and children. Hence, the result may be stated shortly thus: in Scotland, a man cannot disinherit his wife and children; whereas in England he can. See other incidents of this distinction in Paterson's *Compendium of English and Scotch Law*, ss. 673, 738. If there is a marriage-contract or antenuptial settlement between the husband and wife, the rights both of the wife and children may be materially varied, for the rule then is, that the parties may make what arrangement they please by way of contract, and in such settlements a fixed sum is generally provided both to the wife and children, in lieu of what they would be entitled to at common law, i. e., where no express contract is made.

GOOD-WILL is rather a short popular expression than a legal term. It means that kind of interest which is sold along with any profession, trade, or business. In reality, it is not the business that is sold, for that is not a distinct thing recognised by the law, but the house, shop, fixtures, &c., are sold, and the trade debts; and along with transferring these, the seller binds himself, either by covenant or agreement, to do everything in his power to recommend his successor, and promote his interests in such business. If the seller acts contrary to such agreement, he is liable to an action. But the more usual course is for the seller to enter into an express covenant not to carry on the same business within 30, 40, or 100 miles, or some specified moderate distance from the place where the purchaser resides. At first, such a covenant was sought to be set aside as invalid, on the ground that it tended to restrain the natural liberty of trade; but the courts have now firmly established that if a definite radius of moderate length is fixed upon, it does not sensibly restrain trade, inasmuch as the person covenanting can go beyond those limits, and trade as much as he pleases. Hence, such limitations are a fair matter of bargain, and upheld as valid. If the party break his covenant, he is liable to an action for damages.

GOODWIN SANDS, famous banks of shifting sands stretching about 10 miles, in a direction north-east and south-west, off the east coast of Kent, at an average distance of 5½ miles from the shore. The sands are divided into two portions by a narrow channel, and at low water, many parts are uncovered. When the tide recedes, the sand becomes firm and safe; but after the ebb, the water permeates through the mass, rendering the whole pulpy and treacherous, in which condition it shifts to such a degree as to render charts uncertain from year to year. The northern portion is of triangular form—3½ miles long, and 2½ in its greatest width; on the northernmost extremity, known as North Sand Head, a light-vessel marks the entrance on this perilous shoal. This light is distant about seven miles from Ramsgate. In the centre, on the western side, jutting out towards the shore, is the Blunt Head, a peculiarly dangerous portion, also marked by a light-ship. The southern portion is 10 miles in length, 2½ in width at its northern end, and sloping towards the south-west, to a point called South Sand Head, which, being marked by a light-vessel, completes the triangle of dangerous proximity recorded for the benefit of mariners.

From the sunken nature of these sands, they have always been replete with danger to vessels passing through the Strait of Dover, and resorting either to the Thames or to the North Sea. On the other hand, they serve as a breakwater to form a secure anchorage in the Downs (q. v.), when easterly or south-easterly winds are blowing. The Downs, though safe under these circumstances, become dangerous when the wind blows strongly off-shore, at which time ships are apt to drag their anchors, and to strand upon the perfidious breakers of the

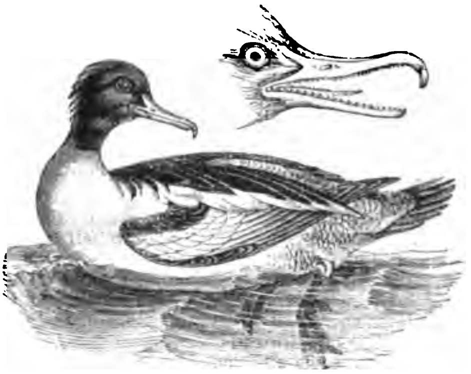
Goodwin, in the shifting sands of which their wrecks are soon entirely swallowed up. Many celebrated and terribly fatal wrecks have taken place here, among which we have only space to enumerate the three line-of-battle-ships, *Stirling Castle*, *Mary*, and *Northumberland*, each of 70 guns, which, with other ten men-of-war, were totally lost during the fearful gale of the 26th November 1703, a gale so tremendous that vessels were actually destroyed by it while riding in the Medway. On the 21st December 1805, here foundered the *Aurora*, a transport, when 300 perished; on the 17th December 1814, the *British Queen*, an Ostend packet, was lost with all hands; and on January 5, 1857, during a gale of eight days' duration, in which several other vessels were lost, the mail-steamer *Violet* was destroyed, involving the sacrifice of many lives in the catastrophe. From these dates, it will be seen that the greatest dangers are to be apprehended in the winter months.

These dangerous sands are said to have consisted at one time of about 4000 acres of low land, fenced from the sea by a wall. One well-known tradition ascribes their present state to the building of the Tenterden steeple, for the erection of which the funds that should have maintained the sea-wall had been diverted: this traditionary account is of little, if any value. Lambard, in writing of them, says: 'Whatsoever old wives tell of Goodwyne, Earle of Kent, in time of Edward the Confessour, and his sandes, it appeareth by Hector Boëtius, the Brittish chronicler, that theise sandes weare mayne land, and some tyme of the possession of Earl Godwyne, and by a great inundation of the sea, they weare taken therfroe, at which tyme also much harme was done in Scotland and Flanders, by the same rage of the water.' At the period of the Conquest by William of Normandy, these estates were taken from Earl Godwin, and bestowed upon the abbey of St Augustine at Canterbury, the abbot of which, allowing the sea-wall to fall into a dilapidated condition, the waves rushed in, in the year 1100, and overwhelmed the whole. How far this account of the formation of this remarkable shoal can be relied on, is a matter of considerable doubt, the documentary evidence on the subject being scanty and unsatisfactory. A colourable confirmation is, however, to be deduced from the fact of the successive inroads which the sea has made for centuries past, and is still making along the whole east coast of England.

As a precaution, now, in foggy weather, bells in the light-ships are frequently sounded. Difficulty is experienced in finding firm anchorage for these vessels; and all efforts to establish a fixed beacon have been hitherto unsuccessful. In 1846, a lighthouse on piles of iron screwed into the sand was erected, but it was washed away in the following year. As soon as a vessel is known to have been driven upon the sands, rockets are thrown up from the light-vessels, and the fact thus communicated to the shore. The rockets are no sooner recognised, than a number of boatmen, known all along the coast as 'hovellers,' immediately launch their boats and make for the sands, whatever may be the state of wind and weather. These 'hovellers' regard the wreck itself as their own property, and although during fine weather they lead a somewhat regardless as well as a wholly idle and inactive life, their intrepidity in seasons of tempest is worthy of all praise.

GOOLE, a thriving market-town and river-port of England, in the West Riding of Yorkshire, is situated on the right bank of the Ouse at its junction with the Dutch River, 22 miles south-south-east of York. It has only recently risen into importance, and may be said to date the commencement of its prosperity from its establishment as a bonding-port in 1829. It has commodious ship, barge, and steam-vessel docks, a patent slip for repairing vessels, ponds for bonded timber, a neatly-built custom house, and extensive warehouse accommodation. G. has a considerable trade in ship and boat building, sail-making, iron-founding, and agricultural machine-making; it has also several corn-mills, some of which are worked by steam. Coal is largely exported along the coast, and in considerable quantities to London. In 1872, 4652 vessels, of 481,643 tons, entered and cleared the port. Pop. (1871) 7680.

GOOSANDER (*Mergus Merganser*), a web-footed bird of the same genus with those commonly called Mergansers (q. v.), and the largest of the British species. It is larger than a wild duck; the adult male has the head and upper part of the neck of a rich shining green; the feathers of the crown and back of the head elongated, the back black and gray, the wings black and white, the breast and belly of a delicate reddish buff colour. The female has the head reddish brown, with a less decided tuft than the male, and much grayer plumage, and has been often described as a different species, receiving the English name of *Dundiver*. Both mandibles are furnished with many sharp serratures or teeth directed backwards (see accompanying illustration), the nearest approach to true teeth to be found in the mouth of any bird. See also Bill. The G. is a native of the arctic regions, extending into the temperate parts of Europe, Asia, and America; in the southern parts of Britain, it is seen only in winter, and then only in severe weather, the females and young migrating southwards in such circumstances more frequently than the old males, and not unfrequently appearing in small flocks in the south of Scotland and north of England; but in some of the northern parts of Scotland and the Scottish isles it spends the whole year. It feeds on fish, crustaceans, and other aquatic animals which its serrated bill and its power of diving admirably adapt it for seizing. The flesh of the G. is extremely rank and coarse, but the eggs appear to be sought after by the inhabitants of some northern countries.



Goosander (*Mergus Merganser*).

GOOSE (*Anser*), a genus of web-footed birds, one of the sections of the Linnæan genus *Anas* (q. v.), having the bill not longer than the head, more high than broad at the base, the upper mandible slightly hooked at the tip; the legs placed further forward than in ducks, and so better adapted for walking; the neck of moderate length, with sixteen vertebræ, a character which widely distinguishes them from swans. In general, geese spend more of their time on land than any other of the *Anatidæ*, feeding on grass and other herbage, berries, seeds, and other vegetable food. Although large birds, and of bulky form, they have great powers of flight. They strike with their wings in fighting, and there is a hard callous knob or tubercle at the bend of the wing, which in some species becomes a spur. The **Domestic G.** is regarded as deriving its origin from the **Gray Lag G.** or **Common Wild G.** (*A. ferus*); but all the species seem very capable of domestication, and several of them have been to some extent domesticated. The Gray Lag G. is almost three feet in length from the tip of the bill to the extremity of the short tail. Its extent of wing is about five feet. The wings do not reach to the extremity of the tail. The weight of the largest birds is about ten pounds. The colour of the plumage is gray, varying in some parts to grayish brown; the rump and belly white, the tail grayish brown and white; the bill is orange, the *nail* at the tip of the upper mandible white. The young are darker than the adults. The Gray Lag G. is common in some parts of the centre and south of Europe, also in many parts of Asia, and in the north of Africa, but it is not known in America. It is a bird of temperate rather than of cold climates. In some countries, it is found at all seasons of the year, but it deserts its most northern haunts in severe weather, migrating southward; its flocks, like those of others of this genus, flying at a great height, beyond the reach of shot, except of the rifle, one bird always leading the flock, the rest sometimes following in a single line, but more generally in two lines converging to the leading bird. The Gray Lag G. was formerly abundant in the fenny parts of England, and resided there all the year, but the drainage of the fens has made it now a rare bird, and only known as a winter visitant in the British Islands. It frequents bays of the sea and estuaries as well as inland waters, and often leaves the waters to visit moors, meadows, and cultivated fields, generally preferring an open country, or taking its place, as remote as possible from danger, in the middle of a field. These excursions are often made by night, and no small mischief is often done by a flock of hungry geese to a field of newly-sprung wheat or other crop. At the breeding season, the winter-flocks of wild geese break up into pairs; the nests are made in moors or on tussocks in marshes; the eggs vary in number from five to eight or rarely twelve or fourteen; they are of a dull white colour, fully three inches long, and two inches in diameter.

Although the common G. has been long domesticated, and it was probably among the very first of domesticated birds, the varieties do not differ widely from each other. *Emden Geese* are remarkable for their perfect whiteness; *Toulouse Geese*, for their large size. As a domesticated bird, the G. is of great value, both for the table, and on account of its quills, and of the fine soft feathers. The quills supplied all Europe with pens before steel pens were invented, and have not ceased to be in great demand. Geese must have free access to water, and when this is the case, they are easily reared, and rendered profitable. Two broods are sometimes produced in a season, ten or eleven in a brood, and the young geese are ready for the table in three months after they leave the shell. They live, if permitted, to a great age. Willughby records an instance of one that reached the age of eighty years, and was killed at last for its mischievousness. Great flocks of geese are kept in some places in England, particularly in Lincolnshire, and regularly plucked five times a year, for feathers and quills. Geese intended for the table are commonly shut up for a few weeks, and fattened before being killed. Great numbers are imported from Holland and Germany for the London market, and fattened in England in establishments entirely devoted to this purpose. *Goose-hams* are an esteemed delicacy. The gizzards, heads, and legs of geese are also sold in sets, under the name of *giblets*, to be used for pies. The livers of geese have long been in request among epicures; but the *pâté de foie d'oie*, or *pâté de foie gras* of Strasburg, is made from livers in a state of morbid enlargement, caused by keeping the geese in an apartment of very high temperature. Large goose-livers were a favourite delicacy of the ancient Roman epicures.

Bean Goose (*Anas segetum*).

The Gray Lag G. is the largest of the native British species. The next to it in size, and by far the most abundant British wild goose, is the **Bean G.** (*A. segetum*), a very similar bird; the bill longer, orange, with the base and nail black; the plumage mostly gray, but browner than in the Gray Lag G., the rump dark brown. The wings extend beyond the tail. The habits scarcely differ from those of the Gray Lag G., but the Bean G. is a more northern species. It is common in all the northern parts of Europe and Asia; and great numbers breed in Nova Zembla, Greenland, and other most northern regions. Large flocks are to be seen in many parts of Britain in winter, particularly during severe frosts, but a few also breed in the north of Scotland, and even in the north of England. The Bean G. is easily domesticated, but generally keeps apart from the ordinary tame geese.—The **White-fronted G.**, or **Laughing G.** (*A. albifrons*), is a frequent winter visitant of Britain; a native of Europe, Asia, and America, breeding chiefly on the coasts and islands of the arctic seas. It is only about 27 inches in its utmost length. The plumage is mostly gray; there is a conspicuous white space on the forehead. It has been often tamed.—Similar to it in size is the **Pink-footed G.** (*A. brachyrhynchus*), a species which has a very short bill. In England it is rare, and a mere winter visitor, but it breeds in great numbers in some of the Hebrides.—The **Snow G.** (*A. hyperboreus*) is found in all the regions within the arctic circle, but most abundantly in America, where it migrates southward in winter, as far as the Gulf of Mexico. It is somewhat smaller than the Bean Goose. The general colour of the plumage is pure white, the quill feathers brownish black. The feathers imported from the Hudson's Bay territories are in great part the produce of this beautiful species, and probably many of the fine white goose feathers imported from Russia. Its flesh is greatly esteemed.—The CANADA G. (*A. Canadensis*) is one of the most abundant North American species, breeding even in the milder latitudes, but in vast numbers in the more northern parts, from which it migrates southwards on the approach of winter. It was introduced into Britain at least 200 years ago, and may now be regarded as fully naturalised; a great ornament of lakes and artificial ponds, from which it makes excursions in small flocks over the surrounding districts. In the uniform breadth of the bill it resembles swans. It is fully three feet and a half from the tip of the bill to the extremity of the tail; but its neck is long and slender, and it does not exceed the common G. in weight so much as in length. The bill, the feet, the head, great part of the neck, the quill-feathers, the rump, and the tail are black; there is a crescent-shaped white patch on the throat, whence this species has received the name of the CRAVAT G.; the back, wings, and flanks are grayish brown, the breast and belly pure white. The Canada G. has a peculiar resounding hoarse cry. It is easily reduced to the most complete domestication. Its flesh affords great part of the winter supplies of the Hudson's Bay residents, and is much used in a salted state.—The CHINA G., or GUINEA G. (*A. Guineensis* or *cygnoides*), of which the native country is supposed to be Guinea, has long been known in Britain in a state of domestication. It has an elevated knob at the base of the upper mandible, which has obtained it the name of Knobbed Goose. —Other species of geese are noticed in the articles BARNACLE GOOSE and CEREOPSIS; and species closely allied to those noticed in this article are found in India and other parts of the world.

GOOSEBERRY (*Grossularia*), a sub-genus of the genus *Ribes* (see CURRANT), distinguished by a thorny stem, a more or less bell-shaped calyx and flowers on 1—3-flowered stalks.—The common G. (*Ribes Grossularia*) is a native of many parts of Europe and the north of Asia, growing wild in rocky situations and in thickets, particularly in mountainous districts; but it is a doubtful native of Britain, although now to be seen in hedges and thickets almost everywhere. Some botanists have distinguished as species the variety having the berries covered with gland-bearing hairs (*setæ*); that having the germens covered with soft unglandular hairs, and the berries ultimately smooth; and that which has even the germens smooth (*R. Grossularia*, *R. uva-crispa*, and *R. reclinatum*); but these varieties seem to have no definite limits in nature. The varieties produced by cultivation are very numerous, chiefly in England, where, and particularly in Lancashire, greater attention is paid to the cultivation of this valuable fruit-shrub than in any other part of the world. In the south of Europe, it is little known. It does not appear to have been known to the ancients. Its cultivation cannot be certainly referred to an earlier date than the 17th c., and was only in its infancy at the middle of the 18th, when the largest gooseberries produced in Lancashire scarcely weighed more than 10 dwts., whereas the prize-gooseberries of that county now sometimes exceed 30 dwts. Many well-known diversities of form, colour, and flavour, as well as of size, mark the different varieties. For the production of new varieties, the G. is propagated by seed; otherwise, generally by cuttings, which grow very freely. Any good garden soil suits the gooseberry. It is rather the better of a little shade, but suffers from much. The bushes are trained in various ways, but it is necessary to prune so that they may not be choked up with shoots, whilst care ought to be taken to have an abundant supply of young wood, which produces the largest berries. Besides its well known wholesomeness and pleasantness, and its use for making an excellent preserve and jelly, the ripe fruit is used for making wine and vinegar. An effervescent gooseberry wine, which might well claim attention under its own name, is often fraudulently sold as champagne. The use of unripe gooseberries for tarts increases the value of this fruit-shrub. The G. season is prolonged by training plants on north walls, and by covering the bushes with matting when the fruit is about ripe. Unripe gooseberries are kept in jars or bottles, closely sealed, and placed in a cool cellar, to be used for tarts in winter. When the bottles are filled, they are heated, by means of boiling water or otherwise, to expel as much air as possible before they are corked and sealed. Various derivations have been given of the name G., but most probably the first syllable is a corruption of *groseille*, the French name of the fruit, from which also comes the Scotch *grozet* or *grozart*. In some parts of England, the G. is called *feaberry*.—Among the other species of G. most worthy of notice are *R. cynosbati*, a native of Canada, of Japan, and of the mountains of India, much resembling the common G. in foliage and habit, the fruit more acid than the cultivated G.; *R. divaricatum*, a native of the north-west coast of America, with smooth, black, globose, acid fruit; *R. irriguum*, also from the north-west coast of America, with well-flavoured globose fruit, half an inch in diameter; *R. oxyacanthoides*, a native of Canada, with small, globose, red, green, or purplish berries of an agreeable taste; *R. gracile*, found in mountain-meadows from New York to Virginia, with blue or purplish berries of exquisite flavour; *R. aciculare*, a Siberian species, with sweet, well-flavoured yellowish or purplish smooth berries; all of which, and probably others, seem to deserve more attention than they have yet received from horticulturists. — The SNOWY-FLOWERED G. (*R. niveum*), a native of the north-west coast of America, is remarkable for its beautiful white pendulous flowers. Its berries in size and colour resemble black currants, are acid, with a very agreeable flavour, and make delicious tarts. Another species from the same region (*R. speciosum*) is very ornamental in pleasure-grounds, and is remarkable for its shining leaves, its flowers with four stamens—the other species having five—and the great length of the filaments.—*R. saxatile*, a native of Siberia, and other species, forming a sub-genus called *Botrycarpum*, have a character somewhat intermediate between currants and gooseberries, being prickly shrubs, but having their flowers in racemes. *R. saxatile* has small, smooth, globose, dark purple berries, like currants, which are very agreeable.

GOOSEBERRY, COROMANDEL. See CARAMBOLA.

GOOSEBERRY, PERUVIAN. See PHYSALIS.

GOOSEBERRY CATERPILLAR, the larva of *Abraxas grossulariata*, a moth of a whitish colour, with yellow streaks, and spotted with black. The larva is beautifully coloured, with black and white stripes, and in its progression forms an elevated loop with its body. It feeds on the foliage of the gooseberry and currant.—Another moth, of which the caterpillar also feeds on the leaves of these shrubs, is *Halias Vanaria*. Both the moth and the caterpillar are smaller than the former. But more destructive than either of these is the larva of a saw-fly, *Nematus ribesii*, which deposits

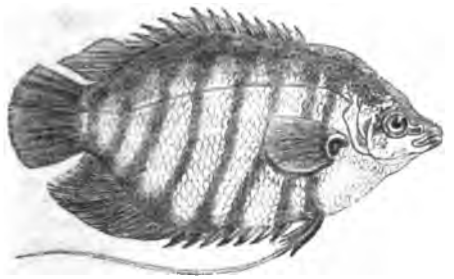
its eggs along the ribs on the under surface of the leaves; the larva is green and 'shagreened' with minute black tubercles. Many remedies have been proposed and tried to prevent the ravages of these larvæ, of which, perhaps, the best are picking off the leaves observed to be covered with the eggs of the saw-fly, and dusting with powder of white hellebore, which, if carefully and sufficiently applied, is most efficacious, killing any kind of larva.

GO'PHER WOOD. The probable identity of the gopher wood of Scripture with the Cypress (q. v.), is maintained partly on account of the qualities of the wood, and partly on account of the agreement of the radical consonants of the names.

GÖ'PPINGEN, a small town of the kingdom of Würtemberg, is situated on the right bank of the Fils, 27 miles north-west from Ulm, and is a station on the railway from Ulm to Stuttgart. It is an industrious, cleanly, and flourishing town, possessing a town-hall, a large castle, and mineral baths, and carrying on manufactures of woollen cloth, earthenwares, and some trade in wool. Pop. (1871) 8649.

GORAL (*Antilope Goral*, or *Nemorhedus Goral*), an animal of the antelope family, inhabiting in large herds the elevated plains of Nepaul. It is of a grayish-brown colour, dotted with black, the cheeks white; the hair is short; the horns are short, inclined, recurved, and pointed. It is a wild and fleet animal, and when pursued, takes refuge in rocky heights. Its flesh is highly esteemed.

GORAMY, or **GOURAMI** (*Osphromenus olfax*), a fish of the family *Anabasidæ* or *Labyrinthibranchidæ*, a native of China and the Eastern Archipelago, highly esteemed for the table, and which has on that account been introduced into Mauritius, Cayenne, and the French West India Islands. Its form is deep in proportion to its length, the head small, and terminating in a rather sharp short snout, the mouth small, the tail rounded, the dorsal and anal fins having numerous rather short spines, the first ray of the ventral fins extending into a very long filament. It is sometimes kept in large jars by the Dutch residents in Java, and fed on water-plants. It was introduced into Mauritius about the middle of the 18th c., and soon spread from the tanks in which it was at first kept into the streams, multiplying abundantly. The success which has attended the introduction of this fish into countries remote from those in which it is indigenous, holds out great encouragement to other attempts of the same kind. The G. is interesting also on other accounts. It is one of the nest-building fishes, and at the breeding season forms its nest by entangling the stems and leaves of aquatic grasses. Both the male and female watch the nest for a month or more with careful vigilance, and violently drive away every other fish which approaches, till the spawn is hatched, afterwards affording a similar parental protection to the young fry.



Goramy (*Osphromenus olfax*).

GORDIAN-KNOT. The traditional origin of this famous knot was as follows: Gordius, a Phrygian peasant, was once ploughing in his fields, when an eagle settled on his yoke of oxen, and remained till the labour of the day was over. Surprised at so wonderful a phenomenon, he sought an explanation of it, and was informed by a prophetess of Telmissus that he should offer sacrifice to Zeus. He did so, and out of gratitude for the kindness shewn him, married the prophetess, by whom he had a son, the famous Midas. When Midas grew up, disturbances broke out in Phrygia, and the people sent messengers to the oracle at Delphi, to ask about choosing a new king. The messengers were informed that a king would come to them riding on a car, and that he would restore peace. Returning to Phrygia, they announced these things, and while the people were talking about them, Gordius, with his father, very opportunely arrived in the requisite manner. He was immediately elected king, whereupon he dedicated his car and yoke to Zeus, in the acropolis of Gordium (a city named after himself), the knot of the yoke being tied in so skilful a manner, that an oracle declared whoever should unloose it would be ruler of all Asia. When Alexander the Great came to Gordium, he cut the knot in two with his sword, and applied the prophecy to himself.

GORDIA'NUS, the name of three Roman emperors, father, son, and grandson.—The first, Marcus Antonius G., was grandson of Annius Severus, and was descended by the father's side from the famous family of the Gracchi. He was remarkable for his attachment to literary pursuits. After being ædile, in which capacity he celebrated the gladiatorial sports with great magnificence, he twice filled the office of consul, first as the colleague of Caracalla, in 213 A. D.; and second, as the colleague of Alexander Severus. Soon afterwards, he was appointed proconsul of Africa, where he gained the affections and esteem of the people by his modest and gentle manners, his splendid liberality, and his refined literary taste; his old age was spent in the study of Plato, Aristotle, Cicero, and Virgil. The tyranny and injustice of the Emperor Maximinus having at length excited a rebellion against his authority in Africa, the imperial procurator there was murdered by a band of nobles who had formed a conspiracy against him on account of his cruelty. G., now in his 80th year, was proclaimed emperor, after having vainly refused the dangerous honour. He received the title of *Africanus*, and his son was conjoined with him in the exercise of imperial authority. The Roman senate acknowledged both, and proclaimed Maximinus, then absent in Pannonia, an enemy to his country. The younger G., however, was defeated in battle by Capellianus, viceroy of Mauritania, before Carthage, and his father, in an agony of grief, put a period to his own existence, having been emperor for little more than a month. In his personal appearance, G. is said to have greatly resembled Augustus.—Marcus Antonius G., grandson of the preceding, was raised to the dignity of Cæsar along with Pupienus Maximus and Balbinus, who were also elected emperors in opposition to Maximinus; and, in the same year, after all three had fallen by the hands of their own soldiers, Marcus Antonius was elevated by the Prætorian bands to the rank of Augustus. Assisted by his father-in-law, Misitheus, a man distinguished for his wisdom, virtue, and courage, whom he made prefect of the

Prætorians, he marched, in the year 242, into Asia, against the Persians, who, under Shahpûr (Sapor), had taken possession of Mesopotamia, and had advanced into Syria. Antioch, which was threatened by them, was relieved by G., the Persians were obliged to withdraw from Syria beyond the Euphrates, and G. was just about to march into their country, when Misitheus died. Philip the Arabian, who succeeded Misitheus, stirred up dissatisfaction in the army against G. by the falsest treachery, and finally goaded on the ignorant and passionate soldiery to assassinate the emperor, 244 A. D. But knowing the great affection which the Roman people had for the gallant and amiable G., he declared in his dispatch to the senate that the latter had died a natural death, and that he himself had been unanimously chosen to succeed him.

GO'RDIUS, a genus of *Annelida*, of the very simplest structure; very much elongated and threadlike, with no greater marks of articulation than slight transverse folds, no feet, no gills, no tentacles, although there is a knotted nervous chord. The mouth is a mere pore at one end of the animal; the other end or tail is slightly bifid, and has been often mistaken for the head. The species inhabit moist situations, are sometimes found on the leaves of plants, but more frequently in stagnant pools, and in mud or soft clay, through which they work their way with great ease. They often twist themselves into complex knots, whence their name G., from the celebrated *Gordian-knot*—and many of them are sometimes found thus twisted together; but they are also often to be found extended in the water. The most common species in Britain is *G. aquaticus*, of which the popular name is HAIR EEL; and a notion still prevails in many parts of the country, that it is nothing else than a horse-hair, which has somehow acquired life by long immersion in water, and which is destined in due course of time to become an eel of the ordinary kind and dimensions; in proof of all which many an honest observer is ready to present himself as an eye-witness who has often seen these very slender eels in his walks. A popular notion prevails in Sweden, that the bite of the G. causes whitlow. When the pools in which the G. lives are dried up, it becomes shrivelled, and apparently lifeless, but revives on the application of moisture. The Abbé Fontana kept one in a drawer for three years, and although perfectly dry and hard, it soon recovered vigour on being put into water. Gordii are extremely common in the Thames.

GORDON, THE FAMILY OF. The origin of this great Scottish historical house is still wrapped in some measure of obscurity. Uncritical genealogists of the 17th c. affected to trace its descent from a mythical High Constable of Charlemagne, a Duke of Gordon, who, it was said, flourished about the year 800, and drew his lineage from the Gordoni, a tribe which, taking its name from the town of Gordunia, in Macedonia, had settled in Gaul before the days of Julius Cæsar. These fables and fancies have long ceased to be believed. Nor is more credit given to the conjecture that the family, having carried its name from Normandy to England in the train of the Conqueror, soon afterwards passed on from England to Scotland. No proof has been found of any connection between the Gordons of France and the Gordons of Scotland. There is little or no doubt now that the Scottish Gordons took their name from the lands of Gordon in Berwickshire. Their earliest historian, writing in the 16th c., says that these lands, together with the arms of three boars' heads, were given by King Malcolm Ceanmohr (1057—1093 A. D.) to the progenitor of the house, as a reward for slaying, in the forest of Huntly, a wild boar, the terror of all the Merse. But in the 11th c., there were neither heraldic bearings in Scotland nor Gordons in Berwickshire. The first trace of the family is about the end of the 12th c., or the beginning of the 13th c., when it appears in record as witnessing charters by the great Earls of March or Dunbar, and as granting patches of land and rights of pasturage to the monks of Kelso. About a century afterwards, it enters the page of history in the person of Sir Adam of Gordon. He is found, in 1305, high in the confidence of King Edward I. of England, holding under that prince the office of joint justiciar of Lothian, and sitting in the English council at Westminster as one of the representatives of Scotland. He seems to have been among the last to join the banner of Bruce, who rewarded his adherence, tardy as it was, by a grant of the northern lordship of Strathbogie. The grant failed of effect at the time; but it was renewed by King David II. in 1357, and by King Robert II. in 1376. Under this last renewal, Sir John of Gordon, the great-grandson of Sir Adam, entered into possession, and so transferred the chief seat and power of the family from the Merse and Teviotdale to the banks of the Dee, the Deveron, and the Spey. Its direct male line came to an end in his son Sir Adam, who fell at Homildon in 1402, leaving an only child, a daughter, to inherit his lands, but transmitting his name through two illegitimate brothers—John of Gordon of Scurdargue, and Thomas of Gordon of Ruthven—to a wide circle of the gentry of Mar, Buchan, and Strathbogie, who, calling themselves 'Gordons,' styled the descendants of their niece 'Seton-Gordons.'

LORDS OF GORDON AND BADENOCH, EARLS OF HUNTLY, MARQUISES OF HUNTLY, AND DUKES OF GORDON.—Elizabeth of Gordon, the heiress of Sir Adam, married before 1408 Alexander of Seton (the son of Sir William of Seton), who, before 1437, was created Lord of Gordon. Their son Alexander, who took the name of Gordon, was made Earl of Huntly in 1445, and Lord of Badenoch a few years afterwards. He acquired by marriage the baronies of Cluny, Aboyne, and Glenmuick in Aberdeenshire; and had grants from the crown of the Highland lordship of Badenoch, and of other lands in the counties of Inverness and Moray. He died in 1470, and was succeeded by his second son George, the second earl, who married Annabella, daughter of King James I., and added to the territories of his house the lands of Schivas in Aberdeenshire, and the Boyne, the Enzie, and Netherdale in Banffshire. He was chancellor of Scotland from 1498 to 1502, and dying soon afterwards, was succeeded by his son Alexander, the third earl, who enlarged the family domains by the acquisition of Strathaven (or Strathdoun) in Banffshire, and of the Brae of Lochaber in Inverness-shire. He commanded the left wing of the Scottish army at Flodden; and, escaping the carnage of that disastrous field, survived till the year 1524. He was succeeded by his grandson George, the fourth earl, under whom the family reached, perhaps, its highest pitch of power. He added the earldom of Moray to its already vast possessions, and long held the great offices of lieutenant of the north and chancellor of the realm. He had the repute of being the wisest, the wealthiest, and the most powerful subject in Scotland. The crown, it is said, was counselled to clip his wings, lest he should attempt, like the Douglases in the previous age, to awe or overshadow the throne. He was stripped of the earldom of

Moray, and, rushing into revolt, was routed and slain at Corrichie in 1562. Sentence of forfeiture was pronounced upon his corpse, but it was rescinded in 1567, and his son George succeeded as fifth earl. He died in 1576. The family had stood aloof from the Reformation, and his son and successor, George, the sixth earl, was conspicuous as the head of the Roman Catholic power in Scotland. He defeated a Protestant army sent against him under the Earl of Argyle in 1594; but submitting to the king, obtained an easy pardon, and was made Marquis of Huntly in 1599. He died in 1636, leaving a character of which we have an instructive sketch by a neighbour and contemporary. 'This mighty marquis,' says the northern annalist, John Spalding, 'was of a great spirit, for in time of troubles he was of invincible courage, and boldly bore down all his enemies triumphantly. He was never inclined to war nor trouble himself; but by the pride and insolence of his kin, was diverse times drawn in trouble, which he bore through valiantly. He loved not to be in the laws contending against any man, but loved rest and quietness with all his heart; and in time of peace, he lived moderately and temperately in his diet, and fully set to building and planting of all curious devices. A well set neighbour in his marches, disposed rather to give nor take a foot of ground wrongously. He was heard say he never drew sword in his own quarrel. In his youth, a prodigal spender; in his elder age, more wise and worldly, yet never counted for cost in matters of credit and honour; a great householder; a terror to his enemies, whom, with his prideful kin, he ever held under great fear, subjection, and obedience. He was mightily envied by the kirk for his religion, and by others for his greatness, and had thereby much trouble.' We mark a new social stage when we are told that he was the first head of his house who 'bought' land. His son George, the second marquis, distinguished himself by the zeal with which he espoused the royal cause in the great civil war of his time. 'You may take my head from my shoulders,' he said, in answer to tempting offers from the Covenanters, 'but not my heart from the king.' Such was the state he kept, that when he took up house in Aberdeen in 1639, he was attended daily by 24 gentlemen, of whom three were of the rank of barons, while eight gentlemen were charged with the watch of his mansion by night. He was beheaded at Edinburgh in 1649, and was succeeded by his son Lewis, the third marquis, who died in 1653. The family possessions had been impaired by war and forfeiture, but it appears that they still sufficed, in 1667, to yield £24,771 Scots a year to his son George, the fourth marquis, who was made Duke of Gordon in 1684. He held out the castle of Edinburgh for King James at the Revolution; and dying in 1716, was succeeded by his son Alexander, the second duke, who died in 1728. He was the last Roman Catholic chief of his race, and, as we are told by Boswell, lived 'in sequestered magnificence, corresponding with the grand dukes of Tuscany,' with whom he believed that he could count kindred. He never travelled in the north without a train of his vassals on horseback. His son, Cosmo George, the third duke, died in 1752, leaving three sons. The youngest, Lord George Gordon, led the Protestant mob which sacked London in 1780; the eldest, Alexander, the fourth duke, died in 1827, being succeeded by his son George, the fifth duke, on whose death, without issue, in 1836, the title of Duke of Gordon (being limited to the heirs-male of the body of the first duke) became extinct, the title of Earl of Huntly fell into abeyance, and the title of Marquis of Huntly was adjudged to the Earl of Aboyne, as heir-male of the body of the first marquis. The estates went to the duke's nephew, Charles, fifth duke of Richmond and Lennox, the son of Lady Charlotte Gordon, eldest daughter of the fourth duke of Gordon by his marriage with the sprightly Jane Maxwell, daughter of Sir William Maxwell of Monreith.

VISCOUNT OF MELGUND, VISCOUNTS OF ABOYNE, EARLS OF ABOYNE, AND MARQUISES OF HUNTLY. —Lord John Gordon, second son of the first Marquis of Huntly, was made Viscount of Melgund and Lord Aboyne in 1627. Three years afterwards, he was burned to death in the tower of Frendraught. In 1632, his elder brother, George, was made Viscount of Aboyne, and on his succession to the Marquisate of Huntly in 1636, the title of Viscount of Aboyne devolved on his third son, who distinguished himself on the king's side during the wars of the Covenant, and died, it is said, of a broken heart, a few days after the execution of Charles I., in 1649. Lord Charles Gordon, third son of the second Marquis of Huntly, was made Earl of Aboyne in 1660. His great-great-grandson, George, who had been a favourite at the court of Marie Antoinette, succeeded as fifth Earl of Aboyne in 1794, on the death of his father, and as eighth Marquis of Huntly in 1836, on the death of the last Duke of Gordon.

EARLS OF SUTHERLAND.—About the year 1512, Adam Gordon of Aboyne, second son of the second Earl of Huntly, married Elizabeth, the heiress of Sutherland, and in her right became Earl of Sutherland. Neither he nor his wife, it appears, could write their own names. Their descendants, the Earls of Sutherland, continued to bear the surname of Gordon through six or seven generations, till the beginning of the 18th c., when they exchanged it for the surname of Sutherland, which had been borne by the Countess Elizabeth before her marriage with Adam Gordon.

LORDS OF LOCHINVAR AND VISCOUNTS OF KENMURE.—William of Gordon, the second son of Sir Adam of Gordon, who figured in the reign of King Robert I. (1306—1329), had a grant from his father of the barony of Stitchel, in Teviotdale, and of the lands of Glenkens, in Galloway. He was the progenitor of the knightly family of Lochinvar, which in 1633 was raised to the peerage by the titles of Lord of Lochinvar and Viscount of Kenmure. William, the sixth viscount—the *Kenmure's on and awa'* of Jacobite song—was beheaded in 1716 for his share in the rising of the previous year. The peerage, which was then forfeited, was restored in 1824, but has been in abeyance since the death of Adam, the ninth viscount, in 1847.

EARLS OF ABERDEEN.—Some genealogists have sought to ingraft this branch upon the parent stem before it was transplanted to the north towards the end of the 14th century. But no evidence has been produced in support of this claim; and modern research holds by the old tradition, that the house descends from one of the illegitimate brothers of Sir Adam of Gordon, who was slain at Homildon in 1402. Its first possession seems to have been Methlic on the banks of the Ythan. Patrick Gordon of Methlic fell under the banner of the Earl of Huntly at the battle of Arbroath in 1445. His son and successor was of sufficient mark to obtain the bishopric of Aberdeen for one of his younger sons in 1516. The family reached the rank of lesser baron in 1531, and the dignity of knight-baronet in 1642. Its chief, at this last date—Sir John Gordon of Haddo—one of the most gallant of the northern cavaliers, was the proto-martyr of his party, the first of the royalists who suffered death by a judicial sentence. He was beheaded at the cross of Edinburgh by the Covenanters in 1644, bequeathing the name of 'Haddo's Hole' to one of the aisles of St Giles's Church, which had been his prison. His son, Sir George Gordon of Haddo, after distinguishing himself at the university and the bar, was made a Lord of Session in 1680, Lord President of the court in 1681, and Lord Chancellor in the following year. He was raised to the peerage in 1682, by the titles of Earl of Aberdeen, Viscount of Formartine, Lord Haddo, Methlic, Tarves, and Kellie. He died in 1720, with the character of being 'a solid statesman, a fine orator, speaking slow but strong.' Some of these lineaments, it has been thought, reappeared, with his love of letters, in his great-great-grandson, George, fourth Earl of Aberdeen, who died in 1860, after holding the office of Prime Minister of the United Kingdom from December 1852 to February 1855.

The history of the Gordons was written in the middle of the 16th c., at the request of the fourth Earl of Huntly, by an Italian monk, who found his way to the Cistercian monastery of Kinloss, in Moray. His work, which has not yet been printed, is entitled, *Historiæ Compendium de Origine et Incremento Gordoniæ Familiæ, Johanne Ferrerio, Pedemontano, authore, apud Kinlos* A. D. 1545, *fideliter collectum.* A century later, the Gordons found another and abler historian in a country gentleman of their own race, the excellent and accomplished Robert Gordon of Straloch, who died in 1661, before he had completed his *Origo et Progressus Familiæ Illustrissimæ Gordoniorum in Scotia.* It is still in manuscript. A *History of the Ancient, Noble, and Illustrious Family of Gordon*, by William Gordon, of Old Aberdeen, was published at Edinburgh in 1726—1727, in 2 vols. 8vo. *A Concise History of the Antient and Illustrious House of Gordon*, by C. A. Gordon, appeared at Aberdeen, in 1 vol. 12mo, in 1754. The chief value of both books is now in their rarity. A work of much greater merit is the *Genealogical History of the Earldom of Sutherland*, or, as its author called it, 'The Genealogie and Pedigree of the most Ancient and Noble Familie of the Earles of Southerland, wherein also many Particulars are related touching the Surname of Gordoun and the Family of Huntley.' This was published at Edinburgh in 1813, in 1 vol. fol. It was written in 1639, by Sir Robert Gordon of Gordonstoun, the fourth son of the twelfth Earl of Sutherland by his marriage with that Lady Jane Gordon (daughter of the fourth Earl of Huntly), who was divorced from the infamous Earl Bothwell, in order that he might marry Mary Queen of Scots. Along with Sir Robert Gordon's work, there is printed a continuation of it to the year 1651, by Gilbert Gordon of Sallach. We learn from this sequel that the House of Gordon of Gight (claiming descent from a younger son of the second Earl of Huntly), which gave birth, at the end of the 18th c., to the poet George Gordon, Lord Byron, gave birth, at the end of the 16th c., to one of the assassins of Wallenstein, Colonel John Gordon, governor of Egra, in Bohemia.

GORDON, GENERAL PATRICK, one of the most distinguished of the many soldiers of fortune whom Scotland sent to the wars of Europe, was born at Easter Auchleuchries, a bleak homestead on the eastern coast of Aberdeenshire, on the 31st of March 1635. His father, a 'goodman' or yeoman, was a grandson of the family of Gordon of Haddo, afterwards raised to the earldom of Aberdeen. His mother, an Ogilvie, who could count kindred with the noble houses of Deskford and Findlater, was the heiress of Auchleuchries, an estate of five or six petty farms, worth in those days about £360 Scots, or £30 sterling a year, and hopelessly burdened by mortgages. In his fifth year, G. was sent to the neighbouring parish school, where he seems to have got a fair knowledge of Latin. The gates of the university were closed against him by his devotion to the Roman Catholic faith of his mother; and so, at the age of sixteen, he resolved—to use his own words—'to go to some foreign country, not caring much on what pretence, or to what country I should go, seeing I had no known friend in any foreign place.'

A ship from Aberdeen landed him at Danzig in the summer of 1651, and some Scottish acquaintances or kinsfolks placed him at the Jesuit college of Braunsberg. His restless temper could not long endure the stillness and austerity of that retreat, and making his escape from it in 1653, he led for some time an unsettled life, until, in 1655, he enlisted under the flag of Sweden, then at war with Poland. During the six years that he took part in the struggle between these two powers, he was repeatedly made prisoner, and as often took service with his captors, until again retaken. He had risen to the rank of captain-lieutenant, when he resolved to try his fortune next with the czar, and, in 1661, joined the Muscovite standard.

Here his services in disciplining the Russian soldiers were duly appreciated, and his rise was rapid. He was made lieutenant-colonel in 1662, and colonel in 1665. Hearing that the death of his elder brother had made him 'goodman of Auchleuchries,' he wished once more to return to Scotland; but he found that there was no escape from the Russian service. The czar, however, sent him on a mission to England in 1666. On his return, he fell into disgrace, for what reason, does not very clearly appear. In 1670, he was sent to serve in the Ukraine against the Cossacks; and when these were subdued, he was sent back, in 1677, to defend Tschigirin against the Turks and the Tartars. His gallant performance of that duty gained him high military reputation and the rank of major-general. In 1683, he was made lieutenant-general; and two years afterwards he obtained leave to visit England and Scotland. King James II. wished him to enter the English service; but it was in vain that he petitioned for leave to quit Russia. In 1688, he was made general, and now began his intimacy with the Czar Peter, who, in the following year, owed to G.'s zeal and courage his signal triumph over the conspirators against his throne and life. Nor was this G.'s only great service to his imperial master. In 1698, he crushed the revolt of the Strelitzes, during the czar's absence from Russia. Peter was not ungrateful, and G.'s last years were passed in opulence and honour. He died at Moscow, in the morning of the 29th November 1699. 'The czar,' says his latest biographer, 'who had visited him five times in his illness, and had been twice with him during the night, stood weeping by his bed as he drew his last breath; and the eyes of him who had left Scotland a poor unfriended wanderer, were closed by the hands of an emperor.'

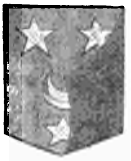
G. kept a journal for the last forty years of his life. It seems to have filled eight or ten thick quartos, of which only six are now known to exist. An abridgment of them, rendered into German, under the title of *Tagebuch des Generals Patrick Gordon*, was published at Moscow and St Petersburg, in 3 vols. 8vo, in 1849—1851—1853, very carefully edited by Dr Posselt. In 1859, *Passages from the Diary of General Patrick Gordon*, in the original English, edited by Mr Joseph Robertson, were printed by the Spalding Club in 1 vol. 4to.

GORDON, LORD GEORGE, celebrated in connection with the London Protestant riots of 1780, the third son of the third Duke of Gordon, was born September 19, 1750. At an early age he entered the navy, and rose to the rank of lieutenant, but quitted the service during the American war, in consequence of a dispute with the Admiralty relative to promotion. Elected in 1774 M.P. for Luggershall, one of the pocket boroughs disfranchised by the Reform Bill of 1832, he soon rendered himself conspicuous by his opposition to ministers, and the freedom with which he attacked all parties; but though eccentric, he displayed considerable talent in debate, and no deficiency of wit or argument. A bill having, in 1778, passed the legislature for the relief of Roman Catholics from certain penalties and disabilities, the Protestant Association of London was, among other societies, formed for the purpose of procuring its repeal, and in November 1779, G. was elected its president. In June 1780, he headed a vast and excited mob, of about 100,000 persons, which went in procession to the House of Commons, to present a petition against the measure, when he addressed them in a speech calculated to inflame their passions and bigotry. Dreadful riots ensued in the metropolis, lasting for several days, in the course of which many Catholic chapels and private dwelling-houses, Newgate prison, and the mansion of the chief-justice, Lord Mansfield, were destroyed. G. was arrested, and tried for high treason; but no evidence being adduced of treasonable design, he was acquitted. His subsequent conduct seemed that of a person of unsound mind. Having, in 1786, refused to come forward as a witness in a court of law, he was excommunicated by the Archbishop of Canterbury for contempt. In 1787, he was convicted, on two official informations, for a pamphlet reflecting on the laws and criminal justice of the country, and for publishing a libel on the queen of France (Marie Antoinette) and the French ambassador in London. To evade sentence, he retired to Holland, but was sent back to England, and apprehended at Birmingham. Sentenced to imprisonment, he died in Newgate, of fever, November 1, 1793. He had latterly become a proselyte to Judaism.

GORDON, Sir John Watson, President of the Royal Scottish Academy, son of a captain in the navy, was born at Edinburgh about 1790. He studied for four years under John Graham, director of the Academy of the Trustees for the Encouragement of Manufacture, where he shewed the usual desire of young artists to become an historical painter, but ultimately turned his attention to portraiture, in which he achieved a distinguished reputation. G. continued to reside in his native city. He first exhibited in the Royal Scottish Academy in 1827, was elected in 1841 an Associate, in 1850 an Academician of the London Royal Academy; and on the death of Sir William Allan, President of the Royal Scottish Academy, when the honour of knighthood was conferred on him. G. was as national in his art as it is possible for a portrait-painter to be—that is to say, he excelled in transferring to the canvas those lineaments of character which are conceived to be pre-eminently Scotch. The shrewd, cautious, calculating countenance of the Caledonian has never been so happily rendered. Nearly every man of note in Scotland, and not a few in England, sat for their portrait to this artist. Among his best-known works may be mentioned, 'Sir Walter Scott' (1831), 'Dr Chalmers' (1837), 'Duke of Buccleuch' (1842), 'Lord Cockburn' (1842), 'Thomas De Quincey' (1843), 'Lord Robertson' (1846), 'Principal Lee' (1847), 'Professor Wilson' (1851), 'Earl of Aberdeen' (1852), and 'the Provost of Peterhead' (1853). The last picture, which is the property of the Merchant Maiden Hospital, Edinburgh, gained for G. the gold medal at the French Exposition of 1855, and may be reckoned as among the happiest examples of portraiture in existence in any country.' He died June 1864.

GORDO'NIA, a genus of trees and shrubs of the natural order *Ternstræmiaceæ*, having five styles combined into one, which is crowned with five stigmas, a 5-celled capsule, and winged seeds. Several species are natives of America, of which the most important is the Loblolly Bay (G. *Lasianthus*), which is found in swamps near the sea-coast of the Gulf of Mexico. Moist tracts of considerable extent are often covered with this tree alone. It attains a height of 50 or 60 feet, has oblong, leathery, evergreen leaves, and beautiful, white, sweet-scented flowers, more than an inch in diameter. The bark is much used for tanning. In England, it is cultivated with some difficulty, and generally appears as a mere bush.

GORE, in Heraldry, a charge consisting of one-third of the shield cut off by two arched lines, one drawn from the dexter or sinister chief, and the other from the bottom of the escutcheon, meeting in the fess point. A Gore Sinister is enumerated by heralds as one of the abatements or marks of dishonour borne for unknightly conduct. See Gusset.



Gore.

GORE, Mrs Catherine Grace, an English novelist, was born at East Retford, Nottinghamshire, in 1799. Her father, Mr Moody, was a wine-merchant in moderate circumstances. In 1823, she was married to Captain Charles Arthur Gore, with whom she resided for many years on the continent, supporting her family by her literary labours. These were varied and voluminous to an extraordinary degree, amounting in all to seventy works. She died at Lynwood, Hants, January 27, 1861. Her first published work was *Theresa Marchmont, or the Maid of Honour*, published in 1823. Some of her early novels, as the *Lettre de Cachet*, and the *Tuileries*, were vivid descriptions of the French Revolution; but her greatest successes were her novels of English fashionable life, conspicuous among which were—*Cecil, or the Adventures of a Coxcomb*, and *Cecil, a Peer*, *The Ambassador's Wife*, *The Banker's Wife*, &c. She also wrote a prize comedy, entitled *The School for Coquettes; Lord Dacre of the South*, a tragedy; *Bond*, a dramatic poem; and other poetical and descriptive works.

GORE'E, a very small island, belonging to the French, is situated immediately south-east of Cape Verd, on the western coast of Africa. It is only about three miles in circumference, contains a town defended by a fort, and covering two-thirds of the entire surface of the island. It is considered by the French as an important commercial entrepôt; its exports are gold-dust, ivory, wax, &c. Population of the island about 7000; of the town, 3042.

GO'REY, a small municipal borough and market-town of Ireland, in the county of Wexford, is situated about 24 miles north-north-east of the town of that name, and three miles inland from the coast of St George's Channel. It is an old town, having received its charter of incorporation from James I., and consists mainly of one street of nearly a mile in length. Besides the national school and the savings-bank, the Roman Catholic chapel, with nunnery attached, built recently in the pointed style, may be mentioned. G. carries on a considerable trade in agricultural produce. Pop. (1871) 2673.

GORGE (Ital. *gorga*, throat), the rear-opening into any work in fortification, consists of the space between the extremities of the two sides, as between the faces of a ravelin, or between the flanks of a bastion. The demi-gorges of a bastion are lines in continuation of the curtains on each side, extending from the extremities of the flanks to the point of intersection of the lines. See also FORTIFICATION.

GORGED. When a lion or other animal has a crown by way of collar round its neck, it is said heraldically to be gorged.

GŐRGEI, ARTHUR, general commanding-in-chief of the Hungarian army during 1848—1849, was born at Toporcz, in the county of Szepes (Zips), February 5, 1818, and after a thorough military education, got a commission as lieutenant in the regiment of Palatine Hussars. Finding garrison-life too monotonous, and promotion slow, G. took leave of it, and turned a zealous student of chemistry at Prague. At the outbreak of the revolution, G. hastened to the seat of the first independent Hungarian ministry, offering his services, and was sent to Belgium, where he effected a purchase of arms for the new levies of Honvéds. He first exhibited his great military capacity after the rout of the Hungarian army near Schwechat, when he was made a general, and conducted the retreat that had to be effected with consummate skill and courage. His raw levies had to be kept together and drilled under the roaring cannon of the enemy; the disaffected officers, many of them foreigners, and addicted to monarchy, to be retained under the revolutionary flag; a commissariat to be organised during fatiguing marches and constant fighting. Perczel's corps was totally dispersed at Moor; government and diet were fleeing towards the Transylvanian frontier, and the dreary wilderness of the Carpathians threatened to become the tomb of all, in the midst of a winter little less severe than that which destroyed the Grand Army of Napoleon I. At the end of December 1848, Hungary seemed to be lost; at the beginning of March 1849, G. was concerting a plan for driving the enemy out of the country. After Dembinski's failure as general-in-chief, G. was declared the head of the united army corps of the north (hitherto his own), of the Upper Theiss, under Klapka, and of Szolnok, under Damjanich. Forty thousand men, the finest army Hungary ever saw, broke forth from behind the Theiss, and drove the Austrians, with bloody losses, from one position to another. The battles of Hatvan, Bitske, Isaszeg, Gödöllö, Vácz, Nagy-Sarlo, were a succession of triumphs. Pesth was evacuated by the enemy, the siege of Komorn was raised, and before the month of April was over, nothing was left in the enemy's hands except a small strip on the western frontier, and the impregnable fastnesses which surround Tittel on the Lower Theiss. Buda, the ancient capital of the realm, well fortified and garrisoned, was to be stormed, and for this the victorious campaign had to be interrupted. The delay was fatal. Russian armies hastened to the rescue of Austria, and regiments of veterans were despatched by Radetzky, the war in Italy being nearly over. The fortress of Buda was carried on the 21st of May, but the flower of the Hungarian infantry was buried among its ruins. In the latter part of June, the Austro-Russian army, under Haynau and Panjutine, beat G. near Zsigard; and the affair at Györ (Raab) resulted in the retreat of the Hungarians close to the walls of the fortress of Komorn. On the 2d of July, a bloody battle was fought near Szöny, where G. gave proofs of indomitable courage. On the 16th of July, a desperate fight took place in and near Vácz between Russians and Hungarians. G., after some weeks, arrived in the neighbourhood of Arad with an army decimated by continual fighting, by heavy marches, and by dysentery. At Debreczin the corps of Nagy-Sándor was sacrificed in order to allow an agonising march of a few days. On the 9th of August, the lower army, under Dembinski, was annihilated in the battle of Temesvár, and on the 10th, G. was declared dictator by a council held in the fortress of Arad, under the presidency of Kossuth. But further resistance on the part of the Hungarians was now hopeless, and on the 13th G.'s army surrendered at Világos to Prince Paskiewitch, commander-in-chief of the Russian forces. This surrender has been often imputed as treachery to Görgei. Whether such an imputation is excusable, may be best judged from the circumstance, that on the day of surrendering G. had 24,000 men with 140 cannon, and that five armies, with more than 200,000 men and 1000 cannon, were closing upon him from different directions. G. was confined to Klagenfurt, whence he was released on parole, and engaged, as is rumoured, in chemical studies. In 1852, a work was published at Leipsic (a translation of which appeared at London in the same year), under the title, *Mein Leben und Wirken in Ungarn in den Jahren* 1848 *und* 1849.

GO'RGET (Ital. *gorgietta*, from *gorga*, a throat), that part of ancient armour which defended the neck.—Also a crescent-shaped ornament formerly worn by military officers on the breast.

GORGET (Fr. *gorgeret*, from *gorge*, the throat), a surgical instrument, or rather a series of surgical instruments, devised to facilitate the operation of Lithotomy (q. v.). They are now almost entirely out of use.

GO'RGIAS, a celebrated Greek rhetorician, of the time of Socrates, was born at Leontini, in Sicily, and settled in Greece, residing for the most part at Athens, and at Larissa in Thessaly. He died at the age of 105 or 109. G. has been immortalised by Plato in a Dialogue which bears his name. Two works attributed to him are extant, *The Apology of Palamedes*, and the *Encomium on Helena*, but their genuineness has been disputed by several critics. G. displayed little aptitude for theorising on the art which he professed to teach, and was not remarkable for speculative acumen generally, but he would appear to have been a quick and judicious *observer*. He avoided, according to Plato, general definitions of virtue and morality, but, on the other hand, Aristotle notices that he had a true appreciation of the facts of morality, as they are manifested in life and character, and the picture given of him by Plato is in harmony with this remark. He did not wish to be thought a *sophist*, but only a *rhetorician*, and the ancients were in fact at a loss whether to consider him the latter or both.

GO'RGO, or GORGON, according to Homer, a frightful monster inhabiting the infernal regions, the head of which was peculiarly appalling. Homer and Euripides make mention of only one G., the daughter of Terra, who was slain by Minerva, while Hesiod mentions three Gorgones—Stheno, Euryale, and Medusa, the daughters of Phorcys and Ceto, for which reason they are called likewise the Phorcides. Their habitation, according to the same author, was in the Western Ocean, in the neighbourhood of Night and the Hesperides; while Herodotus and other later writers place it in Libya. They are represented as girded with serpents with heads erect, vibrating their tongues, and gnashing their teeth. Æschylus describes them as winged virgins with brazen claws, and enormous teeth, having two serpents round their bodies by way of girdle. The name G. was given more especially to Medusa. According to later legends, Medusa was originally a very beautiful maiden, and the only one of the three sisters who was mortal. But she having become a mother by Neptune in one of Minerva's temples, that virgin goddess was so affronted, that she changed Medusa's hair into serpents, which gave her so fearful an appearance that whoever looked on her was turned into stone. Medusa was killed by Perseus (q. v.), and her head was afterwards placed in the shield of Minerva. Various explanations have been given of the myth both by the ancients and the moderns, but no one in particular can be said to be satisfactory.—Compare Levezow, *Ueber die Entwickelung des Gorgonenideals in der Poesie und bildenden Kunst der Alten* (Berlin, 1833).

GORGO'NIA, a genus of zoophytes (*Anthozoa*), allied to *Alcyonium* (q. v.). The whole structure (polype-mass) is rooted and branching, consisting of a horny central axis with a polypiferous flesh, which when dried becomes a friable crust full of calcareous spicules. The hard stem is composed of concentric layers, probably formed in succession by consolidation of the fleshy substance. The stem is usually brown or black, whilst the flesh, or even the dried crust, often exhibits colours of great brilliancy. The polypes have eight tentacles. Several species of G. are rare British zoophytes; but the species most generally known is *G. flabellum*, or the *Flabellum Veneris*, also called the Sea-fan, a tropical species, often brought home as a curiosity from the West Indies, which exhibits in a striking manner the flat shape, more or less characteristic of this genus, and of the family *Gorgoniadæ*.

Gorgonia (*Gorgonia flabellum*).

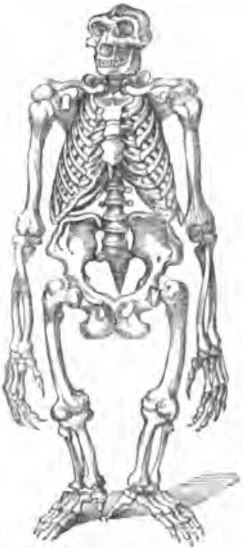
GO'RHAM CONTROVERSY. The Gorham controversy arose out of the refusal of Henry Philpott, Bishop of Exeter, to institute the Rev. Cornelius Gorham, formerly fellow of Queen's College, Cambridge, and then vicar of St Just-in-Penrith, to the vicarage of Brampford Speke, on his presentation thereto by the Lord Chancellor. The alleged ground of this refusal was, that after examination the bishop found Mr Gorham to be of unsound doctrine as to the efficacy of the Sacrament of Baptism, inasmuch as he held that spiritual regeneration is not given or conferred in that sacrament, and in particular, that infants are not made therein 'members of Christ and the children of God,' as the catechism and formularies of the church declare them to be. The case was brought before the Arches Court of Canterbury, which decided (1849) that baptismal regeneration is the doctrine of the Church of England, and that Mr Gorham maintained doctrines on the point opposed to those of the church, and that consequently the bishop had shewn sufficient cause for his refusal to institute, and that the appeal must be dismissed with costs. From this decision, Mr Gorham appealed to the judicial committee of Privy Council. The committee complained that the bishop's questions were intricate and entangling, and that the answers were not given plainly and directly. Their decision was in substance as follows; and it must be noted what points they undertook to decide, and what not. The court declared that it had no jurisdiction to settle matters of faith, or to determine what ought, in any particular, to be the doctrine of the Church of England, its duty being only to consider what is by law established to be her doctrine upon the legal construction of her articles and formularies. It appeared that very different opinions as to the sacrament of baptism were held by the promoters of the Reformation; that differences of opinion on various points left open were always thought consistent with subscription to the articles; and also, that opinions in no important particular to be distinguished from Mr Gorham's had been maintained without censure by many eminent prelates and divines. Without expressing any opinion as to the theological accuracy of Mr Gorham's opinions, the court decided that the judgment of the Arches Court should be reversed. Mr Gorham was accordingly instituted to Brampford Speke. During the two years that the suit was pending, the theological question was discussed with all degrees of ability and acrimony in sermons and pamphlets; and it was expected that if the judgment had gone the other way, a large body of the evangelical clergy, who for the most part hold views more or less in accordance with those of Mr Gorham, would have seceded from the church.

GORI'LLA (*Troglodytes Gorilla*), a great African ape, generally referred by naturalists to the same genus with the chimpanzee, although Professor Isidore Geoffroy St Hilaire has attempted to establish for it a separate genus. It has received the name by which it is now known in consequence of its being supposed to be the same animal which is mentioned in the *Periplus* of Hanno the Carthaginian navigator, who visited the tropical parts of the west coast of Africa about the year 350 B.C., although it is by no means certain that the G. of Hanno is not the chimpanzee. Vague accounts of apes of great size, and of which very wonderful stories were told, were from time to time brought from Western Africa; but it was not till 1847 that the G. became really known to naturalists, when a skull was sent to Dr Savage of Boston by Dr Wilson, an American missionary on the Gaboon river. Since that time, not only have skeletons and skins been obtained in sufficient number for scientific examination, but information has also been procured concerning the habits of the animal in its native haunts. The accounts of the G. given in Du Chaillu's *Explorations and Adventures in Equatorial Africa* (Lond. 1861), are regarded by the highest scientific authorities, and particularly by Owen, as in the main trustworthy, notwithstanding all the doubt that has been cast over that traveller's narrative of his adventures; and there is little doubt that they are in accordance with all that we have learned from other sources, and with the inferences to be deduced from the dentition and osteology of the animal.

The G. differs from the chimpanzee in its greater size; the height of an adult male in an erect posture being commonly about five feet six inches or five feet eight inches, although there is reason to think that it sometimes exceeds six feet. Its strength appears also to be greater in proportion to its size, and even its skeleton indicates very great muscular power both in the jaws and limbs. The bony ridges in the skull above the eyes are extremely prominent; and the skull of the male also exhibits a large occipital ridge on the top of the head. The brain is small. The nasal bones project more than in the chimpanzee, thus producing an approximation to the human face, in a somewhat prominent nose. The lower part of the face, however, projects very much; and besides that the teeth do not form a perfectly uninterrupted series as in man, the canine teeth are very large, particularly in the male, projecting considerably more than an inch from the upper jaw, much larger in proportion than in the chimpanzee; although, on the other hand, the molars bear a greater proportion to the incisors, and thus approach more to the human character.

Gorilla.

The breadth at the shoulders is great. There are thirteen pair of ribs. The pelvis approaches the human form more than in any other ape. The arms are not so long as in the chimpanzee, but reach nearly to the knee in the erect position. The lower limbs, although shorter in proportion than in man, are longer than in the chimpanzee. The foot is less turned inward than in the chimpanzee, and is better fitted for walking on the ground; the great toe is a true thumb, as in the chimpanzee, standing out from the foot at an angle of about 60°, and is remarkably large and strong. The hands or paws of the fore limbs are also remarkable for their great size, their thickness, and their strength. The fingers are short, but the circumference of the middle finger at the first joint is sometimes more than six inches. —The G. has a black skin, covered with short dark-gray hair, reddish brown on the head; the hair on the arms longer, that on the arm from the shoulder to the elbow pointing downwards, and that on the fore-arm pointing upwards to the elbow, where a tuft is formed. The face is covered with hair, but the chest is bare. There is scarcely any appearance of neck. The mouth is wide, and no red appears on the lips. The eyes are deeply sunk beneath the projecting ridge of the skull, giving to the countenance a savage scowl, the aspect of ferocity being aggravated by the frequent exhibition of the teeth. The belly is very large and prominent;



Skeleton of Gorilla.

in accordance with which character, the G. is represented as a most voracious feeder, its food being exclusively vegetable—partly obtained by climbing trees, and partly on the ground. It is very fond of fruits and of some leaves, as the fleshy parts of the leaves of the pine-apple; and employs its great strength of jaws and teeth in tearing vegetable substances and cracking nuts which would require a heavy blow of a hammer. It is not gregarious in its habits. It spends most of its time on the ground, although often climbing trees. It is capable of defending itself against almost any beast of prey. It has a kind of barking voice, varying when it is enraged to a terrific roar. It inhabits exclusively the densest parts of tropical forests, and is only found in regions where fresh water is abundant. It is much dreaded by the people of the countries in which it is found, although by some of the tribes its flesh is sought after for food. Many strange stories are current among them about its habits, which seem entitled to little regard—as, for example, of its carrying away men and women, and detaining them for some time in the woods—of its lying in wait on the branch of a tree till a man passes beneath, furtively stretching down one of its hinder legs to catch him, and holding him in the grasp of its foot, or rather hand, till he is strangled; and the like.—The G. has not been hitherto tamed, and in an adult state at least, seems very incapable of it. The stories of gorillas tamed by the inhabitants of Western Africa, and made to work for them, are worthy of no credit. The name given to this animal in its native country is *Ngina*, or *Ingeena*.

Du Chaillu has described, as discovered by himself, two other species of *Troglodytes*, the Koolo-kamba (*T. Koolo-kamba*) and the Nshiego-Mbouvé (*T. calvus*), smaller than the G.; the latter remarkable for making an umbrella-like shelter of leaves placed against a branch to protect itself from the rain.

GO'RKHA, a town of Nepaul, stands in lat. 27° 52′ N., and in long. 84° 28′ E. Originally the seat of the reigning dynasty of the country, it gives name to the dominant race—a race noted alike for fidelity and valour during the mutiny of 1857. G. is 53 miles to the west of Khatmandu, the capital of the state.

GO'RKUM (Dutch, *Gorinchem*), a town and fortress of the Netherlands, in the province of South Holland, is situated on the right bank of the Merwede, at the junction of the Linge with that river, 22 miles east-south-east of Rotterdam. It is well built, has a town-house, several military establishments, and a great transit trade in agricultural produce and fish, especially salmon. Pop. 9000.

GÖ'RLITZ, a fortified town of Prussia, in the province of Silesia, is a principal station on the railway from Dresden to Breslau, and is situated on a declivity on the left bank of the Neisse, 52 miles west of Liegnitz. It is well built, is surrounded by old walls, and flanked with towers, the chief of which is the Kaisertrutz, now the guard-house and armoury of the town. Among the many beautiful Gothic churches, the most interesting is that of St Peter and St Paul, built 1423—1497, and having five naves, a magnificent organ, and a bell 12½ tons in weight. In the north-west of the town is the Kreuzkapelle (Chapel of the Cross), an imitation of the Holy Sepulchre at Jerusalem. G. has also a gymnasium with an excellent library, numerous educational and benevolent institutions, and a theatre. A viaduct upwards of 1500 feet in length, and 115 feet high, one of the grandest in the north of Germany, here crosses the valley of Neisse. G. has manufactures of cloth, pens, leather, glass, and tobacco; has extensive weaving and bleaching, and a lively transit trade. In eight cloth factories, driven by water and steam power, 1590 workers produce 18,148 pieces of cloth annually. Pop. (1871) 42,000.

GÖRLITZ PROCESS is the name of a celebrated trial which took place in Germany in 1850. It was occasioned in this way: On the 13th of June 1847, the Countess of Görlitz was strangled by a servant of her own named Johann Stauff, whom she had caught stealing some valuables from an open desk in her sitting-room, and her corpse was found a few hours after burned by a combustible stuff heaped upon her. After more than two years spent in preliminary investigation, the case was tried before the assizes at Darmstadt, 11th of March 1850, and occupied a whole month. The murderer, who obstinately denied having committed the crime imputed to him, was condemned to imprisonment for life. But the scientific interest of the case arose from its having led to a discussion on the possibility of the spontaneous combustion of the human body. While the physician, Von Siebold, declared in favour of the possibility, the chemists Bischoff (q. v.) and Liebig (q. v.) sought to demonstrate the opposite opinion, which is generally held by scientific men. See SPONTANEOUS COMBUSTION.

GÖRRES, JAKOB JOSEPH VON, a distinguished German author, was born at Coblenz, January 25, 1776. In common with most of the ardent youth of the time, G. threw himself eagerly into the movement of the French Revolution; became an active member of the clubs and debating societies which sprung up in all the towns upon the French border, and established a newspaper, entitled the *Red Journal*, which was the exponent of the most extreme opinions of the time. In the year 1799, he went to Paris as the chief of a deputation to negotiate the annexation of the Rhineland to the French Republic, but the revolution of the 18th Brumaire put an end to this and all similar dreams. G. returned to Germany, disgusted with politics, quietly settled down in a professorship in his native town, and devoted himself exclusively to literature for several years. His works on art, on physiology, on the laws of organism, and on the relations of faith and science, attracted much attention. In 1806, he published the first part of his well-known collection of *German Popular Legends;* and in 1808, his work on the mythology of the Asiatic nations, and a further contribution to the legendary literature of Germany. From these studies, however, in common with the great body of the German nation, he was aroused to the hope of liberation from French tyranny, by the reverses of the French arms in the Russian expedition. G. was not slow to appeal to the national sentiment of his countrymen in the *Rhenish Mercury*, one of the most spirit-stirring journals which Germany had ever possessed; he became, in truth, the literary centre of the national movement. After the re-establishment of German independence, G. continued the career of a journalist, and addressed himself against the encroachments of domestic absolutism with the same energy with which he had denounced the tyranny of foreign occupation; until, having drawn upon himself the displeasure of the government, he was obliged to flee to France, and afterwards to Switzerland. In 1827, he gladly accepted the professorship of the History of Literature in the new university just then founded at Munich by the liberal King Ludwig of Bavaria. From this date, G. made Munich his home, and his later years were devoted to literature, and in part also to the animated religious controversies occasioned in Germany by the contests between the Archbishop of Cologne and the Prussian government on the subject of mixed marriages and Hermesianism. See HERMES. In all these controversies, G., who was an ardent Roman Catholic, took an active and influential part. He was, if not the originator, at least the main supporter of the well-known Roman Catholic journal, the *Historisch-Politische Blätter*. His last work of importance was his *Christliche Mystik* (Ratisbon, 1836—1842). He died January 27, 1848. See the *Historisch-Politische Blätter*, 1848, and Wetser's *Kircher Lexicon*, vol. iv.

GORT, a small but thriving town of Ireland, in the province of Connaught, is prettily situated on a small stream in the county of Galway, and close to its southern boundary, 17 miles north-north-east of the town of Ennis. Its trade is chiefly in retail. Pop. (1871) 2077.

GO'RTSCHAKOFF, a Russian family, traces its ancestry through St Michael of Tschernigoff (born 1246) to Rurik and Vladimir the Great.—PRINCE PETER G., governor of Smolensk, defended that town two years (1609—1611) against Sigismund of Poland, when it was taken by storm.—PRINCE DIMITRI G., born 1756, was a celebrated Russian poet, and wrote odes, satires, and epistles. He died 1824.—PRINCE ALEXANDER G., born 1764, served under his uncle Suwaroff in Turkey and Poland, displayed great courage at the capture of Praga (a suburb of Warsaw), and was made lieutenant-general in 1798. In the campaign of 1799, he commanded under Korsakoff at Zürich, was subsequently made military governor of Viborg, repulsed Marshal Lannes at Heilsburg, and commanded the right wing at the battle of Friedland. Appointed minister of war in 1812, he filled this post to the end of the war, when he was made general of infantry, and member of the imperial council. He died in 1825.—PRINCE ANDREAS G. served in 1799 as major-general under Suwaroff in Italy; and commanded a division of grenadiers at Borodino, in

1812, where he was wounded. In the campaign of 1813—1814, he commanded the 1st corps of Russian infantry, and distinguished himself at Leipsic and Paris. He was made general of infantry in 1819, and in 1828 retired from active service.—Prince Peter G. was born in 1790. Having made the campaigns of 1813 and 1814, he served in Caucasia under General Yermoloff. As chief of the general staff of Wittgenstein in 1826, he was one of the signers of the Treaty of Adrianople. In 1839, he was appointed governor-general of Eastern Siberia, and occupied that important post until, in 1851, he retired from active life. On the outbreak of the Crimean war, however, he offered his services, which were accepted; and at the battle of the Alma he commanded the left wing of the Russians. He also took part in the battle of Inkermann. He died in 1868.

GORTSCHAKOFF, Prince Mikail, brother of the preceding, was born in 1795, commenced his military career as an officer of artillery, and distinguished himself in 1828 at the sieges of Silistria and Schumla. Chief of the staff of Count Pahlen in 1831, he gave proofs of extraordinary valour in the battle of Ostrolenka and at the taking of Warsaw. He was wounded at Grohow, and made general; succeeded Count Toll as chief of the staff of the whole army, was appointed general of artillery in 1843, and military governor of Warsaw in 1846. In 1853, he commanded the Russian forces in the Danubian provinces, crossed the Danube, at Braila, March 23, 1854, occupied the frontiers of Bessarabia, and in March 1855 directed the defences of Sebastopol, attacked by the armies of Great Britain and France. As a reward for his services in this unsuccessful but still brilliant defence, Prince G. was appointed by the Emperor Alexander II. lieutenant-general of the kingdom of Poland, and was for several years a wise and conciliatory representative of his youthful emperor at Warsaw. He died May 30, 1861.—Prince Alexander M., Russian diplomatist, brother of the preceding, was born in 1798. He was secretary of the Russian embassy in London in 1824, *chargé d'affaires* at Florence in 1830, counsellor of the embassy at Vienna in 1832, and envoy extraordinary to Stuttgart in 1841. In 1854, he was charged by the Emperor Nicolas with the interests of Russia in the Vienna conferences; and in 1856 he succeeded Count Nesselrode as Minister of Foreign Affairs. In 1870, he issued his circular upsetting the treaty of 1856, and leading to the London Conference of 1871, which granted the demands of Russia.

GORUCKPO'RE, a city of Hindustan, in the lieut.-governorship of the North-West Provinces, and capital of a district of the same name, stands on the left bank of the Rapti, which joins, 85 miles further down, the Ghagra from the left, the whole of the intermediate course being navigable. It is in lat. 26° 42′ N., and long. 83° 23′ E., being 430 miles to the north-west of Calcutta; and it contained (1871) 50,853 inhabitants.—The district of G. has an area of 4585 square miles, and a population of 2,019,350.

GORY DEW, a dark red slimy film not unfrequently to be seen on damp walls and in shady places; often on the whitewashed walls of damp cellars, where its appearance is apt to occasion alarm from its resemblance to blood. It is one of the lowest forms of vegetable life, one of the *algæ* of the group *Palmellaceæ* (included in *Confervaceæ*), and nearly allied to the plant to which the phenomenon of Red Snow (q. v.) appears to be chiefly owing. Its botanical name is *Palmella cruenta*. It sometimes extends over a considerable surface, and becomes a tough gelatinous mass. The structure and mode of growth of this and allied plants will be noticed under the head Palmellaceæ. Its characteristic red colour appears also in *Hæmatococcus sanguineus*, a nearly allied plant, found in similar situations, but which seems to extend more as an aggregation of cells, not soon melting down into an indefinite slime like the cells of the *Palmella*. The prevalent colour of the group, however, is green.

GÖRZ, or **GÖ'RITZ**, an important town of Austria, in the crown-land of the Kustenland (Coast Districts), (q. v.), and capital of a district of the same name, is charmingly situated in a fruitful plain on the left bank of the Isonzo, about 25 miles north-north-west from Trieste. Among its principal buildings are the old castle of the former Counts of Görz, now used as a prison; and the cathedral, with a beautiful *sacrarium*. G. has extensive sugar-refining, and manufactures of rosoglio, silks, linen, cotton, and leather; it has also a thriving trade in its manufactures and in dried fruits. Charles X. of France died here, Nov. 6, 1837. Pop. (1869) 16,823.

Goshawk (*Astur palumbarius*)
(Copied from *Falconry in the British Isles*).

GO'SHAWK (*Astur*), a genus of *Falconidæ* (q. v.), distinguished from the true falcons by a lobe or festoon, instead of a sharp tooth, on the edge of the upper mandible, and by the shortness of the wing, which reaches only to the middle of the tail. It is more nearly allied to the sparrow-hawks, from which it is distinguished by its more robust form, by its shorter legs, and by the middle toe not being elongated, as in that genus. The species to which the name G. originally and strictly belongs (*A. palumbarius*), is very widely diffused over Europe, Asia, the north of Africa, and North America, chiefly inhabiting hilly and wooded regions. It is now very rare in Britain, particularly in England. Although one of those that were called *ignoble* birds of prey, it was much used for falconry, being easily trained, and very successful in catching such game as is either confined to the ground, or does not rise far from it, or such as is to be found in woods, through the branches of which the G. readily threads its way in pursuit. The G. was thus flown at hares, rabbits, pheasants, partridges, &c. It ordinarily seeks its prey by flying near the ground, and can remain a very long time on the wing. It follows its prey in a straight line, not rising in the air to descend upon it, like the falcons; and when baffled by the object of pursuit entering a wood and hiding itself in some covert, will perch on a bough, and await its reappearance with wonderful patience for many hours. Its flight is very rapid. The G. builds in trees. Its nest is very large. The female, which is much larger than the male, is about two feet in entire length. Both sexes are of a dark grayish-brown colour, the upper surface of the tail-feathers barred with darker brown; there is a broad white streak above each eye; the under parts are also whitish, with brown bars and streaks.—Other species are found in India, South Africa, Australia, &c.

GO'SHEN, the name of that part of ancient Egypt which Pharaoh made a present of to the kindred of Joseph when they came to sojourn in that country. It appears to have lain between the eastern delta of the Nile and the frontier of Palestine, and to have been suited mainly for a pastoral people, which the Hebrews were. Rameses, the principal city of the land, was the starting-point of the Exodus of the chosen people, who reached the Red Sea in three days. From this and other circumstances, it has been concluded that the *Wáde-t-Tumeylát* (the valley through which formerly passed the canal of the Red Sea, and at the western extremity of which Rameses was situated) is probably the G. of the Old Testament.

GO'SLAR, a small but ancient and interesting town of Hanover, is situated on the border of Brunswick, on the Gose, from which the town derives its name, 26 miles south-east of Hildesheim. It was at one time a free imperial city, and the residence of the emperor. Of all the fortifications of which it once boasted, the walls and one tower—the Zwinger, the walls of which are 21 feet thick—alone remain. Of the venerable cathedral, the porch (*Vorhalle*, date 1150) is the sole relic; the corn-magazine is a portion of an old imperial palace; the Gothic church in the market-place dates from 1521; the hotel called the *Kaiserworth* has eight portraits of German emperors. G. was founded by Heinrich I. about 920; and under Otto I. the mines, for which G. has ever since been celebrated, were opened in 986. The manufactures of G. are unimportant; and the mines of gold, silver, copper, lead, and zinc are nearly exhausted. Pop. (1871) 8923.

GOSPEL SIDE OF THE ALTAR, the right side of the altar or communion table, looking from it, at which, in the English Church service, the gospel appointed for the day is read. It is of higher distinction than the epistle side, and is occupied by the clergyman of highest ecclesiastical rank who happens to be present. In some cathedrals, one of the clergy has this special duty to perform, and is designated the Gospeller.

GOSPELS. The expression is derived from the Anglo-Saxon, and means literally *good news*. The message of Christ, or the doctrine of Christianity, was called the Gospel (*to euaggelion*); and the inspired records by which this message or doctrine have been transmitted to the church in successive ages, have received the name of the Gospels (*ta euaggelia*). When this name was first distinctly applied to these records, is uncertain. The use of it in Justin Martyr, about the middle of the 2d c., is a subject of dispute. It appears to have been in common use in the course of the third century.

1. *Genuineness.*—The primary and most interesting inquiry concerning the Gospels is as to their genuineness. They profess to be the inspired records of our Lord's life—of his sayings and doings—proceeding in two cases from men who were his apostles and companions (Matthew and John); and in the two other cases from men who, although not themselves apostles, were apostolic in their position and character, the immediate companions and fellow-labourers of the apostles (Mark and Luke.) According to their profession, they were all composed during the latter half of the 1st c.; the three *Synoptic* Gospels, as they are called, probably during the decade preceding the destruction of Jerusalem by Titus (60—70), and the fourth Gospel of St John near the close of the century. The question as to their genuineness is in the main the question as to the fact of their existence at this early period; the special authorship of each Gospel is a comparatively less important question.

It is obvious that the existence of the Gospels within the 1st c. is a point which can only be settled by the ordinary rules of historical evidence. What traces have we of their existence at this early period? As Paley illustrates the matter, we can tell of the existence of Lord Clarendon's *History of the Rebellion* at a period antecedent to Bishop Burnet's *History of his Own Times*, by the fact that Burnet quotes Clarendon. If the Gospels existed in the 1st c., therefore, we shall expect to find similar evidences of their existence in the Christian writings of the 2d and 3d centuries. We do find such evidence in abundance during the 3d century. In such writers as Origen and Cyprian, we not only find quotations from the Gospels, but we find the Gospels themselves mentioned by name as books of authority amongst Christians. From the writings of Origen alone, if they had survived, we might have collected, it has been said, the whole text not only of the Gospels, but of the Old and New Testaments. At this point, then, there is no question. No one can dispute the existence of the Gospels in the age of Origen, or that immediately preceding—that is to say, in the beginning of the 3d century. But we can ascend with an almost equally clear light of evidence to the time of Irenæus, or the last quarter of the 2d century. The passage in which Irenæus speaks of the Gospels is so significant and important that it deserves to be extracted. 'We,' he says (*Contra Hæres.* lib. iii. c. 1), 'have not received the knowledge of the way of our salvation by any others than those through whom the Gospel has come down to us; which Gospel they first preached, and afterwards, by the will of God, transmitted to us in writing, that it might be the foundation and pillar of our faith.' 'For after our Lord had risen from the dead, and they (the apostles) were clothed with the power of the Holy Spirit descending upon them from on high, were filled with all gifts, and possessed perfect knowledge, they went forth to the ends of the earth, spreading the glad tidings of those blessings which God has conferred upon us. *Matthew among the Hebrews published a Gospel in their own language;* while Peter and Paul were preaching the Gospel at Rome and founding a church there. And after their departure (death), Mark the *disciple and interpreter of Peter himself delivered in writing what Peter had preached; and Luke, the companion of Paul, recorded the Gospel preached by him. Afterwards, John, the disciple of the Lord, who leaned upon his breast, likewise published a Gospel while he dwelt at Ephesus in Asia.*' These words are very explicit and to the point; and elsewhere, Irenæus speaks still more particularly of the several Gospels, and endeavours to characterise them in a somewhat fanciful way, which, if it does not prove his own judgment, at least proves the kind of veneration with which the Gospels were regarded in his time. It is equally beyond question, then, that the Gospels were in existence in the end of the 2d c., and that they were attributed to the authors whose names they bear. 'It is allowed by those who have reduced the genuine apostolic works to the narrowest limits, that, from the time of Irenæus, the New Testament was composed essentially of the same books as we receive at present; and that they were regarded with the same reverence as is now shewn to them.'—Westcott, *History of Canon.* The evidence upon which we accept as undoubtedly genuine the productions of many classic authors, is not to be compared in clearness and fulness to the evidence for the genuineness of the Gospels at this stage. Any difficulties that the subject involves begin at a point higher up than this.

The age of Irenæus is the *fifth* generation from the beginning of the apostolic era—the *third* from the termination of it. The ascending generations may be characterised as those (4) of Justin Martyr, and (3) of Ignatius and Papias; and (2) of St John, or the later apostolic age. It is within these three generations, and especially within the third and fourth, that the subject of the genuineness of the Gospels gives any cause for hesitation and discussion.

Such writers as Justin Martyr and Ignatius nowhere quote the Gospels by name. In a fragment of Papias preserved by Eusebius, there is mention of Matthew and Mark having written accounts of the actions and discourses of our Lord; but with this exception, there is no mention of the Gospels, or of their authors by name, in these earlier Christian writers. Not only so, but Justin Martyr appeals constantly to sources of information which he styles not 'Gospels' of St Matthew, St Luke, or St John, but *Memoirs of the Apostles* (*apomnēmoneumata tōn apostolōn*). The phrase *a kaleitai euaggelia* (which are called gospels), which follows the former in the common versions of Justin's text, is supposed by many to be an interpolation. This has given rise to a good deal of discussion as to the effect of Justin Martyr's evidence on this subject. The discussion has been of this nature. Were these *Memoirs of the Apostles* our Gospels, or were they some other books of information as to Christ's sayings and doings to which he had access? Many German critics have been confident they were not our Gospels; and Bishop Marsh has gone the length of saying, that Justin did not quote our Gospels. The question, therefore, as to whether Justin Martyr quotes our Gospels, may be said to be the turning-point in the evidence for their genuineness. Although not altogether free from difficulty, it appears to us that no reasonable doubt can be entertained that the *Memoirs of the Apostles* to which Justin constantly refers were no other than our Gospels. This appears conclusively established by the three following considerations: (1) The degree of coincidence which exists between the numerous passages which Justin quotes from his *Memoirs*, and the corresponding passages in the Gospels.—The *verbal* coincidence with the text of the Gospels is sometimes exact, and sometimes so nearly so as to appear exact in a translation. The want of entire verbal coincidence is just what might be expected in a writer like Justin, who quotes the Old Testament in the same general manner, and is the very same as we find in other writers both before and after him. Further, the account which he gives of the origin of the *Memoirs* corresponds with the origin of the Gospels —viz., that two were written by apostles, and two by companions of the apostles. (2) The extreme improbability that there could have been other books besides the Gospels of the same apparently authoritative character, all trace of which have disappeared, and of which, in fact, we find no indication save in Justin Martyr.—Everything seems against such a supposition. The books of which Justin speaks were read in the assemblies of the Christians on Sundays; they were regarded with respect and veneration; they were evidently looked upon as authoritative. It is wholly inconceivable, that if there were such books other than the Gospels, they should not have been mentioned by other writers as well as Justin; or that they should have utterly perished. (3) The certainty, from the statements of such writers as Irenæus in the generation immediately following him, that Justin must have known our Gospels.—In this later generation we find the Gospels everywhere diffused: received and reverenced alike at Alexandria, Lyons, and Carthage; by Clemens Alexandrinus, Irenæus, and Tertullian. They could not all at once have attained this wide diffusion, or started into this position of authority. The manner in which Irenæus speaks of them can only be accounted for by the fact, that he had received them from his teachers; that they had been handed down to him as inspired authorities from the first ages. We must take the light of such a statement with us in ascending to the age of Justin Martyr; and in this light it is unintelligible that the Gospels should not have been known to Justin, and consulted by him. The mere fact of his calling his authorities by the peculiar name of *Memoirs* cannot be set against all this evidence. The name of *Memoirs*, indeed, rather than Gospels, was only a natural one for this writer to use, with his classical predilections and philosophical training, and considering that he was addressing a heathen emperor, and through him the Gentile world at large.

When we ascend beyond the age of Justin to Ignatius and Papias, we find in a fragment of the latter, as has been already stated, mention of Matthew and Mark having written accounts of the life of the Lord; while in the letters of the former, as in the still earlier Epistle of Clemens Romanus and the so-called Epistle of Barnabas—both of which belong to the 1st c., and consequently reach the apostolic age itself—we find various quotations that seem to be made from the Gospels. The quotations from St Matthew are the most numerous. If these quotations stood by themselves, it might be doubtful how far they constituted evidence of the existence of the Gospels at this early period. They might possibly indicate merely a uniformity of oral tradition as to the sayings of our Lord; but when we regard them in connection with the position of the writers, and the whole train of thought and association in which they occur, they seem to bear out the widest conclusion we could wish to found on them. The existence and character of such men as Ignatius and Clemens are unintelligible save in the light of the Gospel history.

In addition to this chain of direct Catholic evidence for the genuineness of the Gospels, the fragments which have been preserved of heretical writers furnish important, and in some respects singularly conclusive evidence. The Gnostic Basilides quotes the Gospels of St John and St Luke about the year 120. The heretics appealed to them as well as the Catholic writers, and in this fact there is a strong guarantee that no fictions or inventions could have been palmed off upon the church in the 2d c., as the most renowned German theory as to the origin of the Gospels virtually supposes. Upon a review of all the evidence from the apostolic Fathers down to the council of Laodicea, when the four Gospels are reckoned as part of the canon of Scripture, 'there can hardly be room for any candid person to doubt,' it has been said, 'that from the beginning the four Gospels were recognised as genuine and inspired—that a line of distinction was drawn between them and the so-called apocryphal Gospels.' As a mere question of literary history, the genuineness of the Gospels certainly rests on far higher evidence than that on which we receive, without hesitation, many ancient writings.

2. *Internal Character and Contrast.*—After the genuineness of the Gospels, the next point of importance regarding them is the relation which they bear to one another in respect of their contents and arrangement—the coincidences and discrepancies with one another which they present. The most obvious distinction among the Gospels as a whole is between the Gospel of St John and the three Synoptical Gospels, as they are called. Matthew, Mark, and Luke, in narrating the ministry, discourses, and miracles of our Lord, confine themselves exclusively to what took place in Galilee until the last journey to Jerusalem. We should not know from them of the successive journeys that our Lord made to Jerusalem. John, on the contrary, brings into view prominently his relation to Judea; and of the discourses delivered in Galilee, he only records one, that, namely, in the 6th chapter. It is obvious, on a superficial glance, that John had a special object in writing his Gospel, an object in some respects more *dogmatical* than historical; and it is probable that, having seen the preceding Gospels, he purposely abstained from writing what they had already recorded, and sought to supply such deficiencies as appeared to exist in their records. When we have no knowledge of the subject, this at least seems as probable a supposition as any other. A comparison of the three Synoptical Gospels reveals some interesting results. If we suppose them respectively divided into 100 sections, we shall find that they coincide in about 53 of them; that Matthew and Luke further coincide in 21; Matthew and Mark in 20; and Mark and Luke in 6. This, of course, applies to the substantial coincidence of fact and narrative in each case. The relative verbal coincidence is by no means so marked; it is, however, very considerable, and presents some interesting features, which Professor Andrew Norton has set forth clearly in his admirable work on the *Genuineness of the Gospels*.

It is not desirable to go into further details in this place; but the result of the extremely critical and minute scrutiny to which the text of the Gospels has been subjected may be stated as follows. There is a singular coincidence in substance in the three Synoptic Gospels. 'Substantial unity with circumstantial variety,' is a saying strictly true of them—more true of them than of any authors professing to narrate the same circumstances. The coincidence is greatly more apparent in the discourses than in the narrative parts of the Gospels, most of all apparent in the spoken words of our Lord. At the same time, there are certain portions of narrative of great importance, that shew in the several evangelists almost a verbal coincidence, as in the call of the first four disciples and the accounts of the Transfiguration. 'The agreement in the narrative portions of the Gospels begins with the baptism of John, and reaches its highest point in the account of the passion of our Lord, and the facts that preceded it; so that a direct ratio might be laid between the amount of agreement and the nearness of the facts related to the Passion. After this event, in the account of his burial and resurrection, the coincidences are few.' There are no parts that furnish more difficulty, in the way of formal harmony, than the narratives of the Resurrection.

The language of all the Gospels is well known to be Greek with Hebrew idioms, or what has been called Hellenistic Greek. The tradition, however, of a Hebrew original of St Matthew's gospel is uniform. In the fragment of Papias, and in the statement of Irenæus—the earliest sources in which we have any distinct mention of the Gospels—it is plainly asserted that Matthew wrote his Gospel in the Hebrew dialect. The fact is made a mark of distinction between his Gospel and the others. The same uniformity of tradition ascribes the Gospel of St Mark to the teaching of St Peter. The Gospel of St Mark is the most summary of the three, yet, in some respects, it is stamped with a special individuality and originality. It describes scenes and acts of our Lord and others with a minutely graphic detail, throwing in particulars omitted by others, and revealing throughout the observant eye-witness and independent historian.

3. *Origin of the Gospels.*—This is a separate inquiry from their genuineness, although intimately connected with it, and springs immediately out of those facts as to the internal agreement and disagreement of the Gospels of which we have been speaking. The inquiry has been treated in an extremely technical manner by many critics, and it would not suit our purpose to enumerate and examine the various theories which have been propounded on the subject. We may only state generally, that the object of these theories has been to find a common original for the Gospels. Some profess to find such an original in one of the three Gospels, from which the others have been more or less copied, and each of them in turn has been taken as the basis of the other two. The more elaborate theories of Eichhorn and Bishop Marsh, however, presume an original document, differing from any of the existing Gospels, and which is supposed to pass through various modifications, into the threefold form which it now bears in them. It appeared to Eichhorn that the portions which are common to all the three Gospels were contained in a certain common document from which they all drew. It had been already assumed that copies of such a document had got into circulation, and had been altered and annotated by different hands. But Eichhorn works out an elaborate hypothesis on such a presumption. He requires for his purpose no fewer than five supposititious documents. The conditions of the problem cannot be met otherwise. These are in order: 1. An original document; 2. An altered copy which St Matthew used; 3. An altered copy which St Luke used; 4. A third copy made from the two preceding, used by St Mark; 5. A fourth altered copy used by St Matthew and St Luke in common. Bishop Marsh, in following out the same process of construction, finds it necessary to increase the supposititious documents to eight, which we need not describe. There is not the slightest external evidence of the existence of such documents; and theories of this kind, which, in order to explain difficulties, call into existence at every stage an imaginary solution, do not require serious refutation.

Another and more probable supposition is, that the Gospels sprang out of a common oral tradition. The preaching of the apostles was necessarily, to a great extent, a preaching of facts; and so zealously did they give themselves to the task of promulgating the wondrous life and death of Christ, that they early divested themselves of the labour of ministering to any of the lower wants of the congregations of disciples that they gradually gathered round them. It is obvious that, in the course of their active 'ministry of the word,' the facts of our Lord's life and death, of which they had been eye-witnesses, would gradually assume a regular outline. What the reading of the Gospels is to us, the preaching of the apostles would be very much to the early Christians. The sermon of

Peter at Cæsarea (Acts x. 34) may give some imperfect idea of the character of this preaching. The facts thus briefly indicated would expand in frequent communication to something of the more detached and living form which they exhibit in the Gospels, or rather in what we may suppose to have been the common substratum or groundwork of the Gospels. It is to be remembered that the apostles were promised that the Holy Spirit would 'bring all things to their remembrance, whatsoever the Lord had said unto them.' And this constant guidance and superintendence of the Divine Spirit would sufficiently account for the uniformity and consistency of their oral instruction, even although not reduced to writing for a considerable number of years. Allowing for the widest space of years it may be necessary to assume before the writing of the first Gospel, the chief apostles themselves are yet living at the end of this space. It is not a mere tradition of their teaching that survives, but it is their own living witness that is circulated from church to church, as they pass to and fro in their evangelistic labours.

It is impossible to say whether this hypothesis of the origin of the Gospels be really the correct one or not; all we need to say is, that it seems to possess more probability in itself than any hypothesis of a common written source, from which they were respectively borrowed, and which has disappeared. It fits, moreover, into the facts of the case.—Westcott, *Introduction to the Study of the Gospels*, p. 189.

According to this view of the origin of the Gospels, that of St Mark, if not the oldest in composition, is yet probably the most direct and primitive in form. In its lifelike simplicity and comparative unconsciousness of aim, it represents most immediately the apostolic preaching; it is the testimony delivered by St Peter, possibly with little adaptation. Historical evidence, as we have already said, is uniform as to the association of Mark and Peter: Mark is everywhere *interpres Petri*. The Gospels of St Matthew and St Luke, again, 'represent the two great types of recension to which it may be supposed that the simple narrative was subjected. St Luke represents the Hellenic, and St Matthew the later Hebraic form of the tradition, and in its present shape the latter seems to give the last authentic record of the primitive Gospel.'

A common oral Gospel seems also to present the most natural explanation of the accordances and variations of the three Synoptic Gospels. The words of the Lord, which present in all such a marked uniformity, would necessarily assume a more fixed character in such an oral tradition, while the narrative surrounding them would remain comparatively free. Single phrases of a peculiar and important character would be closely retained; there would be, exactly as we find, a uniform strain of hallowed language mingling with variations in detail—a unity of tone, and even of speech, with variety of modulation and emphasis.

This theory of a common oral origin of the Gospels is of course widely separated from the well-known Tübingen theory, which carries the period of tradition down to the middle of the 2d c., and supposes the Gospels to have been then called forth by the influence of opposing teachers. The facts of the case, as well as the evidence for their genuineness, which we have already quoted, are wholly opposed to such a supposition, for in this case the representation of the Gospels would be wholly ideal. There might be a ground of fact in the mere existence of Jesus of Nazareth, but the picture of His life and death would be merely the imaginative dream of men intoxicated by religious enthusiasm. And this is the Tübingen explanation of the rise of Christianity! It may be surely said that there never was a more inadequate explanation of a wonderful historical phenomenon; for how was the Jewish mind, in its feebleness and decay, capable of conceiving such an ideal as the life and character of Christ? Their inspired origin in the 1st c., and as the records of a life and death witnessed by the apostles, is —whatever difficulties it may present—the conclusion alike sanctioned by orthodoxy, and approved by impartial historical inquiry.—The reader who desires further information on the subject may consult Professor Norton's work on the *Genuineness of the Gospels*, and Westcott's *Introduction to the Study of the Gospels*.

GO'SPORT ('God's port'), a market-town and seaport of England, in the county of Hants, stands on the western shore of Portsmouth Harbour, and directly opposite Portsmouth, with which it is connected by a floating bridge. It is 14 miles south-east of Southampton, and 89 miles south-west of London by the London and South-Western Railway. It is enclosed within ramparts, which seem a portion of those which also surround Portsmouth and Portsea. The Haslar Gun-boat Ship-yard, connected with the town, is used for hauling up and keeping in repair all the gun-boats belonging to this port. An extensive iron foundry for the manufacture of anchors and chain-cables, and considerable coasting-trade are here carried on. The main feature of G., however, is the *Royal Clarence Victualling Yard*, which contains a brewery, a biscuit-baking establishment worked entirely by steam, and numerous storehouses. The bakery can turn out ten tons of biscuit in one hour. In the immediate vicinity is Haslar Hospital, erected in 1762, the chief establishment in Great Britain for invalid sailors, of whom 2000 can be accommodated and supplied with medical attendance. Pop. (1871) 7366.

GO'SSAMER, a light filamentous substance, which often fills the atmosphere to a remarkable degree during fine weather in the latter part of autumn, or is spread over the whole face of the ground, stretching from leaf to leaf, and from plant to plant, loaded with entangled dew-drops, which glisten and sparkle in the sunshine. Various opinions were formerly entertained concerning the nature and origin of gossamer, but it is now sufficiently ascertained to be produced by small spiders, not, however, by any single species, but by several, not improbably many species; whilst it is also said to be produced by young, and not by mature spiders, a circumstance which, if placed beyond doubt, would help to account for its appearance at a particular season of the year. The production of gossamer by spiders was first demonstrated by the observations of Dr Hulse and Dr Lister in the 17th c., but these observations did not for a long time meet with due regard and credit, particularly amongst the naturalists of continental Europe. It is not yet well known if the gossamer spread over the surface of the earth is produced by the same species of spider which produce that seen floating in the air, or falling as if from the clouds. Why gossamer threads or webs are produced by the spiders at all, is also a question not very easily answered. That they are meant merely for entangling insect prey, does not seem probable; the extreme eagerness which some of the small spiders known to produce them shew for water to drink, has led to the supposition, that the dew-drops which collect on them may be one of the objects of the formation of those on the surface of the ground, whilst it has been also supposed that they may afford a more rapid and convenient mode of transit from place to place than the employment of the legs of the animal. As to the gossamers in the air, conjecture is still more at a loss. They are certainly not accidentally wafted up from the ground, as might be supposed; the spiders which produce them are wafted up along with them; but whether for the mere enjoyment of an aërial excursion, or in order to find insect prey in the air, is not clear, although the latter supposition is, on the whole, the most probable. The threads of gossamer are so delicate that a single one cannot be seen unless the sun shines on it; but being driven about by the wind, they often become beaten together into thicker threads and flakes. They are often to be felt on the face when they are scarcely visible. The spiders which produce these threads shoot them out from their spinnerets, a viscid fluid being ejected with great force, which presently becomes a thread; sometimes several such threads are produced at once in a radiating form, and these being caught by the ascending current of heated air, are borne up, and the spider along with them. It would seem that the spider has even some power of guiding in the air the web by which it is wafted up.

GOSSYPIUM. See COTTON.

GOTHA, a town of Germany, capital of the duchy of Saxe-Coburg-Gotha, is situated on an elevation in a beautiful district on the right bank of the Leine, 18 miles west of Erfurt, by the Thuringian Railway. It is a handsome, well-built town, is quadrilateral in form, and was formerly surrounded by walls, which, however, have been thrown down, and public walks laid out in their place. The principal public building is the large ducal palace of Friedenstein, with two large side-wings, and two towers of 144 feet in height. This palace contains a picture-gallery, in which Cranach, V. Eyck, Holbein, Rubens, and Rembrandt are represented; a cabinet of engravings (a very valuable collection); a library (founded by Ernst the Pious in 1640) of 150,000 volumes and 6000 manuscripts, among which are 2000 Arabic, and from 300 to 400 Persian and Turkish; a collection of about 80,000 coins and 13,000 medals, one of the finest collections in Europe; and a Japanese and Chinese museum. G. has also an arsenal, a new and old town-hall, and numerous educational and benevolent institutions. The principal manufactures are muslins, cottons, porcelain, coloured paper, cloth, linen, tobacco, musical and surgical instruments, &c. Gotha sausages have a widespread celebrity. Several hundreds of designers, engravers, printers, and colourers of maps are employed here in Justus Perthes's large geographical establishment. Pop. (1871) 20,591.

GOTHA, ALMANACH DE, a universal political register, is published annually at Gotha (q. v.). The publication of this almanac commenced in 1764, in the German language, in which it was continued until Napoleon I. became emperor, when it was changed to the French language; it has recently been published in both tongues. The almanac is a small pocket volume, containing at present nearly one thousand pages of small type, and recording the sovereigns and royal families of every civilised country, with the civil, diplomatic, military, and naval officers, a great amount of statistical information, a compact summary of historical events, obituary notices of the most distinguished persons, and other matters of political interest. No book ever printed contains so much political and statistical information in so small a compass. The boundaries of states are given according to the latest treaties, with their extent, population, and revenues. The *annuaire diplomatique* contains the name of every diplomatic representative and *attaché* of Europe and America. The pay of officers of governments, national expenditures and debts, with the interest, the number of representatives, under representative governments, and their proportion to the population, are carefully given. As a work of such an extent cannot be brought down to the end of the year, the date of publication is stated, and in some instances a date has been given to each page, as completed, to shew that the editor is not answerable for subsequent changes. When the *Almanach de G.* was commenced, there was but one republic in existence—that of Switzerland. It was then little more than a register of the crowned heads and royal families of Europe. It has been slow to recognise political changes, and for years after the French Revolution, continued to print under the head of 'France,' Louis XVII. as the reigning monarch. It was not until Napoleon became emperor that his name found a place in its pages, and then his whole family was given, as with the other royal houses. It was at this period that it began to be printed in French, which, being the recognised language of courts, is found the most convenient, and has been ever since retained. During the Empire, Napoleon I. considered this little publication so important, that he exercised over it a rigid supervision, and in 1808, an entire edition, which had just been worked off, was seized by a body of French gendarmes. The editor hurried to Paris, and found that his error was in his alphabetical arrangement, by which Anhalt, of the Ernestinian line of Saxon princes, took precedence of Napoleon, who claimed the right to be placed at the head of the nobility of the Rhine. To secure this re-arrangement of the alphabet, the edition of that year was printed at Paris. It is probable that a similar supervision of the press kept out of the historic pages the successes of the allies against the Empire in the succeeding numbers, in which there was no mention of the campaigns of the Peninsula and the victory of Trafalgar. On the restoration of the Bourbons, however, these events were recorded in a *resumé*, which made up for the previous omissions.

GOTHA, DUCHY OF. See SAXE-COBURG-GOTHA.

GOTHARD, ST, a mountain group in the Helvetian Alps, reaches in its highest peaks the height of 12,000 feet. See ALPS. St G., however, is chiefly famous for the pass over the Alps, which at its summit rises to the height of 6800 feet. By means of this pass, the high-road from Fluelen, on Lake Lucerne, is carried without interruption in a south-south-east direction to Lago Maggiore, in the north of Italy. The construction of the road was commenced in 1820, and opened in 1832. In 1834, nearly one-third of the road, with numerous bridges and terraces, was swept away by the violence of a most terrific storm which burst on the summit of the pass; and in 1839 a similar occurrence took place. Since that time, however, the road has been in a good state of repair. It is one of the best and most convenient of the Alpine carriage-ways, is free from snow for four or five months of the year, beginning with June, and is equal, if not superior, to any other in the interest and grandeur of its scenery.

GOTHIC ARCHITECTURE. Under this title are comprised the various styles of architecture which prevailed in Western Europe from the middle of the 12th c. to the revival of classic architecture in the 16th century. The term *Gothic* was at first bestowed by the Renaissance architects on the medieval styles as a term of reproach. This epithet they applied to every kind of medieval art which had existed from the decline of the classic styles till their revival, all else being by them considered as *barbarous* and *Gothic*. The name has now, however, become generally adopted, and has outlived the reproach at first implied in it. It has also become limited and defined in its application. During the present century, the arts of the middle ages have been attentively studied, and their origin and history carefully traced; and as the knowledge of these styles has increased, a feeling of admiration has succeeded to that of contempt, and Gothic now ranks as one of the noblest and completest styles of architecture ever invented.

Origin.—The origin of Gothic architecture has given rise to many very ingenious speculations. It has been said that the style was copied directly from nature; that the pointed arches and groins of the vaults were imitated from the overarching branches of trees; and that the stems of an avenue were the originals of the pillars of the Gothic aisles. Others have strenuously maintained that the invention of the pointed arch was a mere accident, arising from this form having been observed in the interlacing of the circular arches of a Norman arcade. It has also been stated that the style was imported from the East during the Crusades, and that the medieval architects had but little to do with its origin.

More careful study of the Gothic buildings which remain to us, has dispelled these fanciful ideas, and settled the origin and progress of the art on historical as well as internal evidence.

To trace Gothic up to its primary elements, we should have to go far back in the world's history. Some maintain that there are only two styles of architecture of which we have any knowledge—viz., Greek architecture and Gothic architecture; that these are the two typical styles, and that in them are contained all the elements of which all other styles are composed.

This is no doubt to some extent true, just as it is also true that all things in nature are derived from a few primary elements. But as there are many varieties in nature, so there are many developments of the two typical forms of architecture, all of which deserve to be classed as styles.

Greek architecture is the type of the trabeated style—i. e., the style whose principal feature is the straight lintel; Gothic is the type of arcuated architecture, in which the voids are spanned by arches. Of these typical forms there are many varieties. Roman Architecture (q. v.) is the transition form between them. The Romans adopted the Greek form of decoration and the Gothic form of construction; they decorated their exteriors with columns crowned by straight architraves and cornices, and inside these they formed the real construction with arches and vaults. The use of the latter gradually extended, especially in the construction of interiors, and by means of vaults the Romans were able to roof in large areas without encumbering the floor with pillars. This was found to be a very advantageous system of construction, and was carried out in many important examples, as, for instance, in the baths of Caracalla and Diocletian (see BATHS), the Basilica of Constantine, &c. In their works of public utility, where use, not decoration, was the chief object, the Romans always adopted the arch as the fittest mode of construction—as in their aqueducts (q. v.), bridges, &c. The arch thus came gradually more and more into use; and about the time when the barbarians first overran the provinces, the arcuated form of construction was universal, and some attempts had been made to conform the Greek decoration to the circular arches by bending the entablature round the curve—as in the palace of Diocletian at Spalato, in Dalmatia.

To the Romans, therefore, is due the introduction of an arcuated construction with a well developed internal, and a partially developed external decoration. The early Christians adopted their forms of construction and decoration from the Romans. They were also indebted to them for the plans of the buildings, which became the types of the Christian sacred edifices during the middle ages. The Basilica (q. v.), or Roman court-house and market-place, was found to be admirably adapted for early Christian worship, and the circular temples were the prototypes of the Christian Baptisteries (q. v.) which usually accompanied the basilicas. In erecting their buildings, the Christians not only adopted the plans and mode of construction, but used the actual materials of the buildings of the Romans, many of which had been destroyed by the barbarians. Where such materials were abundant—as in Rome and Central Italy—the early Christian architecture very closely resembled that of the Roman buildings which had preceded it. But in more remote districts the builders, finding no ready-made materials at hand, had to design and prepare new ones. In doing so they followed as closely as they could the Roman originals, but their buildings partook more of the constructional than the decorative elements of Roman architecture. The Roman ornament thus dropped out of use; and when, in process of time, decoration was desired, each new people followed its own ideas. The traditional Roman decoration thus became to a great extent lost, and new styles introduced. These new styles each retained some of the original Roman forms and modes of construction; and each style depended for its peculiar character on the particular Roman forms it retained and developed. Thus Constantine, and the architects of the East, seized upon the *dome* as the distinguishing feature of their style, and the architects of Lombardy adopted the plain tunnel-vault. The former style is called Byzantine (q. v.), and has been the type of all Eastern medieval architecture; and the latter Romanesque (q. v.), and has been the origin of all the western architecture of medieval Europe.

History.—From Lombardy—in those ages part of the German empire—the Romanesque style readily passed into Germany and Switzerland, and was also most naturally adopted in the south of France, where examples of Roman architecture abounded. This architecture was carried out with various modifications in these different countries, all of which may have contributed to the general progress of the art; but as might be expected, it is to the banks of the Rhine where the successors of Charlemagne chiefly dwelt, that we must look for the first step in the development of Gothic architecture. The following short sketch of the development of vaulting will shew how this occurred.

The Roman basilicas, and, like them, the early Christian churches (fig. 1), were divided into a central nave with two side-aisles, the former separated from the latter by a row of columns on each side. These columns carried arches on which rested the side walls of the nave, which were carried sufficiently high to clear the roofs of the side-aisles, and admit windows to light the central nave. This row of windows afterwards became the Gothic Clerestory (q. v.). The apse at the end of the nave was semicircular on plan, and was usually roofed with a vault in the form of a semi-dome. This feature was also afterwards more fully developed in the chapels of Gothic churches. The nave and side-aisles were originally roofed with wood, but, owing to their frequent destruction by fire, it became necessary to cover the churches with a more enduring kind of construction. Vaulting was then introduced, the Roman forms, of which many examples existed, being at first closely followed. To trace the progress of vaulting from the simple tunnel-vault of the Romans to the fully developed and magnificent groins of Gothic cathedrals, is a most interesting inquiry; and, indeed, includes the history of the development of Gothic architecture. There is one consideration which will help to explain how the Roman arches were abandoned and new forms sought out. To the Roman emperors who built the splendid vaults of the baths, and who had a subdued world at command, *materials* and *labour* were a small consideration. They could, therefore, afford to build in a style which required perfect materials and workmanship. But medieval princes and bishops could obtain neither, except with great cost and trouble; to economise these, therefore, great skill and attention were required. It was necessary to study to avoid those large and expensive materials of which the Romans were so lavish, and to adopt the simplest and easiest forms of construction.

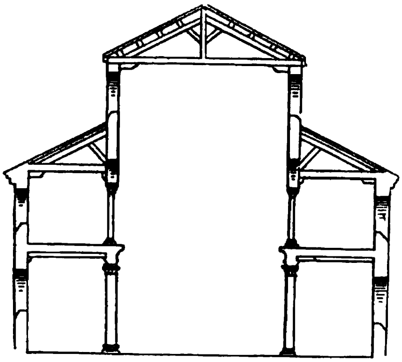


Fig. 1.

The first vaults tried were simple semicircular tunnel-vaults. It was found that these, besides being very gloomy, required very massive walls to resist their thrust. An attempt was then made to relieve this thrust by *transverse arches* (*a*, *a*, fig. 2) thrown across—at intervals—under the tunnel-vault, to act as strengthening arches. Buttresses with a slight projection were applied outside to support these, and a beam of wood was sometimes introduced at the wall-head from buttress to buttress to assist in opposing the thrust of the vault.

This was the first attempt to throw the weight of the vault on single points. In the side-aisles, where the span was small, the Roman intersecting vaults (*b*, *b*, fig. 2) were used; and as the roofs with tunnel-vaulting were found very gloomy and ill-lighted, it was desirable that similar intersecting vaults should be used to cover the main roof, in order to admit windows raised to light the vaulting. But how was this to be managed with the small materials at command? If the transverse arches AB, CD (fig. 3) are semicircular, and the side-arches AC, BD the same—the vault being formed by two intersecting cylinders—then the intersecting groins AD and CB must be elliptical. This was a difficult form of construction: the medieval builders found it easier to construct semicircular groin arches with radius EA (fig. 4), and to fill in the triangular spaces ABE, &c., with slightly domed vaults. Here, then, we have the origin of the groin-rib, the development of which played so important a part in Gothic vaulting. When the space to be covered was square, this form of vault was found to answer, and usually included two bays of the side-aisles. But this arrangement looked awkward externally, the windows of the clerestory not grouping well with those of the side-aisles. A transverse arch (*a*, *a*, fig. 4) was then introduced, carrying up the design from the nave piers to the vaulting. This form of vault is called hexapartite. All the above forms of vaulting were fully developed in the round arched styles of the Rhine.

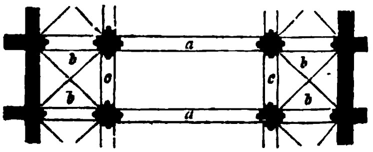


Fig. 2.

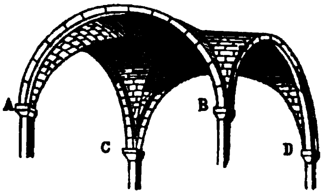


Fig. 3.

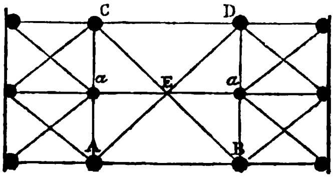


Fig. 4.

In France, these forms were also tried; but it was found that the semicircle is not a good form of arch unless loaded on the haunches, many of the churches which were vaulted in this manner during the 11th c. having to be buttressed or rebuilt in the 12th and 13th centuries. In the south of France (where the Byzantine influence had been strongly

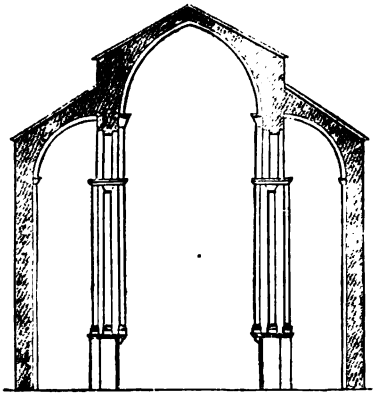


Fig. 5.

felt, through the Mediterranean commerce), the pointed tunnel-vault (fig. 5) had been long in use, and had superseded the semicircular tunnel-vault probably as early as the 9th or 10th century. This form of arch was thus probably suggested to the architects of the north of France, who at once saw how well it would overcome the difficulty of the yielding of the haunches in the semicircular arch. They were thus led to the adoption of the pointed form for their transverse arches *as a structural expedient*, and still retained the semicircular form in the groins. The next question which engaged attention, and the solution of which led to the further use of the pointed arch, was the vaulting of oblong spaces. This had been tried with semicircular arches, but it was found that in this way the vault would require to be very much domed—the diameter of the arches (*c*, *c*, fig. 2) being so much smaller than that of *a a*—whereas by using pointed arches, of different radii, for the transverse and side arches all might be kept to about the same height (figs. 6 and 7). This is more fully explained by fig. 6. If AB be the diameter of the transverse arch (*aa*), and AC that of the side arches (*cc*), it is clear that the semicircular side arch ADC cannot reach the height of the transverse arch AEB, even when stilted as at D′. But in the pointed arch, CEB, the same diameter rises to very nearly the height of the transverse arch. The pointed arches ACB and A′CB′ (fig. 7) shew how easily arches of this form, whatever their diameter, can be built of the same height. By the introduction of this new form of arch the vaulting was strengthened, and the thrust brought to bear steadily on single points. We have thus traced the history of vaulting from the time of the Romans to the 12th c., when the principles of Gothic pointed vaulting were fully developed; and we have dwelt particularly on this subject, because it includes the principles which regulated the whole of the Gothic style. Gothic was not the invention of an individual, but a necessary growth—a gradual development from structural requirement. This is clearly the case with regard to the vaulting, as we have traced it above, and the same might be proved regarding every member of the style. Thus it might be shewn how the ribs became gradually more decided, expressing the part they bore in the support of the roof; how the Nave Piers (q. v.) were gradually subdivided into parts, each shaft bearing on a separate cap a separate portion of the vaulting; how the buttresses were developed as they were required to resist the thrust of the groins concentrated on points; and how the flying buttresses were forced upon the Gothic architects much against their will, as a mode of supporting the arches of the roof.

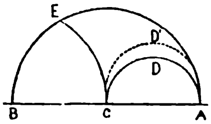


Fig. 6.

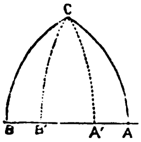


Fig. 7.

The history of the latter is very curious. The thrust of the tunnel-vault was sometimes resisted by half tunnel-vaults over the side-aisles (see fig. 5). These, therefore, required to be high, and a gallery was usually introduced. In the Narthex at Vezelay (fig. 8) we have this gallery with the vaulting used as a counterpoise to that of the nave. This is a fine example of vaulting in the transition state, the vaulting of the gallery resists the main vault, as in fig. 5, and is at the same time groined. This leaves rather a weak point opposite the transverse arches, and to strengthen these, flying buttresses are introduced, which timidly shew themselves above the roof. The galleries were, in later examples, dispensed with to admit of larger clerestory windows, and the flying-buttresses were left standing free. The architects finding them indispensable, then turned their attention to render them ornamental. *Pinnacles* may also be shewn to owe their origin to their use: they acted as weights to steady the buttresses and piers. We shall, under their separate heads, point out how each element of Gothic architecture was in the strictest sense constructional, the decoration being in harmony with its actual use, or as Pugin has said, 'decorated construction not constructed decoration.'

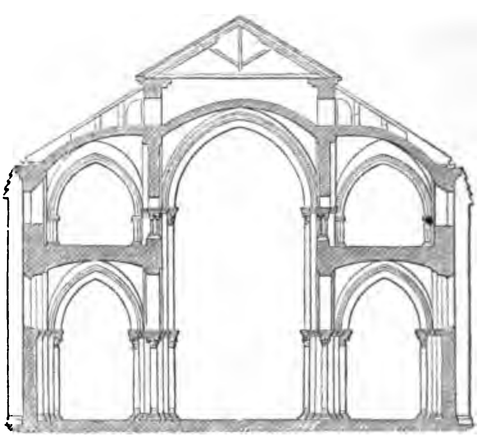


Fig. 8.

The full development of Gothic vaulting, which was the forerunner of the whole style, was first carried out in the royal domain in France about the middle of the 12th century. The Normans had settled in the north of France more than a century before this, and had applied their talents and the fruit of their conquests to the building of splendid temples in honour of their victories. In doing so, they followed out the round-arched style, and brought it forward by a great stride towards true Gothic. See Norman Architecture.

South of the royal domain, in Burgundy, there had existed for centuries great establishments of monks, famous for their architecture. The Abbey of Cluny was their central seat, whence they sent out colonies, and built abbeys after the model of the parent one. The style in which they worked was also an advanced Romanesque, but different from that of the Normans.

Between these two provinces lay the royal domain. Owing to the weak state of the kingdom, architecture had hitherto made little progress in the Isle of France. About the beginning of the 12th c. the monarchy revived, and for the next two centuries was governed by wise and powerful monarchs, who succeeded in re-establishing the royal supremacy. A new impulse was thus given to the literature and arts of the country, by which architecture profited largely. From the state of ruin into which the kingdom had fallen, there were almost no churches existing worthy of the new state of things. New and great designs were formed: hitherto, almost all the important churches of France were abbey churches; now, under the royal patronage, cathedrals were to be built. The bishops, envious of the power of the monks, lent their powerful aid, and the whole of the laity joined heartily in the work. With such a universal impulse, no wonder that architecture took a great stride, and new forms were introduced. It is to this period and people that we owe the development of the true or pointed Gothic style.

We have already seen at Vezelay how nearly the Burgundian monks had approached to Gothic. To complete the development, it only required the side-walls and vaulting of the nave to be raised, so as to admit of windows over the roofs of the side-galleries; and the flying buttresses to be raised with them, so as to receive the thrust of the vault—the latter being constructed with pointed groin ribs, and the side and transverse arches carried to the height of the groins. The laic architects of the royal domain soon accomplished this step, and the new style sprung up and progressed with the most astonishing rapidity.

The earliest example we have of the fully developed Gothic style is the Cathedral of St Denis, in which are deposited the remains of the kings of France. It was founded by the Abbé Suger in 1144. The Cathedral of Notre Dame of Paris soon followed, and almost contemporary with it arose the magnificent cathedrals of Chartres, Rheims, Amiens, Beauvais, Bourges, and a host of others.

Another cause which tended much to hasten the progress of the style, was the invention about the same time of painted glass. The Romanesque architects had been in the habit of decorating their churches with frescoes and other paintings; but this new mode of introducing the most brilliant colours into their designs was at once seized upon by the northern architects. The small circular-arched windows, which were still in many instances retained long after the pointed-arch had become usual in the vaulting, no longer sufficed to light the churches when filled with stained glass. They were therefore enlarged, two or even three were thrown into one, divided only by mullions; this compound window was again increased until the compartment of the clerestory became almost wholly absorbed. The architects were then forced to conform the arches of their windows to the pointed outline of the side-arches of the vaulting. This desire for more and more space for stained glass was the origin of the window-tracery, which forms so beautiful a feature of the style. It is the last attenuated remains of the wall space of the clerestory, which was at last entirely absorbed.

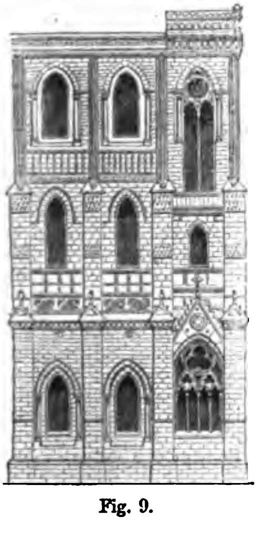


Fig. 9.

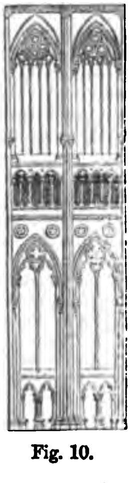


Fig. 10.

Fig. 9, from Notre Dame, is a good illustration of the progress of French Gothic. The left-hand portion of the elevation shews the mode of fenestration adopted. The clerestory windows are small; and, in order to give more light, the vault of the gallery next the window is kept very high. This was the original design; but during the construction of the cathedral, the importance of stained glass had become so great, that the design was altered to give larger windows for its display, as shewn on the right-hand portion of the elevation. These windows also shew the simple early forms of tracery; that in the aisle windows being later and more advanced. Fig. 10 shews two bays from Tournay Cathedral, and is a good specimen of the mode in which the whole space of the side-walls was made available for window tracery and stained glass.

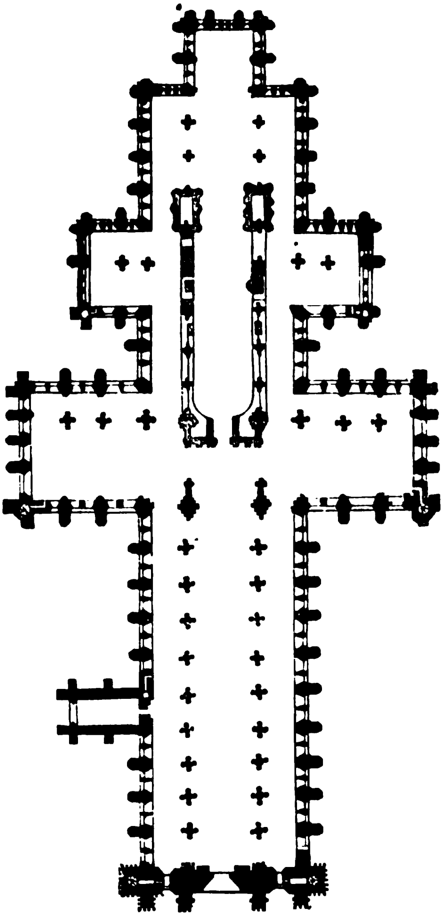


Fig. 11.—Salisbury Cathedral.

The further history of Gothic architecture in France is simply the following out, to their furthest limits, of the principles above indicated, on which the early architects had unconsciously been working when they originated the style. So long as the Gothic architects worked on these principles, they advanced and improved their architecture. When, however, the style had become fully developed and matured (about 1300 A. D.), the spirit of progress died. No new features were developed. The architects seemed to think that in its main elements their style was complete, and contented themselves with continuing the traditional style of their forerunners, pushing to their extremest limits the principles handed down to them. Thus, the height of the cathedrals was extended till, at Beauvais, it exceeded the power of the architects to prop up the vaulting. The system of buttresses and pinnacles was developed with the utmost skill, till at last the original simplicity and repose of the designs were lost, and the exteriors presented an elaborate system of scaffolding and propping-up in stone. The beautiful forms of the early tracery became distorted into all manner of flowing curves, graceful but unmeaning, of the Flamboyant period (q. v.); and, in short, the art became lost in mere cleverness of design and dexterity of execution, and the architect's place was usurped by the freemason.

It is in the cathedrals of the 12th and 13th centuries, above referred to, that we find the noblest development of the Gothic style. Everything tended to make them so. The nation was united in the effort—all the science, all the arts, all the learning of the times were centred in the church. In it, and that almost exclusively, the sculptor, the painter, the historian, the moralist, and the divine, all found scope for the expression of their ideas on the sculptured walls, porches, and niches, or the painted windows of the cathedrals—the churches of the people.

The progress of this style in other countries is no less remarkable. At no time in the world's history did any style of architecture ever spread so wide, or give rise, in so short a time, to so many splendid buildings. No sooner had the style been invented in the central provinces of France, than it immediately spread over the whole of the west of Europe, superseding all other styles, and producing similar splendid buildings wherever it went.

We will note shortly a few of the peculiarities of the style in England, Germany, and Italy. It spread also over the south of France and Spain; but the latter countries have not yet been fully illustrated.

English Gothic.—The Normans introduced their round-arched style at the Conquest in 1066, and there are some fine specimens of this style both in England and Scotland—St Cross, Hampshire; Durham Cathedral; Kelso and Jedburgh Abbeys, &c. But these buildings are not copies of those of Normandy. The English have always, in adopting styles, given them a national impress. As it was with the Norman, so it was to a still greater degree with the pointed Gothic. This was introduced into England about 1174, by William of Sens, who superintended the rebuilding of Canterbury Cathedral. The English architects soon began to follow out a pointed style of their own. They borrowed much from France, and worked it out in their own way, forming what is now called the *Early English* style. The differences between the early Gothic of France and England extend to almost every detail. The mouldings, bases, caps, pinnacles, buttresses, and foliage of the latter are all impressed with the early English feeling. In France, the feeling of the early Gothic is one of unrest—a constant struggle forward. In England, the effort for progress is not so marked—that of carefulness and completeness prevails. In the *plans* of the cathedrals the differences are marked (see figs. 11, 12), as the accompanying plans of the Cathedrals of Salisbury and Amiens shew. The termination of a French cathedral or church is invariably circular ended or apsidal—a form derived from the circular tomb-house or baptistery, which in early Christian times was built separately, and afterwards taken into the cathedral. The English cathedral, on the contrary, is almost always square ended. The French transepts have almost no projection; the English ones have great projections—Salisbury and Canterbury having *two* transepts. The French cathedrals are short and very lofty; the English, long and comparatively low. The French buildings are perhaps the grandest and most aspiring, the English the most finished and picturesque.

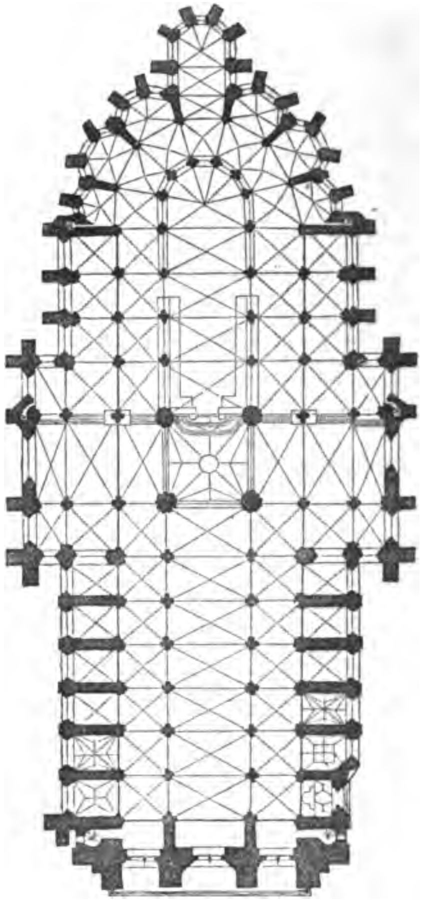


Fig. 12.—Amiens Cathedral.

The exterior of the chevet was a difficulty with the French and Germans, and, as at Beauvais and Cologne, resembles an intricate and confused mass of scaffolding. This difficulty was avoided by the English square ends, which afforded scope for the very English arrangement of the 'Five Sisters' at York, or for a large field of stained glass in a single window.

The western portals of the French cathedrals, such as Rheims and Amiens, are among the boldest and most magnificent features of their architecture. In these the English were not far behind, as the western portals of Peterborough and York shew.

The outlines of the English cathedrals are usually very picturesque and well balanced, the western towers grouping harmoniously with the central, and in this respect the English have the advantage.

In the application of vaulting, the English carried out their own ideas. They were always fond of wooden roofs, and probably this may have led to the invention of the many beautiful kinds of vaults which form so fine a feature of English Gothic (see VAULTING, FAN-TRACERY). In England the style lasted longer than on the continent.

The Germans were nearly a century in adopting the pointed style after its invention in France; and when it was introduced, it retained the appearance of a foreign importation. It never was so completely naturalised as in England. The so-called beauties of the German Gothic are, for the most part, to be regarded rather as excellent specimens of masonry than as artistic developments of the style. The open-work spires, for example, are fine pieces of construction, and have a striking effect; but from the first there is a tendency to commit the work to masons, who rejoice in displaying their manual dexterity. The later Gothic in Germany is the most splendid development of the stone-cutter's art and the draughtsman's ingenuity, these run riot, while the artist is entirely awanting. The distortions of fig. 13 may serve as an example.

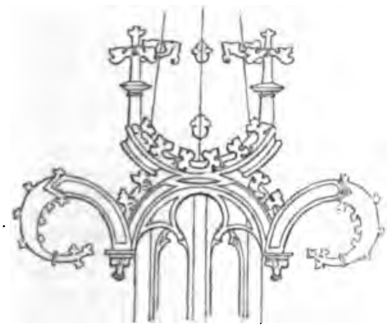


Fig. 13.

The Gothic style forced its way also into classic Italy, but there it was never understood nor practised in its true spirit. It was evidently an imitation from the beginning. The Italian architects tried to vie with those of the north in the size of their buildings, some of which, as San Petronio at Bologna, and Milan Cathedral, are enormous. The former illustrates the defects of Italian Gothic. The arches are very wide, and there are few piers. There is therefore a bare and naked effect, which is not compensated for by any richness of sculpture or colour. There is a want of *scale* about Italian Gothic buildings, as there is about those of Italian classic architecture, both ancient and modern. Size alone is depended on for producing grandeur of effect. There is no attempt made to mark the size, and give a scale by which to judge of the dimensions of the buildings in those styles. A large classic temple is simply a small one magnified. In true Gothic architecture the case is different. Not only are the general dimensions magnified in a large edifice, but also the parts are multiplied. The columns and shafts remain of the same size, but their number is increased. The arches are enlarged in proportion to the general dimensions, but the caps, bases, and mouldings remain of the same size as in a smaller building, and thus indicate the greater size of the arch. A true Gothic building of large dimensions thus tells its own greatness, but in a classic or Italian Gothic edifice the size has to be found out. Stained glass was little used in Italy. It may have been intended to decorate the walls with frescoes—as indeed is the case in a few examples. The Church of St Francis, at Assisi, is the most remarkable building of this kind, and is a most interesting example of fresco-decoration.

The towns of Italy, being early enfranchised, have many municipal buildings in the Gothic style. These will be treated along with those of Belgium hereafter. See MUNICIPAL ARCHITECTURE.

We might, in the same manner, trace the Gothic style in all the other countries of Western Europe; but its history is similar in all. It is in England and France that the true spirit of the style was most felt, and the finest examples remain. Our space has not permitted us to enter minutely into the various styles of Gothic in each country. The more important of these will be treated separately. See EARLY ENGLISH, DECORATED, PERPENDICULAR, FLAMBOYANT.

We may, however, state generally, that both in France and England the style had a complete existence—it was born, arrived at maturity, and died. When the spirit of the early architects had pushed the design to its utmost limits, they rested from their labours, well satisfied with their splendid achievements. Their successors occupied themselves with forms and details, and with the perfecting of every minute part. The art finally passed away, and left architecture in the hands of trade corporations—masons, carpenters, plumbers, &c.—who monopolised the whole work, and acted independently to the exclusion of one directing mind. The result was as we have seen: architecture became masonic skill, and Gothic was finally superseded by the revival of classic architecture in the 16th century.

GO'THLAND (Swed. *Gottland*), an island in the Baltic, lying between 57°—58° N. lat., and 18°—19° 30′ E. long., which, with Faröe, Gotska, Sandöe, and other smaller islands, constitutes the Swedish læn or province of Gottland and Wisby. Pop. nearly 50,000; and the superficial area about 1200 square miles. Chief town, Wisby (q. v.). G. consists mainly of terrace-like slopes of limestone formation, encircled by cliffs which are broken by numerous deep fiords, more especially on the west coasts of the island, the eastern parts of which are flat. The surface is in many parts hilly and well wooded, and the soil is fruitful and well cultivated. The climate is sufficiently mild to allow of the grape and mulberry ripening in favourable situations in the open air. The land is divided among many small proprietors, who live in separate and detached homesteads. The island of G. was for ten years (from 1439 to 1449) the self-elected place of banishment of King Eric X., who, after long-continued dissensions with his Swedish and Danish subjects, retired to Wisby, where he shut himself up in the castle with his favourite mistress and a band of followers. Having refused to resume his duties, he was declared to have forfeited the crowns of Sweden and Denmark, and thenceforward he subsisted by pillaging the ships and infesting the coasts of the lands he had formerly governed. The remains of numerous churches and monasteries in every part of the island, but more especially in and around Wisby, attest its former wealth, and afford many noble specimens of the Gothic architecture of the 11th and 12th centuries. The chief exports of G. are wood, sandstone, marble, lime, and leather.

GOTHS (Lat. *Gothi*, *Gothones*, *Guttones*, *Gutæ*, &c.; Gr. *Gotthoi*, *Gottoi*, *Gouttho*i, *Guthōnes*; Gothic, *Gutthiuda*), the name of a powerful nation of antiquity, belonging to the Germanic race. By some writers they are thought to have had a Scandinavian origin, which was the belief of their own historian, Jornandes. Indeed, Jornandes, Procopius, Capitolinus, and Trebellius Pollio identified them with the Getæ, a branch of the Thracian group of nations; but later researches, especially those of Dr Latham, leave it almost without a doubt that the G. were originally Germans. The earliest notice of them extant among the writers of antiquity is that of Pytheas of Marseille, who lived about the time of Alexander the Great, and wrote a book of travels, some fragments of which have been preserved in the works of other writers. In one of these fragments, we find mention made of a tribe of *Guttones* bordering upon the Germans, and who lived round a gulf of the sea called Mentonomon, a day's sail from the island of Abalus, where they used to gather amber, and sell it to the neighbouring Teutones. This gulf, there is every reason to believe, was the *Frische Haff*, situated on the Prussian shore of the Baltic. The next notice that occurs of the G. is in the *Germania* of Tacitus, in which they are called Gothones, and are represented as dwelling beyond the Lygii; in the same direction, that is, as the one pointed out by Pytheas, though not on the sea-coast. Tacitus also distinguishes them from the Gothini, a tribe east of the Quadi and Marcomanni, and who are represented by him as using the Gallican tongue. The Gothones, according to this historian, were under regal government, and on that account not quite so free as the other tribes of Germany, but still they enjoyed a considerable amount of liberty. The tribes next beyond them, and dwelling immediately on the sea-coast, were the Rugii and Lemovii, whose form of government was also monarchical, and their weapons, like those of the Gothones, round shields and short swords.

We next hear of the G. as settled on the coast of the Black Sea, about the mouths of the Danube, early in the 3d century. But at what time, or under what circumstances, their migration from the Baltic to the Euxine took place, it is impossible to ascertain. 'Either a pestilence or a famine,' says Gibbon, 'a victory or a defeat, an oracle of the gods or the eloquence of a daring leader, were sufficient to impel the Gothic arms on the milder climate of the south.' In their new home, which was also the country of the Getæ (whence, perhaps, the error that confounded them with that people), the G. increased both in numbers and strength, so that, as early as the reign of Alexander Severus (222—235 A. D.), they made some formidable inroads upon the Roman province of Dacia. In the reign of Philip (244—249 A. D.), they ravaged that province, and even advanced to the siege of Marcianopolis in *Mœsia Secunda*. The inhabitants ransomed their lives and property by a large sum of money, and the invaders withdrew for a time to their own country. Under Decius, however, they again entered Mœsia to the number of about 70,000, led by a king named Cniva. Decius himself advanced to meet them, and found them engaged before Nicopolis. On his approach, they raised the siege, and marched away to Philippopolis, a city of Thrace, near the foot of Mount Hæmus. Decius pursued them by forced marches; but at a convenient opportunity, the G. turned with unexampled fury upon the Roman legions, and utterly defeated them. Philippopolis next fell before them by storm, after a long resistance, during which, and the massacre that followed, 100,000 of its inhabitants are reported to have been slain. This was in 250 A. D. In the following year, another tremendous battle took place near an obscure town called Forum Trebonii, in Mœsia, in which the Romans were again defeated with great slaughter, the Emperor Decius and his son being in the number of the slain. The succeeding emperor, Gallus, purchased their retreat by an immediate present of a large sum of money, and the promise of an annual tribute for the future. The G. now set themselves to the acquisition of a fleet, and with this, in 253, advanced to the conquest of Pityus, a Greek town on the north-eastern coast of the Black Sea, which they completely destroyed. In 258, they besieged and took Trebizond, when a great fleet of ships that were in the port fell into their hands. In these, they deposited the booty of the city, which was of immense value; chained the robust youth of the sea-coast to their oars; and returned in triumph to the kingdom of Bosporus. In the following year, with a still more powerful force of men and ships, they took Chalcedon, Nicomedia, Nice, Prusa, Apauræa, and Cius. In a third expedition, which numbered as many as 500 vessels, they took Cyzicus, then sailed down the Ægean, ravaged the coast of Attica, and in 262 anchored at the Piræus. Athens was now taken and plundered, and many other renowned places in Greece were either partially or wholly destroyed. Even Italy was threatened; but, says Gibbon, 'the approach of such imminent danger awakened the indolent Gallienus from his dream of pleasure.' The emperor appeared in arms; and his presence seems to have checked the ardour, and to have divided the strength of the enemy. A portion of the G. now returned to their own country. But in 269 they again started on a maritime expedition in far greater numbers than ever. After ravaging the coasts both of Europe and Asia, the main armament at length anchored before Thessalonica. In Claudius, the successor of Gallienus, however, the G. found a far abler general than any they had yet contended with. This emperor defeated their immense host, said to number as many as 320,000 men, in three successive battles, taking or sinking their fleet, and after an immense slaughter of their troops, pursuing such as escaped until they were hemmed in by the passes of Mount Hæmus, where they perished for the most part by famine. This, however, was only a single reverse. Aurelian, the successor of Claudius, was obliged to cede to them, in 272 the large province of Dacia, after which there was comparative peace between the combatants for about fifty years. In the reign of Constantine, their king, Araric, again provoked hostility, but was obliged eventually to sue for peace with the master of the Roman empire. Under Valens, they once more encountered the Roman legions, with whom they carried on a war for about three years (367—369) with tolerable success. They now began to be distinguished by the appellations of Ostro-Goths and Visi-Goths, or the G. of the East and West; the former inhabiting the shores of the Black Sea, and the latter, the Dacian province and the banks of the Danube. On the irruption of the Huns, the Visigoths sought the protection of Valens against those barbarians, and in 375 were allowed by him to pass into Mœsia, to the number of about 200,000. Great numbers of them also now took service in the Roman army; but a dispute soon arose between the G. and their new allies, which led to a decisive battle, in 378, near Adrianople, in which the emperor Valens lost his life. The G. now threatened Constantinople, but were not able to take it; and during the reign of Theodosius, there was again a period of comparative peace.

Henceforward, the history of the Visigoths and Ostrogoths flows in two rather divergent streams. Before tracing either of these, however, it should be mentioned that the G., for the most part, became converts to Christianity about the middle of the 4th c., adopting the Arian form of belief, in accordance with the instructions of their renowned teacher and apostle, Bishop Ulfilas. Here, also, it may be stated that the term Mœso-Goths was applied to certain of the Western G., who having settled in Mœsia, there devoted themselves to agricultural pursuits, under the protection of the Roman emperors.

Visigoths.—Upon the death of Theodosius the Great in 395, and the partition of the empire between Honorius and Arcadius, the renowned Alaric, king of the Visigoths, sought the command of the armies of the eastern empire, and upon being refused, invaded Greece with an army of his countrymen. About 400, he invaded Italy, took and pillaged Rome (410), and was preparing to carry his arms into Sicily and Africa, when his career was arrested by death. See ALARIC. Alaric was succeeded in the sovereignty by Athaulf (410—415), who, having married Placidia, the sister of Honorius, withdrew from Italy into the south of Gaul, and about 412 crossed the Pyrenees into Spain. Athaulf was assassinated at Barcelona, and his successor, Sigeric, dying the same year, the choice of the G. now fell on Wallia (415—418), who extended his power over a great part of Southern Gaul and Spain, and made Toulouse his capital. The G., under this monarch, greatly assisted the Romans in their contests with the Vandals and the Alani. Wallia was succeeded by Theodoric I. (418—451), son of the great Alaric. He lost his life in the bloody engagement of Châlons-sur-Marne, leaving the throne to his son Thorismund (451—452), who, however, was assassinated by his brother Theodoric II. (452—466), who reigned for some years, but was at length himself assassinated by his brother Euric (466—483), whose reign was unusually brilliant and successful. He extended the sovereignty of the Visigoths considerably both in France and Spain, introduced the arts of civilisation among his subjects, and drew up for their use a code of laws, in which were embodied many sound principles of jurisprudence. Under his successors, Alaric II. (483—506) and Amalaric (506—531), however, the kingdom of the Visigoths declined before that of the Franks. The former fell by the hand of Clovis in battle in 507, and the latter was killed either in battle or by the hand of an assassin in the year 531. Under his successor Theudes, the rule of the Visigoths was confined exclusively to Spain. Theudes was in his turn assassinated in his palace at Barcelona in the year 548. It will not be necessary to trace the long line of Visigothic kings that subsequently ruled in Spain from this period down to the year 711. The Visigothic power was completely broken, and their last king, Rodrigo or Roderick, slain by the Saracen invaders on the battle-field of Xeres de la Frontera.

Ostrogoths.—At the time when the Visigoths were admitted by Valens within the boundaries of the Roman empire, the same favour was solicited by the Ostrogoths, but was refused them by that emperor. They revenged themselves for this slight or injury by making frequent incursions into the Roman territories, sometimes on their own account, and sometimes as the allies of the Visigoths. In 386, the Ostrogoths sustained a severe defeat under their king or general, Alatheus, in attempting to cross the Danube, when many thousands of them perished, either by the sword of the Romans, or in the waves of the river. After this, they obtained a settlement in Phrygia and Lydia, but were ever ready to aid any fresh band of barbarians that prepared to assault the empire. Thus, they joined Attila in his renowned expedition against Gaul (450—453), and fell by thousands under the swords of their kinsmen the Visigoths at the battle of Châlons-sur-Marne. After this, they obtained a settlement in Pannonia, whence they pressed upon the eastern empire with such effect, that the sovereigns of Constantinople were glad to purchase their forbearance by large presents of money. In 475, Theodoric, the greatest of the Ostrogoth sovereigns, succeeded to the throne upon the death of his father Theodemir. He directed his arms almost immediately against the eastern emperor Zeno; and having gained considerable advantages over him, obtained a grant of some of the richest provinces in the empire. Eventually, he was named chief of the imperial guard, and indeed consul for the year 484. In 488, with the consent and advice of Zeno, he planned an immense expedition against Odoacer, king of Italy, who had held that title since 476, when he dethroned Augustulus, the last of the western emperors. Theodoric utterly defeated Odoacer, slew him, it is said, with his own hand, and reigned undisturbed sovereign of Italy until his death in 526. The seat of his empire was at Ravenna, which he sometimes exchanged for Verona, and once—i. e., in 500—he visited Rome, when he convened a meeting of the senate, and declared that it was his intention to rule the people committed to his charge with even-handed justice. To a great extent, he fulfilled this promise, and governed his subjects upon the whole wisely and to their advantage. The glory of his reign was, however, sullied by the execution of two of the most distinguished men of that age, Boethius and Symmachus, upon the plea that they were engaged in a conspiracy against him. During his reign, the Ostrogoth kingdom included, besides Italy, all the adjoining countries within the Rhone and the Danube; also the modern Bosnia, Servia, Transylvania, and Wallachia. In the disorders consequent upon the death of Theodoric, the Emperor Justinian sought to win back Italy to the allegiance of the emperors of Constantinople; and for this purpose he despatched Belisarius at the head of an army into that country. In 536, Belisarius entered Rome, which he held for his master, although invited by the G. to become himself their king; but all his and his successor's efforts to subdue the G. were at that time utterly fruitless. Totila (541—552), a noble Goth, was elected as successor to Vitiges, the antagonist of Belisarius, but was conquered in the battle of Tagina, by the imperial general, Narses, in the year 552. In that battle, Totila received his death-wound, and was succeeded by Teias, who did all that a brave man could to repair the misfortunes of his countrymen. It was to no effect, however, for he also was killed in battle in the following year, when 'his head,' says Gibbon, 'exalted on a spear, proclaimed to the nations that the Gothic kingdom was no more.' The Ostrogoths, broken and dispersed by their calamities, henceforward disappear from history as a distinct nation, their throne in Italy being filled by the exarchs of Ravenna; while the nation generally became absorbed in the indiscriminate mass of Alani, Huns, Vandals, Burgundians, and Franks, who had from time to time established themselves in the dominions of the old Roman empire.

GOTLAND (GÖTALAND, or GÖTARIKE), the most southern of the three old provinces or main divisions of Sweden (q. v.). G. is now divided into 12 læns or departments; it has a superficial area of about 37,000 square miles, or one-fifth that of all Sweden, and a population of 2,202,305. The greater part of the region, more especially in the north and in the interior, is covered with mountains, forests, and lakes, but its southern districts contain some of the most fertile land in Sweden. The principal lakes are the Wener (q. v.) and the Wetter (q. v.). The river Göta, which was unfit for navigation on account of its cataracts, the most picturesque of which is Trollhättan, has been rendered navigable by the construction of numerous locks and canals, and it is now open to vessels of considerable burden from Gottenborg, on the Cattegat, to Lake Wener, from whence the Göta Canal extends the line (of 260 miles) of internal communication across the kingdom to its eastern shores. G. comprehends a large portion of the mining districts, and is especially rich in iron and alum, and yields good copper, nickel, coal, &c. The peasantry are superstitious, attached to their old traditional usages and their national costume, but are honest and industrious, hospitable and contented.

GOTTENBORG (Swed. *Götaborg*), next to Stockholm, the most important city of Sweden, in lat. 57° 41′ N., long. 11° 58′ E., and the principal town of the læn of Gottenborg. The population, in 1872, was 59,329, exclusive of its extensive environs. G., which was founded by Gustavus Adolphus in 1618, is situated on the river Göta, a few miles from the Cattegat, and consists of a lower and upper town; the former intersected by numerous canals, which are bordered by *allées* of fine trees, and spanned by numerous bridges; and the latter picturesquely scattered over the adjacent rocky heights. Its admirable harbour, which is protected by three forts, affords safe anchorage to ships of heavy burden, and has long been noted for its extensive foreign commerce. The upper parts of the town have wide and regular streets and good stone houses; but there are few buildings deserving of special notice excepting the new church, the Exchange, the Cathedral, the Town-hall, and Arsenal. G. is the see of a bishop, and the seat of the government of the district. It has good schools, one of them founded by Oscar I., the late king, for the children of soldiers; a public library; and an academy of science and literature, which was incorporated in 1775; besides various educational, literary, and benevolent institutions of merit. The completion, in 1832, of the Göta Canal, which connects the German Ocean and the Baltic, exerted a very important influence on the commercial relations of G., by bringing it into direct communication with Stockholm and a great portion of the interior of the kingdom, which it supplies with the products of foreign commerce and its own home-industry. The latter has of late years attained considerable importance, and now, besides ship-building, includes extensive manufactories of woollen and cotton goods, sail-cloths, tobacco, snuff, glass, paper, sugar, and porter. In 1866, 3832 vessels, of 770,071 tons, entered and cleared the port. The exports are iron, copper, deals, tar and pitch, alum, fish, &c.; and the imports, salt, cereals, wine, and articles of colonial trade.

GOTTFRIED VON STRASBURG, or GODFREY OF STRASBURG, so called, it is believed, either from having been born, or from having resided in the town of Strasburg in Alsace, was one of the most eminent poets or minnesingers of the Middle High German period. He flourished during the latter half of the 12th century. His chief work, *Tristan*, in the composition of which he was employed at his death, and which extends to about 20,000 stanzas, was written about the year 1207, during the lifetime of Hartmann of Aue, whom he celebrates as the first of German narrators, and after the publication of the first portion of Wolfram von Eschenbach's *Parcival*, to the prologue to which he alludes. Eilhart of Oberge had worked up the story of *Tristan* from a French poem. G. founds his story on another French poem (of which considerable fragments are still extant), and names as the author Thomas of Brittany, who, however, is not to be confounded with the half or wholly fabulous Thomas of Ercildoune, referred to in the old English story of *Tristan*, published by Sir Walter Scott. Besides *Tristan*, some lyric poems by G. are still extant. G.'s works, with Ulrich von Türheim's and Heinrich von Freiberg's continuations of *Tristan*, were published by Fr. H. von der Hagen (Breslau, 1823). An edition worthy of the poet is still a desideratum. A translation of *Tristan* into modern German with an original conclusion, has been published by H. Kurtz (Stuttgart, 1844).

GÖTTINGEN, a town in the former kingdom of Hanover, in lat. 51° 31′ N., long. 9° 56′ E., and one of the pleasantest in Lower Germany, is situated in a fruitful valley on both banks of an artificial arm of the Leine, called the New Leine, about 60 miles south of Hanover. It is in general well built, but is almost destitute of fine edifices, and has an air of solitude, which even the number of students cannot dissipate. The *Rathhaus*, an old castellated and picturesque edifice; the educational institutions, of which there are many; the hospital, and the university, are the only buildings of any note. The university, instituted by George II., king of England, and Elector of Hanover, in 1734, and opened 17th September 1737, is regarded as the great national school of Brunswick, Mecklenburg, and Nassau, as well as of Hanover. Connected with it are the library, containing 400,000 vols. and 5000 manuscripts; the observatory; the art museum, with collections of old oil-paintings, of engravings, of coins and models of all sorts, and some casts from the antique; the lying-in-hospital, the chemical laboratory, and the botanic gardens (laid out under Haller's superintendence in 1739), one of the chief ornaments of the town. From 1822 to 1826, the number of students attending the university of G. averaged 1481 annually; but in consequence of the troubles of 1831, the number in 1834 had fallen to 860. The university could, however, still boast a rare assemblage of distinguished teachers, such as Blumenbach, Dahlmann, Ewald, Gauss, Gervinus, Gieseler, Herbart, Lücke, Otfr. Müller, the brothers Grimm, &c.; but the expulsion in 1837 of the 'seven professors,' Albrecht, Dahlmann, Ewald, Gervinus, the two Grimms, and W. Weber, for political reasons, inflicted a blow upon the university from which it has never recovered. It has upwards of 100 professors of various grades, many of whom are men celebrated throughout Europe. The average number of students is 700. The chief manufactures of the town are hosiery, leather, and musical and scientific instruments; but the only flourishing trade of G. consists in the sale of tobacco and tobacco-pipes, books, and sausages. Pop. (1871) 15,841.

GOTTSCHED, JOHANN CHRISTOPH, a once popular German writer, was born at Juditenkirch, near Königsberg, in Prussia, February 2, 1700, and at the age of 14 entered the university of Königsberg with the intention of studying for the church, but he soon turned his attention to philosophy, the fine arts, and languages. In 1724, he removed to Leipsic, where in 1730 he became extraordinary professor of philosophy and poetry, and in 1734 professor of logic and metaphysics. He died 12th December 1766. G.'s great merit lay in his endeavouring to make the German language the vehicle of instruction for his countrymen in literature and science. In other respects, he was essentially French; and his clear, calm, and 'correct' understanding naturally led him to admire writers like Racine and Boileau, and to value elegance, precision, and purity of style more highly than all other merits. G. executed a multitude of poems, critical and philosophical works, translations, &c. His tragedy, *Der Sterbende Cato* ('The Dying Cato'), which, in the days of its popularity, went through not less than ten editions, is now regarded by his countrymen as a frightful specimen of 'correct' and watery verse.

GOUDA (Dutch, *Ter Gouwe*), a town of Holland, in the province of South Holland, is situated on the right bank of the Yssel, at the junction of the Gouwe with that river, 11 miles north-east of Rotterdam. It has the largest market-place in Holland, consisting of a spacious square, which contains the town-house and the church of St John. The latter building has 31 magnificent stained glass windows, most of them 30 feet high, and two of them nearly twice that height. These windows were executed between 1560 and 1603 by the brothers Grabeth, and are among the finest in Europe. G. is said to have had, in 1751, 374 clay-pipe works; it has now only 16. The clay used in this manufacture is brought from Coblenz and Namür. It has also numerous potteries, extensive brick and tile works; the bricks are called Clinkers, or Dutch clinkers, and are much used in building and in paving. G. also manufactures cotton, woollen, and sail cloths, has rope-walks, gin-distilleries, breweries, and a famous cheese-market, at which G. cheese, made from new milk, and esteemed the best in Holland, is extensively sold. Pop. 15,325.

GOU'KEKA, GOTCHA, or **SEVANG, Lake of,** a deep inland lake of Russian Armenia, in lat. 40° 8'—40° 35' N., and long. 44° 45'—45° 35' E., 30 miles north-east of the town of Eriwan. It is 47 miles in length from north-west to south-east, is 15 miles in average breadth, and is situated in a mountainous district at an elevation of 5300 feet above sea-level. The principal facts known about this lake are, that it is very deep, and yields good fish; that its banks abound in volcanic products; and that, without having any considerable outlet, it receives the waters of several unimportant streams.

GOURA (*Lophyrus coronatus* or *Columba coronata*), by far the largest of the pigeon family (*Columbidæ*), a native of Java, New Guinea, and other islands of the Indian Archipelago. It is two feet four inches in length from the tip of the bill to the extremity of the tail. It is a very beautiful bird, of a grayish-blue colour, parts of the back and wings black and purplish-brown, a broad white bar across the wings. The head is adorned with a large semicircular crest of narrow straight silky feathers, always carried erect. The G. is in the highest esteem for the table, and might probably be domesticated with great advantage in tropical countries; but attempts which have been made to introduce it into the poultry yards of Holland have completely failed, owing to the climate.

GOURD (*Cucurbita*), a genus of plants of the natural order *Cucurbitaceæ*, nearly allied to the cucumber; having male and female flowers on the same plant, the flowers large and yellow. The species are annual plants of very rapid growth; their leaves and stems rough; their leaves broad and lobed; their stems often very long and trailing; natives of warm climates, although the native region of the kinds chiefly cultivated is very uncertain, and they have probably been greatly modified by long cultivation, so that perhaps all of them may be forms of one original species, a native of some of the warmer parts of Asia. The Common G. or Pumpkin (*C. pepo*), with smooth globose or pear-shaped fruit, varying from the size of a large apple to fifty or seventy pounds in weight, is much cultivated both in gardens and fields in almost all parts of the world of which the climate is warm enough for it; and the fruit is not only a very important article of human food, but is also used along with the superabundant shoots for feeding cattle. In many countries, pumpkins are a principal part of the ordinary food of the poorer classes, and are much used even by the wealthy; they are not eaten raw, but dressed in a great variety of ways—as in pies, with apples, sugar, spice, &c., or sliced and fried with oil or butter, or made into soups, &c. Pumpkins are much cultivated in North America. In England, they are also cultivated, but not to a great extent, and never as food for cattle. It is not unusual for English cottagers to plant them on dunghills, and to train the shoots along the neighbouring grass.—The Vegetable Marrow (*C. ovifera* or *C. succada*) appears to be a mere variety of the pumpkin. It was introduced into Europe from Persia since the beginning of the 19th c., but is now more generally cultivated in Britain than any other kind of G., being one of the most hardy, and its fruit of excellent quality and useful for culinary purposes at almost every stage of its growth. When full grown, the fruit is elliptic, very smooth, generally about nine inches long, and four inches in diameter; but these dimensions are occasionally much exceeded.—One of the most valuable gourds for culinary purposes is the Great G. (*C. maxima*); of which the Spanish G. is a green-fruited variety; and the Great Yellow G., the largest of all, has yellow fruit, with firm flesh of a deep yellow colour. It is sometimes fully 200 lbs. in weight, and eight feet in circumference. The form of the fruit is a somewhat flattened globe; when boiled, it is a very pleasant and wholesome article of food. It is much cultivated in the south of Europe.—The Squash (*C. melopepo*) differs from all these in generally forming a bush, instead of sending out long trailing shoots; also in the extremely flattened fruit, the outline of which is generally irregular, and its whole form often so like some kinds of cap, that in Germany one variety is commonly known as the *Elector's Hat*, and the name *Turk's Cap* is bestowed on another. The Squash is regarded as one of the best gourds, and is much cultivated in some parts of Europe and in North America.—The Warted G. (*C. verrucosa*), which has a very hard-skinned fruit covered with large warts, and the Musk G. (*C. moschata*), distinguished by its musky smell, are less hardy than the kinds already named; as is also the Orange G. (*C. aurantia*), sometimes cultivated on account of its beautiful orange-like fruit, which, however, although sometimes edible and wholesome, is not unfrequently very unfit for use, on account of colocynth developed in it. This is apt to be the case in some degree with other gourds also, but the bitter taste at once reveals the danger. The same remark is applicable to the young shoots and leaves, which, when perfectly free from bitterness, are an excellent substitute for spinach. In Scotland, even the most hardy gourds are generally reared on a hotbed and planted out. In England, it has been suggested that railway-banks might be made productive of a great quantity of human food by planting them with gourds. Ripe gourds may be kept for a long time in a cool well-ventilated place, nor are they injured by cutting off portions for use as required. The name G. is often extended to many other *Cucurbitaceæ.*

GOUT (Fr. *goutte*, from Lat. *gutta*, a drop), a medieval term of uncertain date, derived from the humoral pathology (see RHEUMATISM), indicating a well-known form of disease, which occurs for the most part in persons of more or less luxurious habits, and past the middle period of life. The acute attack of gout begins most commonly by a painful swelling of the ball of the great toe or of the instep, sometimes of the ankle or knee; much more rarely, it attacks both lower limbs at once; and more rarely still, it seizes first upon some other part of the body, the foot being either not attacked at all, or becoming involved at a later period. In the great majority of cases, the foot is not only the first part attacked, but the principal seat of the disease throughout; according to Scudamore, indeed, this is the order of events in not much less than four-fifths of the cases. In exceptional instances, the ankle, knee, hand, elbow, &c., are attacked at first; now and then, the disease smoulders in the system in the form of disorders of the digestive or nervous functions, or oppression of the circulation for some considerable time before it takes the form of 'regular' gout—that is, of an acute attack, or fit, of gout in the foot. The name podagra (Gr. *pod*, foot, and *agra*, seizure) indicates the leading character of the disease as apprehended by all antiquity; and the very numerous references to the disorder so called, not only in the medical writings of Hippocrates, Galen, Aretæus, Cælius Aurelianus, and the later Greek physicians, but in such purely literary works as those of Lucian, Seneca, Ovid, and Pliny, shew not only the frequency, but the notoriety of the disease. The allusions, indeed, are of a kind which give ample proof that the essential characters of gout have not been changed by the lapse of centuries; it is caricatured by Lucian in his burlesque of *Tragopodagra* in language quite applicable to the disease as now observed; while the connection of it with the advance of luxury in Rome is recognised by Seneca (*Epist.* 95) in the remark that in his day even the women had become gouty, thus setting at naught the authority of physicians, which had asserted the little liability of women to gout. Pliny likewise (book 26, chap. 10) remarks upon the increase of gout, even within his own time, not to go back to that of their fathers and grandfathers; he is of opinion, further, that the disease must have been imported; for if it had been native in Italy, it would surely have had a Latin name. Ovid and Lucian represent gout as mostly incurable by medicine; from this view of it, Pliny dissents. The list of quack remedies given by Lucian is one of the most curious relics of antiquity.

In the present day, gout is observed to prevail wherever there is an upper class having abundant means of self-indulgence, and living without regard to the primeval law of humanity, 'in the sweat of thy face shalt thou eat bread.' The directness, however, with which gout can be traced, in particular cases, to its predisposing causes is very various; and in many instances, a well-marked hereditary tendency to the disease may be observed, which even a very active and temperate life can scarcely overcome; while, on the other hand, the most gross forms of excess may be practised for a whole lifetime without incurring the gouty penalty. It is difficult to explain these variations; but they leave unaffected the general principle, that gout is a disease especially of the wealthy, and most of all of those who have little physical exertion, and give great scope to the bodily appetites. The prevention and cure, accordingly, have been at all times recognised as being mainly founded on temperance, combined with the cultivation of active and regular habits as to exercise. Many amusing stories are told having this moral, and shewing how gout has been cured by the opportune occurrence of calamities which have created the necessity for labour, and removed the means of self-indulgence. With a few special exceptions, indeed, it may be said that the labouring class, and especially those that labour in the open air, are almost, if not altogether free from this disease. Those, again, that labour much with the mind, not being subject either to great privations, or to the restraint of unusually abstemious habits of life, are remarkably subject to gout; the more so if their bodily and mental constitution has been originally robust, and fitted by nature for a degree of activity which the artificial necessities of fashion or of occupation have kept within too narrow limits. Hence, the well-known saying of Sydenham, that gout is almost the only disease of which it can be said that it 'destroys more rich men than poor, more wise men than simple.' And in this manner accordingly (he adds), there have lived and died 'great kings, princes, generals, admirals, philosophers, and others like these not a few.' Gout is, therefore, the counterpoise in the scales of fortune to many worldly advantages; the poor and needy have it not, but suffer from their own peculiar calamities; the favourites of fortune are exempt from many privations, but this very exemption paves the way for the gout; whereby even in this world Dives suffers as well as Lazarus, and sometimes, it may be, learns the lesson of his suffering. Such is the sense, though not the exact words, in which, nearly two hundred years ago, Sydenham expressed the convictions of a lifetime on this subject.

Sydenham's treatise on gout is interesting not only as containing the well-considered views of a master in the medical art, but also as the faithful description of the disease by one of the victims of it. His account of the paroxysm of regular gout may be given here with some abbreviation. After some weeks of previous indigestion, attended with flatulent swelling and a feeling of weight, rising to a climax in spasms of the thighs, the patient goes to bed free from pain, and having had rather an unnaturally strong appetite the day before. In the middle of the night, he is awakened by a pain in the great toe, or sometimes in the heel, the ankle, or the calf of the leg. The pain resembles that of a dislocated bone, and is accompanied by a sense as if water not perfectly cold were poured over the affected limb; to this succeeds chilliness, with shivering, and a trace of feverishness, these last symptoms diminishing as the pain increases. From hour to hour, until the next evening, the patient suffers every variety of torture in every separate joint of the affected limb; the pain being of a tearing, or crushing, or gnawing character, the tenderness such that even the weight of the bedclothes, or the shaking of the room from a person's walking about in it, is unbearable. The next night is one of tossing and turning, the uneasy limb being constantly moved about to find a better position; till towards morning the victim feels sudden relief, and falls over into a sleep, from which he wakes refreshed, to find the limb swollen; the venous distention usually present in the early stage having been succeeded by a more general form of swelling, often with itching between the toes, and a peeling-off of the cuticle. This individual attack may be repeated many times, in the course of what is termed 'a fit of the gout,' which commonly extends over a period of weeks, or even months, before the patient is completely relieved; or the attacks may occur in both limbs, or in several other parts of the body in succession, the real termination of the 'fit' being at last indicated by an apparently complete restoration of health, and even, in some cases, by a period of improved condition and capacity for exertion, as compared with the state of the patient before the attack.

Such are the principal features of the 'regular gout.' In this form, it might almost be called a local disease; although the connection of the attacks with deranged digestion, or with a variety of other minor ailments too complex to be described here, and the obvious relief obtained through the 'fit' from the symptoms of constitutional suffering, point to a cause of the disease operating over a larger range of functions than those included in the ordinary local manifestations at this period. Regular gout, accordingly, forms only part of a nosological picture, in which the so-called irregular, atonic, metastatic, or retrocedent forms have to be included before it can be said to be at all complete. These, indeed, form almost all the darker shadows of the picture; for regular gout, though a very painful disorder, can hardly be said to be dangerous to life, or even to the limb affected, at least until after many attacks.

It is the tendency, however, of gout, when recurring often, to fall into irregular forms, and herein lies its danger. One source of local aggravation is, indeed, soon apparent, and it leads rapidly to other evils. The joints which have been repeatedly the seat of the regular paroxysm, become, more or less permanently, crippled and distorted. A white, friable, chalk-like material is gradually deposited around the cartilages and ligaments, and sometimes in the cellular tissue and under the skin. Sometimes this material is discharged externally by ulceration, and then usually with relief. At other times, it accumulates into irregular masses, or 'nodosities,' which entirely destroy, or at least greatly impair, the movement of the limb. The patient is laid up more or less permanently in his arm-chair; and exercise, the great natural specific remedy of the gouty, is denied by the very conditions of the diseased state itself.

Then follow aggravations of all the constitutional sufferings; the more so, perhaps, in proportion as the local attacks in the foot become obscurely marked. Indigestion continues, or becomes constant, assuming the form chiefly of acidity after meals; the liver becomes tumid, the abdomen corpulent, the bowels disposed to costiveness; the kidney discharges a vitiated secretion, and not unfrequently there is a tendency to gravel and Calculus (q. v.); the heart is affected with palpitations, or fainting-fits occur, sometimes with spasmodic attacks of pain; the arteries become the seat of calcareous deposits, and the veins are varicose in the limbs and in the neighbourhood of the lower bowel (see PILES); the temper is singularly irritable, and often morose; then, sooner or later, the appetite fails, or is only kept up by very stimulating and unwholesome diet, with an excess of wine or of alcoholic liquors; in the end, the body emaciates, the energy of all the functions becomes enfeebled, and the patient falls a prey to diarrhœa, or to some slight attack of incidental disease. Sometimes the end is sudden, as by apoplexy or structural disease of the heart; sometimes, on the other hand, it occurs in the midst of one of those violent spasms which have popularly acquired the name of 'gout in the stomach;' the true character of these attacks, however, being by no means well understood.

The sketch here given of the leading external phenomena of gout is very incomplete, as every popular description, to be at all intelligible, must necessarily be. But the reader will not fail to see in it the type of a disease occurring under a number of remarkably varied forms, and lurking in the constitution, at times, under the most strangely anomalous disguises, or even under the general aspect of robust or rude health. It has been an object, accordingly, with physicians to trace out the gouty predisposition under the name of a habit of body, or *diathesis*, cognisable previously to any of the local manifestations. At this point, however, the ideas of authorities usually become hazy, and their descriptions correspondingly ill defined or contradictory. The anomalous forms of the disease itself are also exceedingly difficult to describe accurately, and must on this account be left out of the present summary of the characters of the more usual aspects of gout, as it presents itself to physician and patient. The causes of the disease have been sufficiently indicated above.

One fact in regard to gout has relation to its intimate chemical and structural pathology, not less than to its outward characters; and forms, in fact, the pathological connection of a great number of its phenomena. The concretions found in the joints in all cases of well-marked and highly developed gout have nearly a uniform composition, into which the urate of soda (see URIC ACID) enters as a considerable proportion. Uric acid has long been known as one of the constant organic elements of the urine, through which it seems to be habitually expelled from the system. In certain circumstances, uric acid is deposited also in the form of urinary gravel or Calculus (q. v.); and it is this particular kind of gravel to which the gouty are especially subject, as we have indicated above. A conjunction of facts so striking as these could not but arrest the attention of pathologists; and it is long since Sir Henry Holland and others threw out the hypothesis, that uric acid was to be regarded as the very *materies morbi* of gout, of which ancients and moderns had been so long in search. It would be out of place to enter on the discussion of this subject here; but it must be indicated as a fact of recent discovery, that uric acid in a certain excess has been shewn by Dr Garrod to be characteristic of the blood of the gouty, although a minute amount of this substance is probably present even in perfect health. The most recent speculations, accordingly, tend to connect the gouty predisposition either with an excessive formation, or a checked excretion, of this important nitrogenous organic acid, the product, as physiology teaches, of the vital disintegration of the flesh and of the food, after these have subserved the daily wants of the system. At this point, the inquiry rests for the present.

The *cure* of gout, in the highest sense of the word, demands the careful consideration of all its predisposing causes in the individual, and the strict regulation of the whole life and habits accordingly, from the earliest possible period. It is the difficulty of accomplishing this which makes gout a disease proverbially intractable; for the regular attacks of the disease seldom occur till pretty late in life, long after the habits have been fully formed which are most adverse to the cure. Rigid temperance in eating and drinking, with daily exercise proportionate to the strength and condition of the individual, in reality constitute the only radical cure of gout, the lesson of ages of experience as read to the gouty by the light of science. But the lesson is not learned, or only learned when too late. It should never be forgotten that a man of gouty family, or individually much exposed to the causes of the disease, can only hope to escape it in his old age by habits of life formed at an early period, and by a careful avoidance of most of the common dissipations of youth. That the disease may be warded off in this way, there is ample evidence; and it is not less certain that there is no other way of living secure from gout. The treatment of the fit, in so far as it does not resolve itself into the celebrated prescription of 'patience and flannel,' must be a subject of medical prescription. The well-known virtues of Colchicum (q. v.) are perhaps somewhat overrated by the public; and its dangers are not less striking than its virtues. It is certain, however, that in cautious medical hands colchicum is a remedy of great value in the gouty paroxysm; and of equal value perhaps are certain natural mineral waters, as those of Vichy and Carlsbad. Alkalies and their salts, especially potash and lithia waters, as prepared artificially, with minute doses of iodine and bromine, have likewise been much recommended for the cure of gouty deposits. For the distinctions of gout and rheumatism, and the presumed relation between them in some cases, see RHEUMATISM.

GOUT-WEED, or **BISHOP-WEED** (*Ægopodium podagraria*), a perennial umbelliferous plant, with coarse twice ternate leaves, ovate unequally serrate leaflets, stems from one to three feet high, and compound umbels; now a very common weed in gardens and waste grounds in Britain, although believed to have been originally introduced by the monks from the continent of Europe, on account of the virtue ascribed to it of allaying the pain of gout and piles. It is a troublesome weed, very difficult of eradication. Its medicinal virtue is now discredited. Its smell is not agreeable, but its young leaves are used in Sweden in early spring as a pot-herb. Another English name is Herb Gerard.

GO'VAN, a thriving and picturesque burgh of Scotland, in the county of Lanark, is pleasantly situated two miles west of Glasgow, with which it is connected by an elegant line of villas, on the left bank of the Clyde. The prosperity of G. is chiefly dependent upon Glasgow, into which indeed it has become almost absorbed. It now contains several ship-building yards, which are carried on by Glasgow firms. There are also at G. a dye-work and a factory for throwing silk. Pop. (1871) 19,200. In the 16th c., this ancient village was considered one of the largest in Scotland, and even down to the middle of the 17th c., it received the name of 'Meikle Govane.'

GO'VERNMENT, in its political signification, may be considered as including the power by which communities are ruled, and the means by which, and the form and manner in which, this power is exercised. In treating of the subject, we shall first indicate those characteristics that seem essential to the existence of government altogether, and then proceed to mention the various forms which its machinery has assumed, or is capable of assuming.

1. It is of the essence of every government that it shall represent the supreme power or sovereignty of the state, and that it shall thus be capable of subjecting every other will in the community, whether it be that of an individual, or of a body of individuals, to its own. There is and can be no constitutional or fundamental law, not self-imposed, which is binding on a government in this, its highest sense. Whatever be the restraints which humanity, Christianity, or prudence may impose upon governments as on individuals, it is implied in the idea of a government that it should be politically responsible to no human power, at least for its internal arrangements, or in the language of politics, that it should be autonomous. The governments of states which are members of a confederation—as, for example, the states of the American republic, or the Swiss cantons—do not, it is true, possess this independent character. But in so far as they fall short of it, they are deficient in the characteristics of a government in the absolute sense, just as the states are states, not in the highest, but only in a subsidiary sense. The sovereign power with which government is thus armed may be an expression either of the general will of the community itself, as in free states, or of the will of a conqueror, and of the army which supports him, as in subject states. In the former case, the power of government over the individual citizen is as absolute as in the latter; but there is this very important difference between them, that in the former case he himself voluntarily contributes a portion of the absolute power to which he submits, whereas in the latter it is entirely independent of his volition. In the power which government possesses of controlling every other will, is implied the power of protecting every separate will from being needlessly or wrongfully controlled by any other will, or number of wills, the will of the government always excepted. With a view to the exercise of this latter power, government possesses a right, which politically is also unlimited—the right, namely, of inquiry into the relations between citizen and citizen. It is of its essence that its scrutiny should be as irresistible as the execution of its decrees. 2. Every government, whatever be its form, seeks the realisation of what we have described as its necessary character, by the exercise of three distinct functions, which are known as its legislative, judicial, and executive functions. The first, or legislative function of government, consists in expressing its sovereign will with reference to a particular matter, irrespective altogether of the effect which it may have on the interests of individuals; the second, or judicial, consists in applying the general rule, thus enunciated, to individual cases in which disputes as to its application have arisen; whilst the third, or executive function, consists in carrying into effect the determinations of the sovereign will, whether these determinations be expressed in the exercise of its legislative or its judicial functions.

In large communities, which are at the same time free—that is to say, in which the general will of the people is sovereign—the performance of the legislative functions of government almost necessarily implies the existence of a general council, parliament, or as it is often called, a legislature; whilst the performance of its judicial functions implies the existence of judges and courts of justice, and of its executive that of a police and an army. But all of these, like the existence of councils of ministers, or servants of the sovereign will—governments in the narrower sense—and the rules by which their appointment, resignation, &c., are regulated, are practical necessities of government in certain circumstances, not theoretical necessities of government in the abstract.

The forms in which communities have sought to realise the idea of government, as thus explained, have been divided, from very early times, into three classes: 1st, monarchy, or that form in which the sovereignty of the state is placed in the hands of a single individual; 2d, aristocracy, or that in which it is confided to a select class, supposed to be possessed of peculiar aptitude for its exercise; and, 3d, democracy, or that in which it is retained by the community itself, and exercised either directly, as in the small republics of ancient Greece, or indirectly, by means of representative institutions, as in the constitutional states of modern times. Each of these forms of political organisation, if called into existence by an expression of the general will of the community, maintained by its consent, and employed for its benefit, is said to be a legitimate government (Aristot. *Politic.* lib. iii. c. 5)—that is to say, a government which vindicates the interests of the collective body of the people without needlessly encroaching on individual freedom of action. But each of these legitimate forms was said by the ancient publicists (Aristot. *ut sup.* and iii. 4, 7) to have a particular degenerate form to which it was prone. Monarchy tended in the direction of tyranny, or a government for the exclusive benefit of the single ruler; aristocracy to oligarchy, or a government for the exclusive benefit of the ruling class; and democracy to ochlocracy, or mob-government—a government in which the majority, who were necessarily the rudest and most ignorant portion of the community, exercised a tyranny over the more refined and cultivated few. Through these various forms, in the order in which we have enumerated them, each legitimate form being followed by its corresponding degenerate or perverted form, government was supposed to run in a perpetual cycle; the last form, ochlocracy, being followed by anarchy, or no government at all, which formed a species of interregnum so abhorrent to the social and political instincts of mankind as to induce them speedily to revert to monarchy, at the expense of subjecting themselves to a repetition of the misfortunes which they had already experienced. As a refuge from these evils, the so-called mixed government, or government which should combine the elements of order and permanence of two, at least, if not of all the three pure forms of government, whilst rejecting their tendencies to derangement and degeneracy, is supposed to have been devised. A union of aristocracy and democracy was the form in which Aristotle conceived the mixed government, and spoke of it under the title of the *politeia*. But the tripartite government was not unknown to speculators of even an earlier date. Plato had shadowed it forth in his laws, and Aristotle himself tells us that it had been treated of by other writers (*Politic.* ii. c. 3). Who these writers really were has been a subject of much speculation, but there is reason to believe that their works contained mere hints of the principle, and the first writer with whom we are acquainted to whose mind its practical importance was fully present is Polybius, who, with Cicero, by whom he was very closely followed in 'the Republic,' holds it to have been realised in the Roman constitution. The most famous example of the mixed government, however, is supposed to be exhibited in that balance of powers which has been so often said to form the essence of the English constitution. But in addition to the fact that these are not separate powers, but only separate organs of the one power or sovereignty which in free states is of necessity centered in the general will (see CONSTITUTION), it is extremely doubtful whether any period could be pointed out, either in our own history or in the history of any other nation, in which the sovereignty did not find expression obviously either through the one, the few, or the many; or whether such a period, if it did exist, was not a mere period of struggle and transition.

The question as to how far forms of government are a matter of choice on the part of a free people, or are dictated to them by influences which are beyond their volition, has been discussed in a very interesting manner by Mr Mill in his important work on *Representative Government*. The conclusion at which he arrives is, that 'men did not wake on a summer morning and find them sprung up; neither do they resemble trees, which, once planted, 'are aye growing' while men 'are sleeping;' but that 'in every stage of their existence they are made what they are by human voluntary agency' (p. 4). This absolute power of human choice, however, is limited by three conditions which Mr Mill states thus: 'The people for whom the government is intended must be willing to accept it, or at least not so unwilling as to oppose an insurmountable obstacle to its establishment; they must be willing and able to do what is necessary to keep it standing; and they must be willing and able to do what it requires of them to enable it to fulfil its purposes. . . . The failure of any of these conditions renders a form of government, whatever favourable promise it may otherwise hold out, unsuitable to the particular case' (p. 5). But there are still more important conditions, not here enumerated by Mr Mill, but one of which at least is fully recognised in the sequel of his work, which, if not complied with, render forms of government unsuitable not only to one case, or stage of social development, but to all cases and all stages of development. These conditions may be broadly stated as falling under a single category—viz., that forms of government must conform to the constitution of human nature, and recognise those arrangements of Providence which are beyond the reach of human control. This condition seems so obvious, that one would suppose it could scarcely be overlooked in fixing on a particular form of government, and yet there is none which has been overlooked more frequently. The most prominent example—to which, in recent years, much importance has been attached by Mr J. S. Mill and all speculative politicians of note—is that in which a form of government is constructed on the assumption that 'all men are equal,' the fact of nature being the very opposite. Such a form of government, being founded on a false assumption, can be made to work only by the direct results of its action being counteracted by indirect means, as has been the case in all the so-called pure democracies that have had any permanent existence. The state in these cases is governed not in accordance with, but in spite of the form of government.

The famous discussion as to what is absolutely and in itself the best form of government, which has occupied so large a portion of human time and ingenuity, is one which we must here dismiss with the observation, that it rests on another question which has been not less keenly and perhaps scarcely less futilely discussed. The second question is, What is the end of government? for it is clear that could the end-in-itself (the *telos-teleion*) be discovered, we might limit the discussion as to the best form of government to an inquiry into the means which led most directly to the attainment of this end. Now there are, and have always been, two classes of speculators, who assign what appear to be different, and what by many are believed to be irreconcilable ends or objects to government, and indeed to human effort, separate as well as aggregate. By the one, the end of government is said to be 'the greatest happiness of the greatest number,' or the greatest amount of human happiness absolutely considered; by the other class, it is said to be the realisation of the idea of humanity—that is to say, of the divine conception of human nature, through the instrumentality of society. The manner in which the first or Utilitarian creed has recently been expounded by its most important adherents, has had the effect of shewing that the two ends are in reality coincident. If happiness be so defined as to render it identical with moral, intellectual, and physical perfection, the advocate of the ideal end acknowledges that its attainment would involve, of necessity, the realisation of his own aspirations.

A difference of opinion as to the objects of government scarcely more real, though attended with far more fatal consequences than that which has divided speculative politicians, has ranged those who have dealt with government as a practical art in two opposite schools. By the one school, its object is said to be order; by the other, liberty; and each of these objects has been supposed to be attainable only to an extent proportioned to that to which the other was sacrificed. A truer insight into the laws of society has led a more enlightened school than either entirely to reverse this latter opinion; and—whilst holding the two objects referred to, to be in truth the proximate objects of all government—to perceive that they are not only reconcilable, but that each is attainable only in and through the other, and that the perfection with which either is realised in any particular instance will be, not in inverse but in direct proportion to that to which the other is so. Order, so far from being the opposite of liberty, is thus the principle by which conflicting claims to liberty are reconciled. The principle which is really opposed to liberty is licence, in virtue of which the sphere of the liberty of one individual is endeavoured to be carried into that of another. To the extent to which this takes place, the liberty of both is sacrificed, for the territory in dispute is free to neither of the claimants; whereas order, by preserving the boundary between them, assigns to each the portion which is his due, and prevents the waste of liberty which is necessarily involved in the gratification of licence, and the consequent existence of anarchy. The reasons which have led men to believe that the union between the principles of order and liberty, which it is thus their mutual interest to effect, can, in large states, be effected by means of representative institutions better than by any other political expedient that has yet been devised, will be explained under Representative Government. See also Constitution, Monarchy, Democracy, Liberty Equality and Fraternity.

GOWER, John, the date of whose birth is unknown (probably about 1320), is supposed, by his latest biographer, to have belonged to the county of Kent. His history is enveloped in almost total obscurity, but he seems to have been one of the most accomplished gentlemen of his time, and to have been in possession of considerable landed property. He was a personal friend of Chaucer's, who addresses him as 'a moral Gower' in dedicating to him his *Troilus and Cressida*—an epithet which has indissolubly linked itself to his name. He did not long survive his great contemporary, having died in the autumn of 1408. G. was a voluminous writer, and produced the *Speculum Meditantis* (a poetical discourse on the duties of married life). It consisted of ten books, written in French verse, but is supposed to have perished; the *Vox Clamantis*, in Latin (of which there are manuscript copies in the Cottonian and Bodleian libraries); and the *Confessio Amantis*, by which he is best known, in English. This latter work, extending to the portentous length of 30,000 verses, was first printed by Berthelet in 1573. An excellent edition of the works of G. was published in 1857, under the editorial care of Dr Reinhold Pauli, with a memoir and critical dissertation.

G. is almost uniformly heavy and prosaic. Writing much in French, his English poem is full of Norman-French words, and in his native tongue he never attained Chaucer's ease and mastery. Apart from literary merit or demerit, his poem is interesting to the scholar and the antiquary, because therein the elements which form our modern English are found side by side, or but indifferently fused together.

GOWRIE, Carse of. See Perthshire and Carse.

GOWRIE CONSPIRACY, one of the most singular events in the history of Scotland, took place in August 1600. On the 5th of that month, as King James VI., then residing at Falkland Palace, in Fife, was going out to hunt, Alexander Ruthven, brother of the Earl of Gowrie, whose father had been executed for treason in 1584, came to his majesty, and informed him that, on the previous evening, he had seized a person of a suspicious appearance, and evidently disguised, with a pot full of foreign gold hid under his cloak, and had confined him in his brother's house at Perth. Conceiving him to be an agent of the pope or the king of Spain, the king agreed to examine the man himself, and, without waiting to change his horse, set out for Perth, attended only by the Duke of Lennox, the Earl of Mar, and about 20 others. Soon after his arrival, while his retinue were at dinner, Ruthven conducted the king up a winding staircase and through several apartments, the doors of which he locked behind him, and brought him at last to a small study, where stood a man in armour, with a sword and dagger by his side. Snatching the dagger from the man's girdle, Ruthven held it to the king's breast, and said: 'Who murdered my father? Is not thy conscience burdened by his innocent blood? Thou art now my prisoner, and must be content to follow our will, and to be used as we list. Seek not to escape; utter but a cry, make but a motion to open the window, and this dagger is in thy heart.' The king expostulated with Ruthven, who so far relented that he went to consult his brother, leaving the king in charge of the man in armour. In the meantime, one of Gowrie's servants hastily entered the apartment where the king's retinue were, and announced that the king had just ridden off towards Falkland. All hurried into the street, and the earl, with the utmost eagerness, called for their horses. On Alexander Ruthven's return to the king, he declared that there was now no remedy, but that he must die, and proceeded to bind his hands with a garter. The king grappled with him, and a fierce struggle ensued. Dragging Ruthven towards a window looking into the street, which the man in armour had opened, the king cried aloud for help. His attendants knew his voice, and hastened to his assistance. Lennox and Mar, with the greater number of the royal train, ran up the principal staircase, but found all the doors shut. Sir John Ramsay, of the Dalhousie family, one of the royal pages, ascending by a back stair, entered the study, the door of which was open, and seizing Ruthven, stabbed him twice with his dagger, and thrust him down the stair, where he was killed by Sir Thomas Erskine and Sir Hugh Herries. On the death of his brother, Gowrie rushed into the room, with a drawn sword in each hand, followed by seven retainers, well armed, and was instantly attacked. Pierced through the heart by Sir John Ramsay, he fell dead without uttering a word. The inhabitants of Perth, by whom Gowrie, who was their provost, was much beloved, hearing of his fate, ran to arms, and, surrounding the house, threatened revenge. The king addressed them from a window, and admitted the magistrates, to whom he fully related all the circumstances, on which they dispersed, and he returned to Falkland. Three of the earl's servants were executed at Perth. The man in armour, Andrew Henderson, the earl's steward, was pardoned. All who were examined were totally ignorant of the motives which had prompted the brothers Ruthven to such a deed, and they still remain in some degree of mystery, although recent discoveries have led to a pretty general belief that the object of the conspirators was to possess themselves of the king's person, to convey him by water to Fast Castle, and either to give him up to England, or to administer the government in his name in the interest of that country and of the Presbyterian leaders at home. Most of the documents relating to the plot are printed.

GOYA Y LUCIENTES, Francisco, the most distinguished painter of the new Spanish school, was born at Fuente de Todos, in Aragon, 31st March 1746, and received his first education in art in the academy at San Luis, Saragossa. On his return from a visit to Rome, the talent and speed with which he executed some paintings for the royal tapestry manufactory gained the approbation of the celebrated Mengs, who superintended that work. His scenes from the common life of the Spanish people excited special admiration; but all the productions of his easel during this early period, to which belong the altar-piece and the crucifix at the entrance to the choir of the church of San Francisco al Grande in Madrid, are marked by simplicity of composition, charming truthfulness, and a natural and effective chiar-oscuro. In 1780, he was elected member of the academy of San Fernando. From this time, the influence of Velasquez and Rembrandt is observable in his paintings. Among the most celebrated of these is his portrait of Charles IV., for which he was made court-painter. In general, his portraits were executed with great felicity and ease. In 1824, he went to Paris for his health, and continued to reside in France till his death, which took place at Bordeaux, 16th April 1828. Besides his works in oil-colour, G. is celebrated for his essays in fresco-painting, etching, lithography, and in almost every department of his art.

GOYA'NNA, a city of Brazil, in the province of Pernambuco, is situated on a river of the same name, 35 miles north-west of Olinda. It has numerous factories and an active trade. Pop. upwards of 10,000.

GOYA'Z, a city of Brazil, is situated on the river Vermelho, in lat. 16° 21′ S., long. 50° 35′ W., nearly in the middle of the empire, being the capital of the central province, which bears its name. The city contains about 7000 inhabitants; and the province, with an area of 290,000 square miles, has, according to the government returns in 1867, a population of only 150,000 (besides 15,000 Indians), mostly aborigines. The chief productions are cotton, timber, and cattle.

GO'ZO, or GOZZO (called by the Romans *Gaulos*), an island in the Mediterranean, belonging to Britain, is about 10 miles in length, and about 5 miles in breadth; has an area of 36 sq. m., and a pop. of 17,000. Its surface is agreeably diversified, and it has many fertile valleys. It appears to have been formerly connected with Malta, from which it is now separated by a channel four miles in width. On this account, and from its natural productions, it is a spot of the highest interest to the naturalist, while the cyclopean walls of the 'Giant's Tower' and Roman monuments of a later period excite the attention of the antiquary. The island abounds in game, and is much frequented by sportsmen. It produces large quantities of grain and cotton, and is celebrated for cattle and for a breed of large asses. From the circumstance of its having two harbours, it is likewise of importance in a commercial and nautical point of view. The chief town is Rabato, situated near the centre of the island. The British governor resides in the Castel del Gozzo.

GOZZOLI, Benozzi, a famous fresco-painter, was born at Florence about the beginning of the 15th c., and studied under Fra Angelico, whose excellence as a painter of sacred subjects he fully equalled, if not surpassed. A glow of rejoicing life seems infused into all G.'s productions. His chief works bearing traces of his master's influence are frescoes in the churches of Orvieto and Rome; his own style being visible in the paintings he executed by command of Pietro de' Medici, in a chapel of the Medici, now Riccordi Palace, at Florence. The great work, however, on which G.'s fame rests, is the immense frescoes executed on the north wall of the famous cemetery, or Campo Santo of Pisa. This wonderful series of paintings, not inaptly termed by Vasari *una terribilissima opera* ('a terrific work'), was undertaken by the artist at the age of sixty, and accomplished in sixteen years. The scenes, which are all scriptural, are 24 in number, and are still in excellent preservation. G. died in 1485.

GRAAF, Regnier de, a celebrated Dutch physician, was born at Schoonhove in 1641, and died at Delft in 1673. He studied at the university of Leyden under Dubois (De le Boë), who is better known under his Latinised name of Sylvius; and on the death of the latter, in 1672, would have been unanimously elected to the vacant chair, if his religion (he was a Catholic) had not proved an insuperable obstacle to his appointment. In 1664, when only twenty-three years of age, he published his *Disputatio Medica de Natura et Usu Succi Pancreatici*, which, although containing several errors—as, for instance, that the pancreatic juice is acid, and that many diseases, and especially intermittent fevers, are due to a morbid condition of this fluid—gained him a great reputation. After a short residence in France, where he took his doctor's degree at Angers in 1665, he returned to Holland, and settled at Delft, where his success in practice gained him much envy. He rendered great service to anatomy in being the inventor of those injections of the blood-vessels which Swammerdam and Ruysch brought to a state of comparative excellence, and which are at the present day the basis of our sound knowledge of most of the tissues of the body. He published several dissertations on the organs of generation in both sexes, which involved him in a prolonged and angry controversy with Swammerdam. According to Haller, his death was occasioned by an attack of jaundice, brought on by the excitement of this controversy, but we do not know Haller's authority for this assertion. All his works were collected in one octavo volume, and published under the title of *Opera Omnia* in 1677, and they were republished in 1678 and in 1705.

GRAAFF-REI'NET, the chief town of the division of its own name, is one of the most important and prosperous towns in Cape Colony. The number of inhabitants is about 3800. During the ten years immediately preceding 1857, it had risen from an inland village to be a great centre of commerce, having its public library, its college, its agricultural society, its banks, and its newspaper. It owes its advancement partly to its position on the high-road between Port Elizabeth and the northern boundary. It is situated on the Sunday, which enters Algoa Bay, near Port Elizabeth.

GRAAFIAN VESICLES. See Ovary.

GRAAL, GRAL, or GRÉAL (a word derived probably from the old French, perhaps Celtic, *gréal*, Provençal, *grazal*, medieval Latin, *gradalis*), signifies a kind of dish. In the legends and poetry of the middle ages, we find accounts of the Holy Graal—San Gréal—a miraculous chalice, made of a single precious stone, sometimes said to be an emerald, which possessed the power of preserving chastity, prolonging life, and other wonderful properties.

This chalice was believed to have been first brought from heaven by angels, and was the one from which Christ drank at the Last Supper. It was preserved by Joseph of Arimathea, and in it were caught the last drops of the blood of Christ as he was taken from the cross. This holy chalice, thus trebly sanctified, was guarded by angels, and then by the Templises, a society of knights, chosen for their chastity and devotion, who watched over it in a temple-like castle on the inaccessible mountain Montsalvage. The legend, as it grew, appears to have combined Arabian, Jewish, and Christian elements, and it became the favourite subject of the poets and romancers of the middle ages. The eight centuries of warfare between the Christians and Moors in Spain, and the foundation of the order of Knight Templars, aided in its development. The stories and poems of Arthur and the Round Table were connected with this legend. About 1170, Chrétien of Troyes, and after him other troubadours, sang of the search for the holy graal by the Knights of the Round Table, in which they met with many extraordinary adventures. Some have supposed that the story of the connection of the miraculous chalice with the Last Supper and the blood of Christ arose from a wrong division of the words *san grêal*, holy vessel, which were written *sang réal*, royal blood, blood of the Lord; but although the coincidence is curious, there is no good reason to suppose that a pun could have been the foundation of a superstition which spread over Europe. The legend of the graal was introduced into German poetry in the 13th c. by Wolfram von Eschenbach, who took Guiot's tales of Parcival and Titurel as the foundation of his poem, but filled it with deep allegorical meanings. It is more elaborately treated by the author of Titurel the Younger; and much curious information may be found in a work, *On the Description of the Temple of the Holy Graal*, by Boisserée ('Ueber die Beschreibung des Tempels des Heiligen Graal,' Munich, 1834).

GRABS, vessels of from 150 to 300 tons, employed on the Malabar coast. They are broad armed ships, with two or three masts, and unsuited for very heavy weather.

GRA'CCHUS is the name of a Roman family, of the gens Sempronia, which contributed several famous citizens to the state. First we have Tiberius Sempronius, who was consul in 238 B. C., and conducted some warlike operations in Corsica and Sardinia. Another Tib. Sempronius distinguished himself in the second Punic war, and for his success in opposing Hannibal, was honoured with the consulship in 215 B. C., and again in 213 B. C. In those days of despondency, he did much to revive the spirit of the senate and people; with the allies, and 8000 *volones*, or volunteer slaves (who afterwards gained their liberty as a reward for their bravery), he withstood the Carthaginians in South Italy, defeated Hanno, and checkmated Hannibal himself; but after many victories, he at length lost his life, either in battle with Mago, or, according to others, by treachery. Hannibal honoured him with a splendid funeral. Passing by some Gracchi of minor note, as the augur of 203 B. C., the tribune of 189 B. C., and others, we come to Tiberius Sempronius, the father of those two reformers and friends of the people whose fame has overshadowed all the others. He was born about 210 B. C., and for many years occupied a foremost position in the state. He was successively tribune, ædile, prætor, consul (twice), and censor, and distinguished himself in several wars. He introduced some important constitutional changes, and was often employed on foreign embassies, in which his judgment and conciliatory spirit were of great service to the state. He married Cornelia, the youngest daughter of P. Scipio Africanus, by whom he had twelve children. Nine of these died in youth; a daughter, Cornelia, married Scipio Africanus the younger. The history of his two sons follows:

1. TIBERIUS SEMPRONIUS GRACCHUS was born about 168 B. C., and was educated with great care by his excellent mother (his father having died while he was yet very young). He first saw military service under his brother-in-law, Scipio Africanus the younger, whom he accompanied to Africa. He was present at the capture of Carthage, and is said to have been the first of the Romans to scale the walls. In 137 B. C., he acted as quæstor to the army of the consul Mancinus in Spain, where the remembrance of his father's good faith and clemency was so fresh after forty years' interval, that the Numantines would treat with no other Roman but the son of their former benefactor. He was thus enabled to save from utter destruction an army of 20,000 Romans, who had been defeated, and were at the mercy of the Numantines. But the peace was considered by the aristocratic party at Rome as disgraceful to the national honour, and was repudiated, Mancinus being stripped naked, and sent back to the Numantines, that the treaty might thus be rendered void. Disgust and disappointment at this result are said by some, though without good reason, to have determined G. to espouse the cause of the people against the nobles; but a much more feasible ground for his conduct is to be found in the oppressed state of the commons at the time. Being elected tribune, he endeavoured to reimpose the Agrarian Law of Licinius Stolo, and after violent opposition on the part of the aristocratic party, who had bribed his colleague M. Octavius Cæcina, he succeeded in passing a bill to that effect. (For a detailed account of the measure, see AGRARIAN LAW.) Tiberius G., his brother Caius, and his father-in-law Ap. Claudius, were appointed triumvirs to enforce its provisions. Meantime, Attalus, king of Pergamus, died, and bequeathed all his wealth to the Roman people. G. therefore proposed that this should be divided among the poor, to enable them to procure agricultural implements, and to stock their newly acquired farms. It is said that he also intended to extend the franchise, and to receive Italian allies as Roman citizens. He also diminished the time which citizens were required to serve in the army. But fortune turned against the good tribune. He was accused of having violated the sacred character of the tribuneship by the deposition of Cæcina, and the fickle people in large numbers deserted their champion and benefactor. At the next election for the tribuneship, his enemies used all their efforts to oust him; and a violent scuffle having arisen between the opposing factions, G. was slain, along with upwards of 300 others. His surviving friends were imprisoned, exiled, or put to death.

2. CAIUS SEMPRONIUS GRACCHUS, who was nine years younger than his brother, was possessed of much greater natural powers, and of more comprehensive views. His brother's death, which occurred while he was serving in Spain under Scipio Africanus, deterred him for some years from entering into public life; and the nobles seeing his great abilities, and fearing his influence with the people, endeavoured to keep him as long as possible on foreign service in Sardinia and elsewhere. But at length he unexpectedly returned to Rome, being urged by his brother's shade, as was said, to enter on his great mission. Goaded by the persecution and groundless accusations of his enemies, he stood

for the tribuneship, and was elected in 123 B.C. After bringing forward some measures to take vengeance on his brother's murderers, he set himself to carry out the agrarian law, which, though not repealed, had by the machinations of the nobles been kept in abeyance. The two great aims of his legislation—viz., to improve the condition of the poor, and to curtail the power of the senate and nobles—were now prosecuted with the utmost vigour, and with unflinching steadiness of purpose. To develop the resources of Italy, and at the same time to employ the poor, he made new roads throughout all parts of the country, repaired old ones, and erected milestones. By his zeal, and by his unwearied industry in personally carrying out his own measures, even to superintending the execution of the public works, and by his affability and kindly good nature, he gained the esteem and approbation of all men with whom he came in contact. With the equites and the poorer classes, he was in special favour. But he at length fell, as his brother had done, by the intrigues of the nobles. One of his colleagues, M. Livius Drusus, was bribed by the opposite faction, and soon succeeded in undermining the influence of Caius by far surpassing him in the liberality of his public measures, and by his benefits to the commons. G. having stood for the tribuneship a third time, was rejected. Ultimately, by a series of moves, the history of which is too long for our space, violence was employed against Caius and his party—a fearful struggle took place in the streets of Rome, in which 3000 men are said to have perished. Many others were imprisoned, and afterwards executed. Caius held aloof from the fight, but was at length compelled to seek safety in flight. He escaped to the grove of the Furies with a single slave, who first slew his master, and then himself. The people saw, when too late, the folly of which they had been guilty in abandoning their best friend in the hour of need, and endeavoured to atone for their crime by erecting statues to the brothers G., by declaring sacred the spots where their blood had been shed, and by offering sacrifices to them as to deities. Caius left a son, whose after-fate is unknown.

GRACE is an expression frequently used in Scripture and in theological discussion. Its distinctive meaning is the idea of *free and unmerited* favour. According to Aristotle, this is the proper meaning of *charis* (Gr. grace), even when applied to man. It is a benefit springing out of the liberality and freeheartedness of the giver, and bestowed without any hope or expectation of reward. Applied to God in the New Testament and in theology, it denotes the free outcoming of his love to man; and when man, on the other hand, is said to be in a state of *grace*, it implies that he is in the enjoyment of this divine love and favour. St Paul draws a sharp contrast (Rom. xi.) between *charis* and *erga* (Gr. works), as mutually excluding one another. 'And if by grace, then is it no more of works: otherwise grace is no more grace. But if it be of works, then is it no more grace: otherwise work is no more work.'

Theologians have distinguished grace into *common or general*, and *special or particular*. *Common* grace is supposed to denote the love which God has to all His creatures, and the light of nature and of conscience which they all enjoy. *Special* grace is the love which God has for His elect people, and by which He saves them from their sins. This *special* or *saving* grace is sometimes also divided in various ways, and spoken of as electing, justifying, sanctifying grace; also in respect of man, as *imputed* or *inherent* grace—the grace, that is to say, of Christ's righteousness imputed or reckoned to the account of those that believe on Him, and the grace of holy and pious dispositions wrought in the heart by the spirit of God. Grace is also spoken of as *efficacious* and *irresistible*, and the relation in which the elect or believing people stand to God is represented as a *covenant of grace*, in contrast with the primitive relation which Adam bore to his Maker before the fall, which is called a *covenant of works*.

All these theological distinctions have arisen in the course of extended argument and discussion on divine truth. They are not to be found—at least in their more technical sense—in the New Testament. The *charis* of St Paul is not a logical distinction, but a spiritual fact. It is the loving aspect of God towards the sinner—towards all sinners, whereby all who confess their sins have free access into His favour, and receive the 'adoption of sons.' The technical distinctions of theology, however, are not without their value when rightly apprehended and interpreted. They mark the course of past controversy—they give precision to theological thought—and when not allowed to deface the simpler proportions of divine truth, they may teach needful and important lessons.

GRACE, Days of. See Bill.

GRACES, the goddesses of grace, favour, and gentleness, the sources of all grace and beauty, appear in Homer in indefinite numbers as the attendants of Cytherea (Venus), whom it is their office to bathe and anoint. Hesiod and most other poets mention three G.—Aglaia, Thalia, and Euphrosyne, the daughters of Zeus and Eurynome. Their worship is said to have been first introduced into Greece at Orchomenos, in Bœotia, by Eteocles. The Lacedemonians and Athenians originally recognised only two Graces, called, by the former, Phænna and Kleta; by the latter, Hegemone and Auxo. In the early ages, the G. were represented in elegant drapery; at a later period, slightly draped, or entirely nude. They appear holding each other by the hand, or locked in each other's embrace.

GRACIO′SA, one of the Azores Islands (q. v.), and the seventh of that group in population and importance.

GRA′DIENT. A tortoise walking is said, in Heraldry, to be gradient.

GRADIENT, a term used chiefly in connection with railways, to signify a departure of the line from a perfect level.

GRA′DUAL, in the Liturgy of the Roman and other Western churches, means that portion of the mass which intervenes between the epistle and gospel, and consists of a few verses of the Holy Scriptures, generally taken from the Psalms. It was originally called the 'Responsum,' or 'Cantus Responsorius;' but, probably for the sake of distinguishing it from other portions of the service called by the same name, its present appellation has been substituted. The name 'gradual' is derived from the place at which this response was chanted, and which was either the ambo, or chanting pulpit, which is approached by 'steps' (*gradus*) or the 'steps' themselves, whether of the ambo or of the altar. Originally, as we find from St Augustine, the gradual response consisted of an entire psalm, and in the mass of the first Sunday of Lent the entire of the 91st (90th in the Vulgate) psalm is chanted. In the Ambrosian Liturgy, the gradual is partly from the Old and partly from the New Testament. The gradual, in the Roman liturgy, is always followed by the 'alleluia,' except in penitential time, when a slow and mournful chant, called the 'Tract,' is substituted.

GRADUAL PSALMS, or '**PSALMS OF THE STEPS**,' or '**SONGS OF DEGREES**,' a name given both by the Hebrews and in the Christian service-books to the fifteen psalms, 120—134 (119—133 in the Vulgate). The origin of this name is uncertain. The rabbins trace it to a fabulous incident connected with the building of the second temple; others explain it as an allusion to the fifteen steps by which (Ezekiel xl. 22—26) the temple was reached; others, again, regard these psalms as containing a prophetic allusion to the return from captivity, which, in the language of the Jews, was 'a going up,' the 134th psalm being the full outburst of exultation at the accomplishment of that great object of hope and longing. These psalms, in the Romish Church, form part of the office of each Wednesday during the Lent.

GRADUALE, the name given to the music of the above described portion of the Roman Liturgy. It is performed during mass after the epistle is read. It is said to have been used from the earliest times to allow the officiating priest time, during its performance, to take his place on the steps of the reading-desk, or on the steps of the gospel side of the altar. The music is according to the character of the words, and may be either an aria, duet, or chorus. The composition must not be long, as the priest has little ceremony to go through during its performance. The best specimens of the graduale are Haydn's *Insanæ et Vanæ Curæ; Salve Regina;* or Mozart's *Misericordias Domini; Sancta Maria; De Profundis*, &c.

GRADUATION, the art of dividing mathematical, astronomical, and other instruments. The simplest problem in graduation is the dividing of a straight line, such as an ordinary scale or rule. This is commonly done by copying from a standard scale, for which purpose a dividing square and a suitable knife for cutting the divisions are used. The dividing square is a hard steel straight-edge, with a shoulder at right angles like a carpenter's square. This is made to slide along the standard scale, and halt at each required division, when a corresponding one is cut upon the rule, &c., by using the steel straight-edge as a guide to the knife. The *original graduation* of a straight line into equal divisions, as in making a first standard scale, &c., is performed either on the principle of *bisection* or *stepping*. In bisecting, the points of a beam-compass (see COMPASS) are adjusted to nearly half the length of the line to be divided; one point is then placed at one end of the line, and a faint arc struck towards the middle: this is repeated at the other end; the small distance between these arcs is then carefully bisected with the aid of a fine pointer and magnifier, which gives an accurate half of the line. The half thus obtained is again bisected in like manner, and these quarters bisected again, and so on until the required subdivision is attained. Stepping is performed with delicately pointed spring-dividers, which are set at once as nearly as possible to the opening of the small division required; then the points are made to step on, leaving at each step a very fine dot; and when it is found that the last dot either falls short of or overpasses the end of the line, the opening is adjusted accordingly, until perfect accuracy is obtained. Thus, if a line were divided into a thousand parts, and each division were $\frac{1}{1000}$th too long or too short, the error would amount to a whole division at the end of a thousand steps. The method of bisection is practically the most accurate, and has been adopted by Graham, Bird, Ramsden, Troughton, and other eminent artists in original graduation. Curved lines are divided on this principle. The chord of an arc of 60° is equal to the radius; therefore, the opening of the compasses required for striking the circle gives this arc at once to start with. An arc 90°, or a quadrant, is obtained by bisecting 60°, and adding the half. By continual bisection of 60°, the finer graduations are produced. The amount of care, patience, skill, and delicacy of touch required in the original graduation of important astronomical instruments, is such, that not above one or two men in a generation have been found competent to the task, and these have become almost as famous as the astronomers who have successfully used the instruments. It would be out of place here to point out in detail the minute precautions and methods of correction that are adopted in this most delicate manipulation; but, as an example, we may mention the fact, that Graham, when dividing the mural quadrant for the Greenwich Observatory, measured his larger chords from a scale made for the purpose; but before laying these down on the quadrant, he left the scale, beam-compasses, and quadrant to stand for a whole night, in order to acquire exactly the same temperature, and that neglect of this precaution would have involved a notable amount of error. The necessity of such extreme accuracy will be understood when we consider the application that is made of these divisions. When, for example, the mariner determines his latitude by taking the meridian altitude of the sun, the graduated arc of the limb of the sextant or quadrant he uses represents, practically, the curved surface of the globe, and the error is magnified just to the same extent as the radius of the earth exceeds that of the divided arc of the instrument. Supposing this arc to be part of a circle of 60 inches' circumference, each degree will occupy $\frac{1}{6}$th of an inch. An error of $\frac{1}{100}$th of an inch in the division would thus mislead the mariner to an extent of more than four statute miles as regards his position on the waters. But such a ship's quadrant is but a coarse and rude instrument compared with astronomical instruments for measuring celestial angular distances by means of a divided arc; in these, an error of a thousandth part of an inch would be regarded as one of serious magnitude.

The methods of *original graduation* above described are not practically adopted except for the largest and most important astronomical or geodesical instruments. Ordinary instruments are graduated by dividing plates or engines which copy and adapt a set of already existing divisions. The dividing-plate which is used for common purposes, such as dividing compass rings, &c., is a divided circle with a steel straight-edge, made movable on the axis or arbor of the plate in such a manner that its edge during every part of its revolution shall fall in the exact line from centre to circumference. The ring, protractor, or other instrument to be divided, is clamped upon the plate with its centre exactly coinciding with that of the plate, and the straight-edge is moved round, and made to halt at the required divisions on the circumference of the dividing-plate, and by using the steel straight-edge as a guide, corresponding divisions are marked off upon the concentric arc of the instrument to be divided. *The dividing-engine* is a very complex machine, requiring the greatest accuracy and care in its construction; so much so, that the possession of a good one affords the means of obtaining a very good income, with a moderate amount of labour in using it. Such was the case with the instrument of Mr Parsons of London, who for many years divided a large proportion of the best theodolites, sextants, &c., that were made in this country. Among the most celebrated dividing-engines may be mentioned those of Ramsden, Troughton, Simms, and Ross. A detailed account of the construction of these would far exceed our limits. Their principal parts consist of a large circle divided with extreme care by original graduation. This wheel is racked on its edge with teeth as equal and accurate as the divisions; a very carefully constructed endless screw works in these teeth, and is moved through any given number of revolutions, or any measured fraction of a revolution, by means of a treadle or other suitable power, thus making the requisite steps for each division; another part of the machine cutting a fine line at the moment of the halt of each step.

These divisions are cut upon an arc of silver, gold, or platinum, which is soldered or inlaid upon the limb of the instrument, the precious metals being used, on account of the oxidation to which common metals are liable.

GRÆCIA, Magna. See Magna Græcia.

GRAF, the German equivalent for Count (q. v.), *Comte*, Comes, and for our Earl (q. v.). The etymology of the word is disputed, but the most probable conjecture seems to be that it springs from the same root with the modern German *raffen* and the Anglo-Saxon *reafan*, to snatch or carry off hastily; and also with our words *reve*, *greve*, and the last syllable of *sheriff*. If this view be correct, the graf, in all probability, was originally a fiscal officer, whose duty it was to collect the revenue of a district. The title first appears in the *lex salica* (compiled in the 5th c.), under the Latinised form of *Grafio;* at a later period, the office is often designated by the Latin equivalent of *Comes*. Charlemagne divided his whole kingdom into grafel districts (*Grafengaue*) or counties, each of which was presided over by a graf. The people were in the habit of appointing a representative called the *Cent-graf* to attend to their interests with the graf, and probably, if necessary, to appeal from his decisions to the central government. Then there was the *Stall-graf*, or stable-graf; the *Comes Stabuli*, or constable of later times; the *Pfalz-graf* (*Comes Palatii*), who presided in the domestic court of the monarch, which as such was the highest court in the realm; the *Send-graf*, who was sent as an extraordinary deputy of the king to control the ordinary *gau-grafen;* and lastly, the *Mark-graf*, or marquis, on whom the important duty of defending the border-lands devolved. When feudal offices became hereditary, and the power of the princes of the empire, secular and ecclesiastical, developed itself, the graf gradually ceased to be an officer possessed of real power, and became merely a titled noble. In Germany, in modern times, there are two classes of grafs: those who are representatives of the old grafel families, who held sovereign jurisdiction immediately under the crown (*landeshoheit*), and who still belong to the higher nobility, their chief taking the title *Erlaucht* (Illustrious); and those who form the highest class of the lower nobility. The former is a very small, the latter, an extremely numerous class of persons.

GRÄFENBERG, a little village in Austrian Silesia, is an extension of the town of Freiwaldau towards the north, and is celebrated as the spot where the water-cure (see Hydropathy) was introduced about the year 1828 by Priestnitz. The village is situated at an elevation of 1200 feet above the level of the Baltic Sea; the climate is inclement, and the vegetation scanty. It extends from the valley, half way up the Gräfenberge. The lodgings for visitors are partly in the buildings connected with the baths, partly scattered on the declivity of the hill, or in Freiwaldau.

GRAFFI'TI (Ital. *graffito*, a scratching), a class of ancient inscriptions to which attention has recently been called, and of which several collections have been made, or are in progress. The graffito is a rude scribbling or scratching with a stylus, or other sharp instrument, on the plaster of a wall, a pillar, or a door-post. Such scribblings are pretty commonly found on the substructions of Roman ruins, as in the Golden House of Nero, the palace of the Cæsars and the Palatine, and in still greater numbers in Pompeii and in the Roman catacombs. Their literary value, of course, is very slight; but as illustrating the character and habits of a certain class of the ancient Romans, and what may be called the 'street-life' of the classic period, they are deserving of study. A small selection of Pompeiian graffiti was published in 1837 by Dr Wordsworth; but the most complete, or, at all events, the most popular collection, is that of Padre Garrucci, a Neapolitan Jesuit, which was published in Paris in 1856. Greek graffiti occasionally are found upon Roman ruins, but they are commonly in Latin, and in a few instances at Pompeii, in the ancient Oscan. A few specimens may not be uninteresting.

Some of them are idle scribblings, such as we may suppose some loiterer to indite at the present day; thus, some lounger at the door of a wine-shop at Pompeii amuses himself by scratching on the door-post the tavern-keeper's name—*Taberna Appii* ('Appius's Tavern'), fig. 1. In other cases, we meet with some scrap of rude pleasantry or scandal, such as not unfrequently defaces the walls of our own towns or villages; thus, *Auge amat Arabienum* ('Auge is in love with Arabienus'), fig. 2. Many rude sketches also are found upon the walls, some of them evidently caricatures, others seriously meant, and grotesque from the extreme rudeness. A great many of the subjects of those sketches are gladiatorial. Here is a specimen (fig. 3):

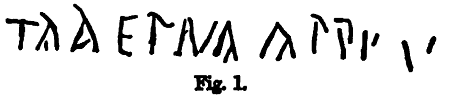


Fig. 1.

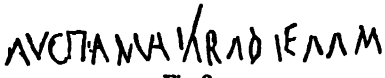


Fig. 2.

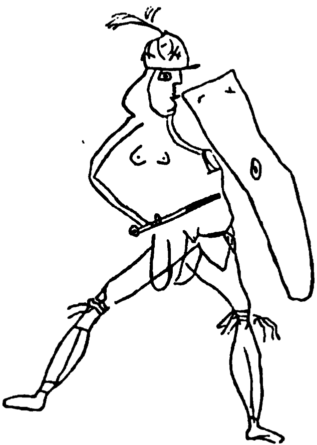


Fig. 3.

By far the largest proportion of the graffiti are from Pompeii, but many have also been discovered at Rome, and some of them are of a most interesting character. One discovered by Father Garrucci in 1856, in a subterranean chamber of the palace of the Cæsars, possesses a strange and truly awful interest, as a memorial of the rude early conflicts of paganism with the rising Christian creed. It is no other than a pagan caricature of the Christian worship of our Lord on the cross, and contains a Greek inscription descriptive of one Alexamenus as engaged in worshipping God. The chamber in which it was found appears to have been a waiting-room for slaves and others of inferior grade.

The graffiti of the catacombs are almost all sepulchral, and are full of interest as illustrating early Christian life and doctrine.—See for the whole subject the *Edinburgh Review*, vol. cx. pp. 411—437.

GRAFTING, the uniting of a young shoot (*scion*) of one kind of plant to a stem (*stock*) of another kind, so that the scion may receive nourishment from the stock. Grafting has been practised from ancient times, as may be seen from passages in the New Testament, and in Virgil and other Latin classics; although it cannot be certainly traced to a more remote antiquity; and its introduction among the Chinese is ascribed to Roman Catholic missionaries. It is a most important part of the art of gardening, and is practised for various purposes, but chiefly for the perpetuation and propagation of the finest varieties of fruit-trees, which could not be accomplished by seed, and is accomplished by grafting more rapidly and easily than by layers or cuttings. Besides this, however, grafting is of great use in hastening and increasing the fruitfulness of fruit-trees; the circulation of the sap being impeded at the junction of the stock and scion—as by a deep wound, removal of bark or the like—more particularly when there is a considerable difference between the stock and scion; and repeated grafting (technically, *working*) is often resorted to by gardeners to obtain flowers and fruit much sooner than would naturally be the case. Grafting is also employed to turn to account the vigour of a root and stem of which the branches are exhausted or otherwise unproductive, and large crops of fruit may often be thus obtained in a garden, much sooner than by any other means.

In grafting, it is particularly to be attended to that the *Alburnum* (q. v.) of the scion is brought into contact with that of the stock. The hard wood of the one never unites with that of the other, remaining separate and marking the place of the operation even in the oldest trees. For scions or grafts, pieces of about six to eight inches long are generally taken from the shoots of the previous summer, with several buds, but portions of shoots of two years old are sometimes successfully employed. The time for grafting is in spring, as soon as the sap begins to appear. The scion should, if possible, be taken from a healthy and fruitful tree, but scions from the extremities of lateral branches are more likely to become speedily fruitful than those from the uppermost branches, where growth is most vigorous. The scion should be kept for a few days before grafting, so that the stock may rather exceed it, not only in vigour, but in the progress of its spring growth; and for this purpose may be placed in the ground, in a rather dry soil, sheltered from the direct rays of the sun. Scions may be kept for some time, and easily carried to a distance, by sticking their lower end into a potato. The end should always be freshly cut off when the scion is to be used. There are various modes of grafting. *Cleft-grafting* (fig. 1) is very commonly practised when the stock is very considerably thicker than the scion. The stock being cut over, is cleft down, and the graft, cut into the shape of a wedge at its lower end by a sharp thin knife, is inserted into the cleft. This mode of grafting is particularly applicable to branches of large trees, when the introduction of a new variety of fruit, or increased fruitfulness, is sought.—*Crown-grafting* is used for still thicker stocks, which are cut across, and then cleft down by two clefts crossing one another at right angles, two scions being inserted close to the bark in each cleft; or no cleft at all is made, and any desired number of scions obliquely cut away on one side are simply inserted between the bark and wood of the stock, the operation in this case being deferred till the bark readily parts from the wood. In this kind of grafting, a longitudinal slit in the bark of the stock, opposite to each graft, is advantageous. — *Tongue-grafting* (fig. 2) is the mode most commonly practised for young trees in nurseries. For this, it is necessary that the stock and the scion should be of not very different thickness. A slit or a very narrow angular incision is made in the centre of the stock downwards, and a similar one in the scion upwards, both having been first cut obliquely, at corresponding angles, and the tongue thus made in the scion being inserted into the incision in the stock, they are fastened very closely and thoroughly together.—In *Saddle-grafting*, the end of the stock is cut into the form of a wedge, and the scion is affixed to it, the base of the scion having been cut or slit up for the purpose.—*Shoulder-grafting* (fig. 3), used chiefly for ornamental trees, is performed by cutting obliquely, and then cutting across a small part at top of the stock, so as to form a shoulder, the scion being cut to fit it.—*Peg-grafting*, not now

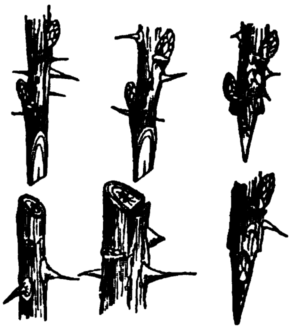


Fig. 1.—Cleft-grafting.

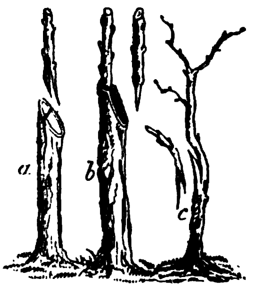


Fig. 2.

a, tongue-grafting; *b*, cleft-grafting; *c*, tongue-grafting (*side-grafting*) as practised in wall trees to fill up vacancies, without cutting over the head of the stock.

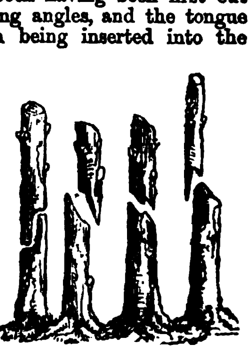


Fig. 3.—Shoulder-grafting.

much in use, is accomplished by making the end of the scion into a peg, and boring the top of the stock to receive it.

Whichever of these modes of grafting is adopted, the graft must be fastened in its place by tying, for which purpose a strand of bast-matting is commonly used. The access of air is further prevented by means of clay, which has been worked up with a little chopped hay, horse or cow dung, and water, and which is applied to the place of junction so as to form a ball, tapering both upwards and downwards. In France, a composition of 28 parts black pitch, 28 Burgundy pitch, 16 yellow wax, 14 tallow, and 14 sifted ashes, is generally used instead of clay. Gutta-percha, applied in a soft state, has also been used, or even blotting-paper held fast by stripes of sticking-plaster. The progress of the buds shews the union of the graft and stock, but it is not generally safe to remove the clay in less than three months; and the ligatures, although then loosened, are allowed to remain for some time longer. From some kinds of fruit-trees, fruit is often obtained in the second year after grafting.

Budding (q. v.) is in principle the same as grafting; and *Flute-grafting* is a kind of budding in which a ring of bark is used instead of a single bud, and a stock of similar thickness having been cut over, a ring of bark is removed, and the foreign one substituted. This is commonly performed in spring, when the bark parts readily, and is one of the surest modes of grafting.—*Inarching* (q. v.), or *grafting by approach*, in which the scion is not cut off from its parent stem until it is united to the new stock, is practised chiefly in the case of some valuable shrubs kept in pots, in which success by the ordinary methods is very doubtful.

An effect is produced by the stock on the scion which it nourishes analogous to that of a change of soil; much of the vigour of a strong healthy stock is also communicated to a scion taken even from an aged tree. There is, moreover, in some degree, an influence of the elaborated sap descending from the scion on the stock which supports it. An important part of the practical skill of the gardener or nurseryman consists in the selection of the proper kinds of stocks for different species and varieties of fruit-trees. The stock and scion, however, must not be of species extremely dissimilar. No credit is due to the statements of ancient authors about vines grafted on fig-trees, apples on planes, &c., the semblance of which can only have been brought about by some delusive artifice; for all attempts at grafting fail except among plants of the same genus, or at least of the same natural family.

Herbaceous plants with firm stems, as dahlias, are sometimes grafted. Some kinds of plants, of small size, in pots, are placed in moist hothouses or hotbeds, under bell-glasses, whilst the junction of the scion and stock is going on, which in these circumstances takes place very surely and very expeditiously. But an accumulation of too much moisture under the bell-glass must be guarded against.

GRAGNA'NO, a town of 11,243 inhabitants, in the province of Naples, two miles south-east of Castellamare, is situated on the flank of Mount Gaurano, from which it is said to have derived its name. The origin of this town dates from the great eruption of Vesuvius in 79 A. D., when the inhabitants of Stabia, in dread of the vicinity of the volcano, fled from their dwellings, and sought refuge on the mountain of Gaurano. G. lies in a beautifully picturesque neighbourhood, which produces excellent wines, and has good macaroni manufactories.

GRAHAM, FAMILY OF. See MONTROSE.

GRAHAM, SIR JAMES ROBERT GEORGE, THE RIGHT HONOURABLE, of Netherby, Cumberland, statesman, eldest son of Sir James, the first baronet, by Lady C. Stewart, eldest daughter of the seventh Earl of Galloway, was born June 1, 1792. The Grahams of Netherby are a junior branch of the Grahams of Esk, Viscounts of Preston, descended from the Earls of Stratherne and Menteith. G. was educated at Westminster School, whence he proceeded to Queen's College, Cambridge. He afterwards became private secretary to Lord Montgomerie, the British minister in Sicily, during the most critical period of the war, and the entire management of the mission devolved upon him at a most important moment, in consequence of the illness of his chief. On the arrival of Lord W. Bentinck, he was continued in his post, and he afterwards accepted a military situation attached to the person of Lord William, who was commander-in-chief in the Mediterranean. He was sent in this capacity to Murat, with whom, at Naples, he negotiated the armistice which separated that general from Napoleon. In 1818, he was returned for Hull on Whig principles; but at the next election, in 1820, lost his seat, and some years elapsed before he re-entered parliament. In 1824, he succeeded to the baronetcy on the death of his father. In 1826, he was returned for Carlisle as a Whig, and a warm supporter of Catholic emancipation. He displayed so much ability in opposition, that Earl Grey offered him, in 1830, the post of First Lord of the Admiralty, with a seat in the cabinet. He was also one of the committee of the cabinet appointed to discuss and settle the provisions of the first Reform Bill. He was at this time very popular with the extreme liberal party, and was supposed to be, of all the members of the Grey cabinet, most favourable to radical changes. In 1834, he seceded from the government, with Mr Stanley, on the appropriation clause of the Irish Church Temporalities Act. He refused to join the Peel administration in that year, but gradually in opposition approximated to the politics of that statesman; and in 1841 became Secretary of State for the Home Department in the government of Sir Robert Peel, who on one occasion declared that G. was the ablest administrator and the best man of business he had ever known. In 1844, he issued a warrant for opening the letters of Mazzini, and caused the information thus obtained to be communicated to the Austrian minister, an act by which the ministry, and G. in particular, incurred great obloquy. He also encountered great displeasure north of the Tweed by his high-handed method of dealing with the Scottish Church during the troubles which ended, contrary to his anticipation, in the Disruption, and the formation of the Free Church. He gave Peel a warm support in carrying the Corn Law Repeal Bill, and resigned office with his chief as soon as that great measure was carried. On the death of Peel in 1850, he became leader of the Peelite party in the Lower House, and led the opposition to the Ecclesiastical Titles Bill. In December 1852, he took office in the Coalition Ministry of the Earl of Aberdeen, and accepted his old office of First Lord of the Admiralty. This was a post much below his talents and pretensions, but he held it until February 1855. G. refused to take office either in the first or second administration of Lord Palmerston, but he gave that minister a general support. He died from disease of the heart, October 25, 1861. When the House of Commons again met, it felt that it had lost one who stood in the first rank of statesmen. His commanding stature, fine personal presence, his calm and impressive delivery, his ripe and gentle wisdom, poured forth in a stream of quiet, yet winning and persuasive eloquence, made him the Nestor of the House of Commons. Yet his changes of opinion, from the Whiggism of his youth to the vehement Conservatism of his manhood, and the Radicalism of his old age, exposed him to incessant and well-founded charges of political inconsistency.

GRAHAM, John, Viscount Dundee, was the eldest son of Sir William Graham of Claverhouse, head of a branch of the noble family of Montrose, in Forfarshire. He was born in 1643, entered St Andrews university in 1665, served in the French army from 1668 till 1672, next entered the Dutch service as cornet in the Prince of Orange's horse guards, and is reported (but on no good authority) to have saved the life of the prince at the battle of Seneffe in 1674. Returning to Scotland, he obtained (February 1678) an appointment as lieutenant in a troop of horse commanded by his cousin, the third Marquis of Montrose. At this time, the government of Charles II. was engaged in its insane attempt to force Episcopacy upon the people of Scotland. A system of fines and military coercion had been carried on for years against all Nonconformists; conventicles and field-preachings were prohibited, penalties were inflicted on all who even harboured the recusants, and the nation lay at the mercy of informers. Maddened by oppression, and fired by a fierce zeal for the Covenant, the people flew to arms; but their efforts were irregular and detached, and each successive failure only aggravated their sufferings. Many were executed, the jails were filled with captives, and those who fled were outlawed, and their property seized. In this miserable service, G. now engaged. He encountered an armed body of Covenanters at Drumclog, June 1, 1679, but was defeated, about forty of his troopers being slain, and himself forced to flee from the field. Three weeks afterwards (June 22), he commanded the cavalry at Bothwell Bridge, where the royal forces, under the Duke of Monmouth, achieved an easy victory over the Covenanters. In this battle, three or four were killed while defending the bridge, but in the pursuit, 400 were cut down (chiefly by G.'s dragoons), and 1200 surrendered unconditionally, to be afterwards treated with atrocious inhumanity. These affairs at Drumclog and Bothwell are the only contests that can even by courtesy be called battles in which G. was engaged in Scotland previous to the abdication of James II. They gave no scope for valour, and displayed no generalship. In his other duties—pursuing, detecting, and hunting down unyielding Covenanters—G. evinced the utmost zeal. He rose to the rank of major-general, was sworn a privy councillor, had a gift from the crown of the estate of Dudhope, and was made constable of Dundee. In 1688, on the eve of the Revolution, he was raised to the peerage by James II. as Viscount Dundee and Lord Graham of Claverhouse. When the bigotry of James had driven him from the throne, Dundee remained faithful to the interests of the fallen monarch. He was joined by the Jacobite Highland clans and by auxiliaries from Ireland, and raised the standard of rebellion against the government of William and Mary. After various movements in the north, he advanced upon Blair in Athol, and General Mackay, commanding the government forces, hastened to meet him. The two armies confronted each other at the Pass of Killiecrankie, July 27, 1689. Mackay's force was about 4000 men; Dundee's, 2500 foot, with one troop of horse. A few minutes decided the contest. After both armies had exchanged fire, the Highlanders rushed on with their swords, and the enemy instantly scattered and gave way. Mackay lost by death and capture 2000 men; the victors, 900. Dundee fell by a musket-shot while waving on one of his battalions to advance. He was carried off the field to Urrard House, or Blair Castle, and there expired. In the Bodleian Library, Oxford, is preserved the letter-book of Nairne, private secretary to James II., and in this book is the copy of a letter purporting to be written by Dundee after he had received his death-wound, giving James a short account of the victory. The letter was first published in Macpherson's *Original Papers*, 1775, and has been treated as a forgery; but Nairne could have had no conceivable motive for forging such a document, which remained unprinted above eighty years.

The character and services of Dundee have been greatly exaggerated and blackened by party spirit. With the Jacobites, he was the brave and handsome cavalier, the last of the great Scots and gallant Grahams. With the Covenanters, he was 'bloody Claverse,' the most cruel and rapacious of all the mercenary soldiers of that age. He was neither the best nor the worst of his class. As a military commander, he had no opportunities for display. He was the hero of only one important battle, and in that his skill was shewn chiefly in his choice of position. As a persecutor, he did not, like Dalyell, introduce the thumb-screw, nor, like Grierson of Lagg, drown helpless women at stakes on the sea-sands. 'In any service I have been in,' he said, 'I never inquired further in the laws than the orders of my superior officers;' and in Scotland he had very bad superior officers—low-minded, cruel, relentless taskmasters. It was fortunate for his reputation that he died after a great victory, fighting for an exiled and deserted monarch. This last enterprise has given a certain romantic interest to his name and memory.

GRAHAM, Thomas, a celebrated chemist, was born in Glasgow in the year 1805. Having studied at Glasgow and Edinburgh, he became, in 1830, Professor of Chemistry at the Andersonian University, and continued in that office till 1837, when he succeeded Dr Turner in the chemical chair of University College, London. In 1855, he was appointed Master of the Mint, and resigned his professorship. From the year 1831, in which his memoir, 'On the Formation of Alcoates, Definite Compounds of Salts and Alcohol,' appeared in the *Transactions of the Royal Society of Edinburgh*, to the time of his death, he was constantly publishing important contributions to chemistry. Amongst the most important of his memoirs we may mention the following: 'On the Law of Diffusion of Gases' (*Tr. R. Soc. Edin.* 1834); 'Researches on the Arseniates, Phosphates, and Modifications of Phosphoric Acid' (*Phil. Tr.* 1833); 'On the Motion of Gases, their Effusion and Transpiration' (*Ibid.* 1846 and 1849); 'On the Diffusion of Liquids' (*Ibid.* 1850 and 1851); 'On Osmotic Force' (*Ibid.* 1854); 'Liquid Diffusion Applied to Analysis,' and 'On Liquid Transpiration in Relation to Chemical Composition' (*Ibid.* 1861). In addition to these memoirs, he brought out an excellent treatise on Chemistry, which has passed through more than one edition. G. was one of the founders and first President of the Chemical and the Cavendish Societies, was a Fellow of the Royal Society, and was more than once appointed one of its vice-presidents. He was likewise frequently placed by government on important scientific commissions. He died 16th September 1869.

GRAHAME, James, a Scottish poet, son of a legal practitioner, was born in Glasgow, April 22, 1765, and was educated at the university of that city. He removed to Edinburgh in 1784, where he commenced the study of law under the tuition of a relative, and was admitted a member of the Society of Writers to the Signet in 1791, and in 1795, of the Faculty of Advocates. Finding the legal profession unsuited to his tastes, and having a sufficiency of worldly means, he withdrew from professional practice, and devoted himself to the cultivation of his muse. He had long regarded the life and duties of a country clergyman with a wistful eye, and an opportunity offering, he took orders in the Church of England, being ordained by the Bishop of Norwich on Trinity Sunday, the 28th May 1809. He was successively curate of Shipton in Gloucestershire, and of Sedgefield in the county of Durham. Ill health compelled him to abandon his sacred duties, and he returned to Scotland; spending a few days in Edinburgh, he proceeded to Glasgow, and died at his brother's residence, near that city, on the 14th September 1811, in the forty-seventh year of his age.

G. has left behind several poetical works, the chief of which are—*Mary Queen of Scots*, a dramatic poem; *The Sabbath; The Birds of Scotland;* and *The British Georgics.* It is on *The Sabbath* that his fame rests. He was a retiring, amiable, and affectionate man, and possessed a deep love for nature, and those passages in his poems are the best that give utterance to that love. There was nothing bold or mounting in his genius, but he had a plenteous command of musical verse and rural imagery.

GRAHAME'S or **HOTHAM'S ISLAND.** A mass of dust, sand, and scoriæ thrown out of a submarine volcano in the Mediterranean, and which remained for some time above the surface of the water, received these names. It made its appearance about thirty miles off the coast of Sicily, opposite to Sciacca, in July 1831. In the beginning of August, when the action of the volcano had ceased, it had a circumference of about a mile and a quarter, the highest point was estimated at 170 feet above the sea, and the inner diameter of the crater about 400 yards. As soon as the eruption ceased, the action of the waves began to reduce the island, and before many months transpired, the whole mass of scoriæ and sand disappeared, being scattered as a stratum of volcanic cinder in that portion of the bed of the Mediterranean.

GRAHAM'S LAND, an island of the Antarctic Ocean, discovered by Biscoe in February 1832, lies in lat. 64° 45′ S., and long. 63° 51′ W., being nearly on the meridian of the east extremity of Tierra del Fuego, and within a comparatively short distance of the polar circle. The position, as above defined, is precisely that of Mount William, the highest spot seen. In front, towards the north, are a number of islets, called Biscoe's Range. No living thing, excepting a few birds, appears to exist.

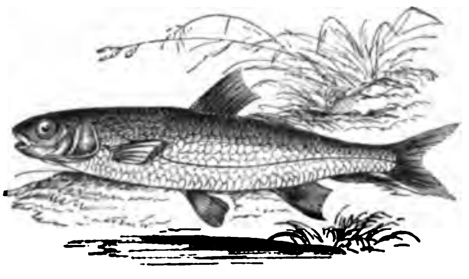
GRAHAM'S TOWN, the capital of the eastern province of the Cape Colony, stands near the centre of the maritime division of Albany. It is about 25 miles from the sea, in lat. 33° 19′ S., and long. 26° 31′ E.; and it contains about 8000 inhabitants, chiefly English. G. T. is the see of two bishops—one of the Church of England, and another of the Church of Rome, and possesses a cathedral. It has also several Wesleyan ministers, besides the pastors of the Dutch Reformed Church. Among the other institutions of the place are its banks, insurance offices, a botanic garden, a public library, a general hospital, large barracks, and two newspapers.

GRAIN (Lat. *granum*, any small hard seed or particle), a term often used as equivalent to *corn*, denoting the seeds of the *Cerealia.*

GRAIN COAST. See Guinea.

GRAINES D'AVIGNON. See French Berries.

GRAINING (*Leuciscus Lancastriensis*), a fish of the family *Cyprinidæ*, of the same genus with the Dace (q. v.), which it much resembles. It was first pointed out as a different species by Pennant, who found it in the Mersey. It occurs in a few English streams, and in some of the lakes of Switzerland. It is rather more slender than the dace. In its habits and food it resembles the trout, rises readily at the artificial fly, and affords good sport to the angler.



Graining (*Leuciscus Lancastriensis*).

GRAINS OF PARADISE, or **MELEGUETTA PEPPER**, an aromatic and extremely hot and pungent seed, imported from Guinea. It is the produce of *Amomum Meleguetta*, or *A. Grana Paradisi*, a plant of the natural order *Scitamineæ* or *Zingiberaceæ*, with lanceolate leaves, one-flowered scapes (leafless stems), about three feet high, and ovate or elliptic-oblong capsules containing many seeds. By the natives of Africa, these seeds are used as a spice or condiment to season their food; in Europe, they are chiefly employed as a medicine in veterinary practice, and fraudulently to increase the pungency of fermented and spirituous liquors. By 56 Geo. III. c. 58, brewers and dealers in beer in England are prohibited, under a heavy penalty, from even having grains of paradise in their possession. This drug is much used to give apparent strength to bad gin. The name Meleguetta Pepper, or Guinea Pepper (q. v.), is also given to other pungent seeds from the west of Africa.

GRAKLE, the common name of many birds of the Starling family (*Sturnidæ*), all tropical or subtropical. They have very much the habits of starlings, and some of them even excel starlings in their imitative powers, and particularly in the imitation of human speech. This is remarkably the case with the Mina Birds (q. v.) of the East Indies, which may be regarded as grakles. Numerous species inhabit Africa. Some of them are birds of splendid plumage. The Paradise G. (*Gracula gryllivora*) of India has acquired a peculiar celebrity as a destroyer of locusts and caterpillars. It is about the size of a blackbird. Buffon tells us, that in order to stop the devastations of locusts in the island of Bourbon, this bird was introduced from India by the government. The grakles, however, beginning to examine the newly-sown fields, excited the alarm of the planters, and were exterminated; but it was found necessary, after a few years, again to introduce them, and they are now very numerous, although they do not confine themselves to insect food, but in default of it are ready to betake themselves to seeds and fruits. They sometimes enter pigeon-houses and feed on the eggs, or even on the newly-hatched young. When tamed, they become very pert and familiar, and exhibit a great aptitude for imitating the voices of animals. A G. of this species, kept in a farmyard, has been known to imitate most of its ordinary sounds, as those of dogs, sheep, pigs, and poultry.—Some of the grakles are known as summer birds of passage in the northern parts of America.

GRA'LLÆ, or **GRALLATO'RES** (Lat. stilt-walkers), an order of birds, generally characterised by very long legs, the *tarsus* (shank) in particular being much elongated, and by the nakedness of the lower part of the tibia, adapting them for wading in water without wetting their feathers. They have also generally long necks and long bills. The form of the bill, however, is various; and in its size, strength, and hardness, it is adapted to the kind of food; some, as snipes, which feed chiefly on worms and other soft animals, having a very soft weak bill, whilst others, which feed on larger and stronger animals, have the bill proportionately large and strong. The form of the body is generally slender. The greater number of the G. are inhabitants of the sea-coast or of marshy districts. Many are birds of passage. Even those which are not aquatic are generally driven from the districts which they frequent either by frost or drought. Cuvier divided this order into *Brevipennes* (q. v.), (Ostrich, Cassowary, Emu, &c.); *Pressirostres* (Bustards, Plovers, Lapwings, &c.); *Cultrirostres* (Cranes, Herons, Storks, Adjutants, Spoonbills, &c.); *Longirostres* (Snipes, Curlews, Godwits, Sandpipers, &c.); and *Macrodactyli* (Rails, Crakes, Coots, &c.). The *Brevipennes* are constituted by some into a distinct order, *Cursores*, and differ very widely in many respects from the true Grallæ.

GRAM. See Chick Pea.

GRAMI'NEÆ. See Grasses.

GRAMMAR, in its usual sense, and as applied to a particular language, investigates and systematises the facts of that language, as exhibited in the most approved writers and speakers; the main divisions or heads being: (1) the way in which the sounds or spoken words are represented by letters (Orthography); (2) the division of words into classes, or 'parts of speech,' the changes or inflections they undergo, their derivation and composition (Etymology); and (3) the way in which they are joined together to form sentences (Syntax). A book embodying the results of such investigations, with a view to enable learners to understand a language, and to use it properly, is a grammar of that language.

Languages were not originally constructed according to rules of grammar previously laid down; but grammar rules were deduced from languages already in existence. In the days of Plato, perhaps the greatest master of language that ever wrote, the division of words into classes or parts of speech had not yet been made. Plato himself, according to Max Muller, took the first step in formal grammar by making the distinction of noun and verb, or rather of subject and predicate; for it was a distinction in the ideas or elements of a proposition he was making, rather than in the words themselves. Aristotle and the Stoic philosophers made further advances in the analysis of language, but they attended little to the forms of words, their object being logical rather than grammatical (see Genitive). It was the Alexandrian scholars, engaged in preparing critical editions of Homer and the other Greek classics, who first analysed, classified, and named the phenomena of language as language; and it was one Dionysius Thrax, who had been trained in the Alexandrian school, and became a teacher of Greek (*Grammaticus*, from Gr. *gramma*, a letter; as those who taught boys their Roman letters were called *Literatores*) at Rome, that published the first practical systematic Greek grammar for the use of his Roman pupils (about 80 B. C.). This work, which still exists, though much interpolated, became the basis of all subsequent grammars, both Greek and Latin; and when grammars of the modern European tongues came to be written, they naturally followed the classical models. The chief matters treated of in grammar are considered under such heads as Adjective, Conjunction, Declension, &c.

In quite recent times, the study of language has advanced beyond this empirical stage, in which its object was confined to the explaining and teaching individual languages; and, under the name of 'Comparative Grammar,' has brought to light the resemblances and differences of the various languages of the world, so as to classify them, after the manner of natural history, into families and minor groups, according to their greater or less affinities. Still higher questions, entering into the origin and growth of speech, and seeking to give a scientific account of its phenomena, now occupy the more advanced students of this subject. See Language, Inflection.

GRAMMAR SCHOOLS received their name at a time when the grammar of the English language was not written, and when all knowledge of the principles of language could be obtained only through a study of the grammar of the ancient tongues, particularly Latin. The idea which lay at the basis of these institutions still pervades them, and the ancient languages are the principal subjects of instruction. History, geography, and modern languages have of late years been admitted into the curriculum of the great majority of these schools; but these subjects still hold a subordinate place, and distinction in Latin and Greek gives pre-eminence, and is the great object of ambition both to masters and pupils. Nor can it be otherwise so long as the universities recognise the ancient tongues as the only sound basis of a liberal education. For a further notice of the grammar schools of Great Britain, see Public Schools, National Education.

GRAMME is the standard unit of French measures of weight, and is the weight of a cubic centimètre of distilled water at 0° Centigrade (corresponding to 32° Fah.); the other weights have received names corresponding to the number of grammes they contain, or the number of times they are contained in a gramme: in the former case, the Greek numerals deca, hecto, kilo, myria, expressing weights of 10 grammes, 100 grammes, 1000 grammes, 10,000 grammes; in the latter case, the Roman numerals deci, centi, are prefixed, to express tenths, hundredths of a gramme. Starting from the relation between the English yard and the French mètre, we are enabled to compare the units of weight, and it is found that a gramme = 15·43248 grains Troy, from which the equivalents in English measure for the other weights can easily be found: thus—

		Grains Troy.		Lbs. Avoirdupois.		
Centigramme	=	·1543234	=	·0000220462		
Decigramme	=	1·543234	=	·000220462		
Gramme	=	15·43234	=	·00220462		
Decagramme	=	154·3234	=	·0220462		
Hectogramme	=	1543·234	=	·220462		
Kilogramme	=	15432·34	=	2·20462		
Myriagramme	=	154323·4	=	22·0462	=	·19684 cwt.
Quintal (q. v.)	=	1543234	=	220·462	=	1·9684 "

GRAMMONT, a small town of Belgium, in the province of East Flanders, is situated on both banks of the Dender, 20 miles south-south-east of Ghent. It has manufactures of lace, fine linen, damask and woollen fabrics, and tobacco; and carries on cotton-spinning, dyeing, bleaching, tanning, distilling, and brewing. Pop. (1870) about 9000.

GRAMMONT, or **GRAMONT**, PHILLIBERT, COUNT OF, a celebrated French courtier, son of Anthony, Duke of Grammont, was born about 1621. While still very young, he served as a volunteer under Condé and Turenne, and distinguished himself by the most chivalric bravery. At the court of Louis XIV., with this reputation added to his youth, noble birth, a handsome person, fine talents and accomplishments, a lively wit, and strangely good-fortune at play, at which he won such amounts as to support even his extravagant expenditures, it is no wonder that he became a favourite. He was distinguished for his gallantries, and even had the audacity to aspire to be the rival of the king in the affections of one of his favourites. This caused him to be banished from France; and he found a pleasant refuge and congenial society in the gay and licentious court of Charles II. of England. Here, after many adventures, he engaged to marry Eliza Hamilton, sister of Anthony, Count Hamilton, but slipped out of London without fulfilling his promise. Two of the lady's brothers set off in pursuit of the forgetful Frenchman, and coming up with him at Dover, asked him 'if he had not forgotten something.' 'Oh, to be sure,' replied G., 'I have forgotten to marry your sister;' and returned to London to complete his engagement. He then went to France, where his wife became one of the ladies of the court of Maria Theresa of Austria. By this marriage he had two daughters, one of whom was married to Henry Howard, Marquis of Stratford, and the other became Abbess of Poussay, in Lorraine. He died in 1707. See *Memoirs of the Comte de Grammont* by his brother-in-law, Anthony, Count Hamilton (edited by Sir Walter Scott in 1811; reprinted in Bohn's 'extra volumes').

GRAMPIANS, the name of the principal mountain system in Scotland. The system runs from north-east to south-west, forming the well-known high grounds of Aberdeenshire, Kincardineshire, Forfarshire, and Perthshire. The average elevation of the summits of this main range is from 2000 to 3000 feet, and the highest elevation reached is that of Ben Nevis (4406 feet) at its western extremity. An outlying branch of the G. extends northward from near the head of the valley of the Dee, and comprises among its chief summits Ben Muicdhui (4295 feet) and Cairngorm (4083 feet). Southward of the western extremity of the G. are situated numerous groups and chains of greater or less extent. Among these the chief summits are Ben Cruachan (3693 feet), Ben Lomond (3192 feet), Ben More (3843 feet), Ben Lawers (3984 feet), and Schiehallion (3547 feet).

GRAMPIANS, mountains in Australia, run north and south in the west part of Victoria, stretching in S. lat. from 36° 52′ to 37° 38′, and in E. long. from 142° 25′ to 142° 47′. From their eastern slope flow the Glenelg and its affluents. The loftiest peak of the range, Mount William, is 4500 feet high above the sea.

GRAMPUS (probably from the French, *Grand poisson*, great fish), a cetaceous animal, common in the arctic seas, as on the coasts of Greenland and Spitzbergen, not unfrequent in the Atlantic, and well known on the British coasts. It is one of the *Delphinidæ*, or Dolphin family, and is commonly referred by naturalists to the same genus with the porpoise, under the names *Phocæna Orca*, *P. Grampus*, and *P. gladiator*, although a new genus, *Grampus*, has also been proposed for it. It is the largest of the *Delphinidæ*, often more than twenty feet in length; its form spindle-shaped, but thicker in proportion than the porpoise, from which it also differs in the much greater height of its dorsal fin, in the upper jaw projecting a little over the lower, and in the smaller number of teeth, which are about eleven on each side in each jaw. The tail is powerful; in a specimen twenty-one feet long, it was found to be seven feet broad. The G. is generally seen in small herds. It is very voracious, and pursues salmon up the mouths of rivers as far as the tide reaches. Marvellous stories are told of attacks which it makes on the whale, and of its tearing out and devouring the whale's tongue, but even the least improbable require confirmation. The G. possesses great strength and activity.

Grampus (*Phocæna Orca*).

GRAN (Mag. *Esztergam*), a town of Hungary, is finely situated on an elevation on the right bank of the Danube, 25 miles north-west of Pesth. It is a royal free-town, is the see of the primate of Hungary, has a large cathedral, and is rich in fine buildings. Pop. (1869) 8780. G., which is one of the oldest towns of Hungary, was the residence of the Hungarian prince, Gejza; and here his son, St Stephen, the first king of Hungary, was born in 979, and converted to Christianity in 1000. It was formerly fortified, and has undergone assaults and sieges almost without number.

GRAN SASSO D'ITALIA ('Great Rock of Italy'), also called MONTE CORNO, from the resemblance to a horn which it presents on the east, is the highest summit of the Apennines, having an elevation of 10,206 feet. It is situated on the borders of the Abruzzi, between Teramo and Aquila. It owes its name partly to its height, and partly to its being formed of a single mass of calcareous earth from its middle to its summit. It is seen to great advantage from the side of Teramo, where it is broken into tremendous precipices. The summit is covered with perpetual snow. Wolves, bears, and chamois abound on the mountain—the last of these animals being found in no other part of the Apennines. The general character of the scenery is more Alpine than Apennine, and in wild grandeur and variety it is not surpassed by any landscape in Italy. To the painter, geologist, and botanist it affords a rich field for their respective pursuits. See *Itinerary* of F. Caldane.

GRANADA, an ancient kingdom, and one of the old provinces in the south of Spain, was bounded on the W. by Andalusia, on the E. by Murcia, and on the S. and S.E. by the Mediterranean. Its greatest length from north-east to south-west was about 210 miles, and its greatest breadth about 80 miles. It is now divided into the three modern provinces of Granada, Almeria, and Malaga, the united areas of which amount to 11,063 square miles, and the united population, in 1870, to 1,351,909. The surface of this ancient province is mountainous and picturesque in a high degree. The mountain-ranges—the chief of which are the Sierra Nevada, the Sierra de Ronda, and the Alpujarras—as a general rule, run parallel with the coast. The principal rivers are the Almanzora, Almeria, Jenil, Guadalhorce, and Guadiaro, all of which, save the Jenil, an affluent of the Guadalquiver, flow into the Mediterranean. The province of G. is, on the whole, fruitful and highly cultivated. The mountains are rich in silver, copper, lead, and iron; and many of the inhabitants are engaged in mining and smelting. Saline and mineral springs abound. In the time of the Romans, G. was a portion of the province of Boetica; but after the Arab invasion it formed an independent Moorish kingdom. For a time it was exceedingly wealthy. From the year 1248 the Moorish kings of G. were obliged to recognise the supremacy of the kings of Castile. A quarrel, however, which arose between the vassal king of G. and Ferdinand and Isabella in the 15th c., resulted in a war of eleven years' duration, the consequence of which was the complete conquest of G. by the Spaniards in 1492, and the total destruction of Moorish authority in Spain. The modern province of G. has an area of 5030 sq. m.; pop. (1870) 485,346.

GRANA'DA (Spanish, *Granata*, Arab. *Garnathah*, said to be a corruption of *Karnáttah*, the ancient fortress of Phœnician origin), a famous city of Spain, formerly capital of the kingdom of Granada, and now chief town of the modern province of the same name, is built on a northern branch of the Sierra Nevada, at an elevation of 2445 feet above sea-level, in lat. 37° 15′ N., long. 3° 45′ W., and is about 140 miles east-south-east of Seville. It stands on the right bank of the Jenil, overlooking the fertile and extensive *Vega* or plain of G., and is watered also by the Darro, a rapid mountain-stream, which joins the Jenil about a mile below the town. Though now sadly decayed, it is still one of the greatest towns of Spain, is the seat of an archbishop, and has a university, attended, it is said, by about 800 students. One of the two hills on which the town is mainly built is surmounted by the Alhambra (q. v.); the other hill is occupied by the suburb called the Albayzin, the oldest part of the town, and now inhabited almost entirely by gipsies. The city of G. proper, namely, that portion of it that contains the Alhambra, is surrounded by high but ruinous walls, and by strong towers. The streets are narrow, crooked, and uneven; the houses, which for the most part are well built, are heavy and gloomy in outward appearance, having the flat roofs and projecting balconies of the Moorish style of architecture; the interiors, however, are convenient and suitable to the climate. G. has several charming public squares. The cathedral, a splendid structure, profusely decorated with jaspers and coloured marbles, and having a high-altar placed under a dome, supported by 22 pillars, contains the monuments of Ferdinand and Isabella, and of Philip I. and his consort Juana. The industry and trade of the town are quite inconsiderable. Pop. 62,000.

The modern city of G. was founded by the Moors in the 8th c., and for some time remained subject to the califs of Cordova; but in 1235 it became capital of the kingdom of Granada, and rapidly rose to distinction as a wealthy trading city and as the seat of arts and architecture. Under the Moors, it attained the highest pitch of its prosperity. Toward the close of the 15th c., it is said to have had 400,000 inhabitants, and to have been surrounded by a wall fortified with 1030 towers. The *Vega* of G., in front of the city, was celebrated for two hundred years as the scene of contest between the Moors and the chivalry of Christendom—a contest which was brought to a termination only by the capture and complete subjection of G. by Ferdinand and Isabella in 1492, after a siege of twelve months.

GRANADA, a city of Nicaragua in Central America, stands on the north-west side of the lake which bears the name of the state. It was founded by Hernandez de Cordova in 1522. The number of its inhabitants, including the suburbs and municipality of Jalatava, is about 15,000. Prior to 1854, it was the thriving seat of many commercial establishments. It suffered greatly, however, from the civil war that broke out in the republic during that year, and was under siege from May 1854 to February 1855; but was bravely and successfully defended by Don Fruto Chamorro, the leader of the conservative party. In 1856, Chamorro having in the meantime died, G. was surprised and taken by the democrats, but was retaken and almost wholly destroyed in the following year. After the conclusion of peace, efforts were made toward the restoration of the city. It has not yet, however, regained its former prosperity and importance.

GRANADI'LLA, the edible fruit of certain species of Passion-flower (q. v.). The name, originally bestowed by Spanish settlers in the West Indies and warm parts of America, is a diminutive of *granada*, a pomegranate. The COMMON G. (*Passiflora quadrangularis*) is extensively diffused over these regions, and much cultivated. The plant is a luxuriant and very ornamental climber, often employed to form arbours and covered walks; it has large, beautiful, and fragrant flowers; oblong fruit, often six inches in diameter, of an agreeable fragrance, and a sweet and slightly acid pulp, very gratefully cooling. It is often eaten with wine and sugar.—The APPLE-FRUITED G., or SWEET CALABASH (*P. maliformis*), is plentiful in the woods of Jamaica, where it forms a principal part of the food of wild swine. It is, however, a very agreeable fruit, about two inches in diameter, its pulp gelatinous, the rind so hard as to be sometimes made into snuff-boxes and toys. The LAUREL-LEAVED G. (*P. laurifolia*), sometimes called water-lemon in the West Indies, is a fruit about the size of a hen's egg; the plant has red and violet fragrant flowers, and very long tendrils. The fruit has a whitish pulp, so watery, that it is usually sucked through a hole in the rind; it has a delicious flavour, and a slight acidity. It is much cultivated.—Several kinds of G. are occasionally cultivated in hothouses in Britain. In the south of Europe, they grow in the open air.

GRANARY WEEVIL, another name of the CORN WEEVIL (q. v.).

GRANBY, JOHN MANNERS, MARQUIS OF, an English general, the eldest son of the third Duke of Rutland, was born January 2, 1721. Educated at Eton and Cambridge, he was at an early age elected M.P. for Grantham. In the rebellion of 1745, he raised a regiment of infantry, and accompanied the Duke of Cumberland into Scotland. Appointed colonel of the Horse Guards in 1755, in February 1759, he received the rank of lieutenant-general, and soon after was sent to Germany, as second in command, under Lord George Sackville, of the British troops, co-operating with the king of Prussia. After the battle of Minden, for his conduct in which he received the thanks of Prince Ferdinand of Brunswick, to the disparagement of his superior officer, who resigned, and was afterwards cashiered, he was appointed commander-in-chief of the British troops, and held that post during the remainder of the Seven Years' War. He particularly distinguished himself at the battles of Warburg in 1760, of Kirchdenkern in 1761, and of Græbenstein and Homburg in 1762. In 1760, during his absence with the army, he was appointed a member of the privy council. After the peace of 1763, he was constituted master-general of the ordnance, and in 1766 commander-in-chief of the army. He died October 20, 1770, in his 50th year. Though very popular in his time, as evidenced by the frequency with which his portrait was used as a sign to public-houses, he was the subject of same of the most terrible invectives of Junius; and his military qualities appear to have been much overrated by his contemporaries.

GRAND, in Music, is a word synonymous with great—such as grand sonata, grand symphony, overture, or chorus, signifying that the composition is full, and not simple or easy.

GRAND CAPE, in English Law, the name of the writ whereby in an action of dower, on the failure of the defendant to appear to answer to the summons, a third part of his lands are attached to await the decision of the court. The writ contains an order for the defendant to appear on a day specified. If the defendant do not appear on the return of the writ of grand cape, judgment is given in favour of the widow, who is thereupon entitled to take possession of the lands in satisfaction of her dower.

GRAND COUTUMIER OF NORMANDY is a collection of the ancient laws of Normandy, and is said to have been compiled in the third year of Henry III. It contains the laws and customs which were in use in England during the reigns of Henry II., Richard I., and John, and such also as were in force in Normandy after the separation of that duchy from England. It is therefore a collection of the laws of Normandy as they stood subsequent to the union with England. The customs of Normandy were to a great extent adopted in England after the Conquest; and the laws of this country, particularly during the reigns of the Norman sovereigns, present a great similarity to those of Normandy. Sir M. Hale, jealous for the honour of England, contends that this similarity arose from the introduction of English customs into Normandy. In the rules of descent, of writs, of process, and of trial, the laws of England and Normandy were at first almost identical. It appears from the Grand Coutumier, that though the verdict of twelve men was always required on a trial by jury, yet in case of a difference of opinion among the original jurors, the minority were set aside and fresh jurors chosen, until twelve men could be found to agree in a verdict. By the custom of Normandy, where a married woman died possessed of land, her husband was entitled to hold the lands, but only while he remained a widower. By the courtesy of England, on the other hand, the widower held the lands for his life, Lands held by Knights' Service (q. v.) and Grand Serjeanty (q. v.) descended, according to Norman custom, to the eldest son; but lands held on an inferior tenure were divided among the sons. And where a man had cohabited before marriage with the woman who afterwards became his wife, a son born before marriage inherited the land to the exclusion of children born in wedlock. See Hale's *History of the Common Law.* The islands of Guernsey, Jersey, Alderney, and Sark were originally part of the duchy of Normandy, and were united to the crown of England by the first princes of the Norman line. Though still attached to England, they are governed by the old feudal laws, or coutumier of Normandy. They have their own independent courts; and a writ from the courts at Westminster does not run in these islands. A royal commission under the great seal of course has force, but the commissioners must judge according to the law of the islands. All causes are originally determined by their own officers, the bailiffs and jurats of the island, who administer a code of laws based upon the Grand Coutumier. From their decision, an appeal lies to the privy council. Acts of the British parliament are not in force in these islands unless they are specially named.

GRAND DAYS were those days in every term solemnly kept in the Inns of Court and Chancery —viz. in Easter term, Ascension-day; in Trinity term, St John the Baptist's Day; in Michaelmas term, All Saints' Day (and of late, All Souls' Day); and in Hilary term, the festival of the Purification of our Lady, commonly called Candlemas Day; and these are *dies non juridici*, no days in court. —*Cowel.* On these days were formerly held the Revels for which the Inns of Court were famous. The last revel held in the Inner Temple was on Candlemas Day 1733, on the occasion of Mr Talbot's elevation to the woolsack. At this feast, fourteen students of the Inn waited at the benchers' table. After dinner, a play was performed by actors, who came full dressed from the Haymarket in chairs, and it is said, refused to receive payment for the honour of the occasion. After dinner, judges, serjeants, and benchers, formed a ring round the stove in the centre of the hall, and *danced, or rather walked about the coal fire, according to the old ceremony, three times*, and all the time the *ancient song* was sung by one Toby Aston, dressed in a bar-gown. The Prince of Wales, Frederick, father of George III., witnessed this part of the ceremony *incog.* The room was then prepared for dancing, which was kept up, with the pleasing interlude of a splendid supper, until morning. See Pearce's *Inns of Court and Chancery.* Grand days continue to be observed, but they have no longer the solemn character formerly attached to them. Nor are they held on the same days as formerly; for by the alteration in the law terms made by 11 Geo. IV. and 1 Will. IV. c. 70, those days no longer fall within the term. Grand days are now fixed at the pleasure of the benchers. On these days an entertainment is given in hall to the judges who had formerly been members of the Inn, and on this occasion an additional bottle of wine is supplied to every mess of four men among the barristers and students. On circuits, also, the circuit bar appoints a special day for the grand day, on which, after dinner, the various matters of social interest affecting the circuit are discussed and settled.

GRAND HAVEN, a small but rapidly increasing town in the state of Michigan, U. S., is situated on the eastern shore of Lake Michigan, at the mouth of Grand River, and forms the western terminus of the Detroit and Milwaukee railroad, which has here a most extensive depôt and a pier 3000 feet long extending into the lake. It has a spacious and excellent harbour, with a depth of from 30 to 50 feet. It exports timber, fish, leather, gypsum, stucco lime, and flour. The exports have already, in some years, exceeded one million dollars in value. Pop. (1870) 3700.

GRAND JURY is the assembly of good and sufficient men, summoned by order of the sheriff to attend every sessions of the peace and every commission of oyer and terminer and general jail delivery in England, for the purpose of inquiring into the charges for offences, and of returning to the court their delivery thereon. The institution of the grand jury dates back to the earliest period of English history, having been in use among the Saxons. By a law of Ethelred it is enacted, 'Exeant seniores duodecim thani, et præfectus cum eis, et jurent super sanctuarium quod eis in manus datur, quod nolint ullum innocentem accusare, nec aliquem noxium celare.'—Wilkins, *Leges Ang. Sax.* 117. From this enactment, it appears that the number of the grand jury was originally twelve; but we learn from Bracton that, in the time of Henry III., it was the practice to return four knights for every hundred, who elected twelve other knights, or else twelve *liberos et legales homines*, to take part with them in the inquest. Towards the latter part of the reign of Edward III., in addition to the inquest for the hundred, the sheriff was required to return a pannel of knights for the whole county. This jury was called *le graunde inquest*, and made inquiry for the county, while the jury for the hundred inquired for its own district only. After the establishment of the *graunde inquest*, the practice of summoning a jury of the hundred gradually went out of use; but until 6 Geo. IV. c. 50, it was deemed necessary that some of the grand jury should be summoned for every hundred. In the present day, the grand jury must consist of not less than twelve, or more than twenty-three members. A grand jury is summoned for every assize, and for the quarter-sessions in counties and burghs. It is not necessary that grand jurors should be freeholders; they may be leaseholders or ratepayers, but often are gentlemen of wealth. The qualification of grand jurors is fixed by 6 Geo. IV. c. 50, and is the same as that of the petit jury. See Jury Trial. Town-councillors of a burgh are exempt from serving on juries within the burgh. An Irish peer, who is a member of parliament, is liable to serve on the grand jury at assizes. An alien cannot serve on the grand jury unless he has been naturalised. In Middlesex, two grand juries were summoned every term, and sworn before the senior judge of the Queen's Bench, but this is discontinued unless on special occasions. After having the oath administered, and receiving a charge from the judge, they retire to their room, and the various indictments, which are called bills, are laid before them. The duty of the grand jury is simply to inquire whether there is sufficient *prima facie* evidence to require a trial. For this purpose, they may require the same evidence, written and parol, as may be necessary to support the indictment at the trial. But in practice, having ascertained that the crown has a sufficient *prima facie* case, they return a true bill, the prisoner's evidence being reserved for the trial. Witnesses are sworn on their examination before the grand jury by an officer appointed by the court. When the jury have come to a conclusion, the clerk indorses on the indictment *a true bill* in case the jury, or a majority of twelve, are satisfied that the case is sufficiently strong. In case they are not satisfied, the indictment is indorsed *not a true bill.* The foreman, accompanied by one or more of the jurors, then carries the indictments into court, and presents them to the clerk, who states to the court the nature of the charge and the indorsement of the jury. A bill having been thrown out by the grand jury, it cannot be preferred to the same grand jury during the same assizes or sessions. The grand jury usually serve for the whole session to which they are summoned; but in an emergency, as where a serious crime has been committed, and the prisoner brought in after the jury has been discharged, it is competent to swear a new jury. It frequently happens at assizes that, an offence having been committed before the grand jury have been discharged, a bill is immediately sent before them, on which they make their return; so that the case is disposed of in a few days, or even a few hours, after commission of the offence.

Although the grand jury has been often complained of as a somewhat superfluous step in the prosecution of offences, and as no longer required, yet it provides an additional safeguard to the liberty of the subject in all cases. It has, however, been proposed to abolish it when the case has been already before a magistrate, who has like duties to perform.

In Scotland there is no grand jury; the duty of investigating and bringing to trial in that country being assigned to a public prosecutor. See Advocate, Lord.

GRAND MASTER (Lat. *magnus magister*; Ger. *Hochmeister*), the title of the head of the military orders, the Hospitallers, the Templars, and the Teutonic knights; see these articles. The title originally borne by the superior of the Hospitallers was simply 'master' (*magister*); but in 1268 Hugh de Reval took that by which they are since known—grand master, *magnus magister*. In the Teutonic order, the title 'master,' with different modifications, was applied to the several superiors of the order in the various countries. Thus, the superior of Germany was styled *Teutsch-meister*, 'German master.' The superior of Livonia was called *Heermeister*, 'military master.' In all these orders the office of grand master was held for life. The name was also used in the Dominican order.

GRAND PE'NSIONARY. Formerly the syndic of each of the important towns of Holland was termed a Pensionary, and the state-secretary for the province of Holland, a Grand Pensionary. Until the time of Olden Barneveldt (q. v.), the Grand Pensioner was also advocate-general for the same province. He had no vote in the assembly of the states, and could only bring forward the subjects of discussion. He, however, collected the votes, wrote the decrees, read the letters addressed to the states, conducted negotiations with foreign ambassadors and ministers, and took charge of the revenues of the province, of its rights and privileges, and whatever else pertained to its welfare. He was a perpetual member of the states-general of the United Netherlands, and thus, as first magistrate of the first of the United Provinces, he acquired immense influence over all Holland, and may be considered premier of the Dutch parliament. The Grand Pensionary held his office for five years, but was in most cases re-elected. The office was abolished in 1795, after the conquest of Holland by the French revolutionists.

GRAND RAPIDS, a prosperous manufacturing city, in the state of Michigan, United States, is situated in a pleasant and healthy district on both banks of the Grand River, about 33 miles from Lake Michigan, and 60 miles north-west of Lansing. The river is here about 900 feet wide, and descends 18 feet in the course of one mile, producing abundant water-power. The G. R. is handsomely built, commands a fine view, and is one of the most important trading and manufacturing cities in the state. The vicinity is rich in salt and gypsum, and in limestone, pine-lumber, and other building materials. Pop. (1870) 18,157. The city was first settled in 1833, and incorporated in 1850.

GRAND RIVER, a river of North America, rises and flows throughout its entire course, within the state of Michigan, and falls into the lake of that name at the town of Grand Haven (q. v.). Its source is in the south-east of the state, in two branches which unite near the town of Jackson. G. R. is navigable for large steamers to the rapids, which are 40 miles from the mouth of the river, and for smaller boats for 50 miles further; its whole course is 270 miles.

GRAND SE'RJEANTY (*magna serjeantia*, or *magnum servitium*, great service), was the most honourable of the ancient feudal tenures. According to Lyttleton, tenure by grand serjeanty is where a man holds his lands or tenements of our sovereign lord the king by such services as he ought to do in his proper person to the king, as to carry the banner of the king, or his lance, or to lead his army, or to be his marshal, or to carry his sword before him at his coronation, or his carver, or his butler, or to be one of his chamberlains of the receipt of his exchequer, or to do other like services. This tenure must have been held of the king. Where lands were held of a subject, on condition of performance of services identical with those which were rendered to the king, the tenure was not grand serjeanty, but knight's service. Thus, lands on the Scottish border held of the king by cornage—i. e., on condition of winding a horn to give notice when the Scots had crossed the border—were held in grand serjeanty; but lands held of a subject for the same service were held in knight's service. Tenants holding by grand serjeanty were free from escuage, which usually appertained to knight's service, and in general could only be called upon to perform their services *infra quatuor maria*, within the kingdom. The services in grand serjeanty were to be performed by the tenant in person, where he was able to do so. The office of attendance on the sovereign's person was esteemed so honourable, that no one below the dignity of a knight could perform it. Hence, where lands held by grand serjeanty were in the possession of a citizen, he was permitted to perform his service by deputy. This tenure by grand serjeanty was by 12 Charles II. c. 24, in common with other military tenures, reduced to common Socage (q. v.), except so far as regards the honorary services, which continue to be observed to this day. Thus, the Duke of Wellington holds of the crown his estate of Strathfieldsaye on condition of presenting to the sovereign a flag bearing the national colours on each succeeding anniversary of the battle of Waterloo. The manor of Woodstock, with the demesne, in which is situated Blenheim Park, is held by the Duke of Marlborough by grand serjeanty, on condition of presenting to the Queen and her heirs, at the castle of Windsor, a standard of France, on the 13th August yearly, being the anniversary of the day on which the battle of Hochstet was fought, near the village of Blenheim, on the banks of the Danube. The tenure of grand serjeanty was observed throughout the continent of Europe. 'The freeborn Franks,' says Mr Hallam, *Mid Ages*, 'saw nothing menial in the titles of cupbearer, steward, marshal, or master of the horse, which are still borne by the noblest families in every country in Europe, and by sovereign princes in the empire. The Count of Anjou, under Louis VI., claimed the office of great seneschal of France—i. e., to carry dishes to the king's table on state-days. Thus, the feudal notions of grand serjeanty prepared the way for the restoration of royal supremacy, as the military tenures had impaired it.'

In Scotland, grand serjeanty was not known as a separate tenure—that is to say, lands held on condition of honorary services rendered to the sovereign were not attended with any privileges other than those attaching to lands held in a similar manner of a subject superior. In that country, a tenure by honorary service was known as a BLANCH HOLDING.

GRANDEE'S (Span. *grandes*), the name by which the most highly privileged class of the nobility of the kingdom of Castile has been known since the 13th century. To this class belonged the whole of that very powerful portion of the nobility who, from their wealth, were called the *Ricos Hombres* by pre-eminence; and to whom, moreover, the crown had granted the right of bearing a banner, and of gathering mercenaries around it on their own account. The members of the royal family were not included amongst the grandees. The honours of the grandees were hereditary; they held lands from the crown on the tenure of military service, being bound to produce a certain number of lances, each lance being represented by a knight with four or five men-at-arms. The grandees were exempted from taxation, and could not be summoned before any civil or criminal judge without a special warrant from the king. They were entitled to leave the kingdom, and even to enter the service of a foreign prince at war with Castile without incurring the penalties of treason. Besides these privileges, which were common to them with the rest of the higher nobility, the grandees possessed several which were peculiar to themselves, or which they shared only with the so-called 'Titulados'—the counts and dukes. Of these must especially be mentioned the right in all public transactions of being covered in the presence of the king. The king addressed a grandee as *mi primo*, 'my cousin-german;' whereas any other member of the higher nobility he called only *mi pariente*, 'my relative.' In the national assemblies, the grandees sat immediately after the prelates and before the titled nobility (titulados). They had free entrance into the palace, and into the private chambers of the monarch; and on the occasion of religious solemnities, they had their place in the chapel royal next to the altar. Their wives shared their dignities, the queen rising from her seat to greet them. Under Ferdinand and Isabella, Cardinal Ximenes succeeded in breaking the power of the feudal nobility so completely, that by the end of the 15th c. the privileges both of the grandees and of the rest of the higher nobility were almost wholly abolished. Ferdinand's successor, Charles V., who considered it still necessary to bind to his party some of the nobles, and to reward others for the important services which they had rendered him, contrived out of an independent feudal nobility to construct a dependent court nobility. Gradually three classes of grandees arose out of this merely nominal nobility. It was the privilege of the first class to be commanded by the monarch to be covered before they had begun to address him; the second class received this command as soon as they had finished their address, and heard the king's reply with covered head; but to the third class it was addressed only after they had already listened uncovered to the royal reply. All grandees had the title *excellency*, and sentries were bound to present arms to them. By the revolution and under the government of Joseph Bonaparte, the dignities and privileges of the grandees were entirely abolished; but they were partially restored at the subsequent restoration, though no very important privileges were bestowed on them. By the constitution of 1834, the first place in the chamber of peers is assigned to the grandees.

GRA'NDFATHER. A grandfather is not liable at common law in England to maintain grandchildren; but if they are destitute, and are relieved by the parish, the parish may, under the statute 43 Eliz. c. 2, call upon him, if able, to contribute to their support. In Scotland, the liability exists at common law, and is enforceable without the aid of a statute if the father, who is primarily liable, is unable to maintain the children.

GRANDVILLE, Jean Ignace Isidore Gérard, a French artist and caricaturist, was born at Nancy, 3d September 1803. In the year 1828, he published the first of a series of humorous sketches, entitled *Les Métamorphoses du Jour*, which were highly thought of; and soon afterwards another series, entitled *Les Animaux Parlants*. After the July revolution, G., with Decamps and Daumier, became the moving spirit of the 'Caricatures,' perfect collections of which are now in great request. His *Convoi de la Liberté*, his *Basse Cour*, *Mat de Cocagne*, &c., as pictures of the politics and manners of the times, are of great and lasting value. When the law of September put an end to political caricature, G. used his pencil to satirise the less important follies and vices of mankind. He also contributed illustrations to new and splendid editions of the *Fables* of Lafontaine and Florian, the *Adventures of Robinson Crusoe*, *Gulliver's Travels*, Abel Hugo's *Vie de Napoleon*, Raybaud's *Jérôme Paturot*, &c. G. is remarkable for depth and delicacy of observation and criticism, for his ingenious turn of thought, and accuracy in portraiture. His drawing is correct, his anatomy accurate, his foreshortening carefully studied; the whole is occasionally hard and cold, the idea complicated, but always united with rare delicacy of allusion and affluence of symbolical details. G. died at Paris, 17th March 1847.

GRANE, GRAN, or **QUADE**, a town and seaport of Arabia, is situated on a bay of the same name at the north-western extremity of the Gulf of Persia, in lat. 29° 26′ N., long. about 48° E. Its trade is of some importance. Pop. estimated at about 8000.

GRANI'CUS, the ancient name of a small river in the north-west of Asia Minor, flowing from the northern side of Mount Ida to the Propontis, and now known as the Kodsha-su. The G. is celebrated as the scene of the first victory gained by Alexander the Great over the Persians after he crossed the Hellespont, 334 B.C.

GRA'NITE, a well known igneous rock, composed of the three minerals, quartz, felspar, and mica, united in a confused crystallisation; that is, without a regular arrangement of the crystals. The felspar is the most abundant ingredient, and the proportion of quartz is greater than that of mica. The name has been given to it on account of its granular structure.

Granite differs from greenstone and the later igneous rocks, in the large quantity of quartz that enters into its composition. In the trappean and other igneous rocks, the silica or silicic acid is only sufficient for union with the bases to form felspar and hornblende, the constituents of these rocks, none remained free to crystallise as pure quartz; while in granite, so great is the excess of silex, that in its pure state, as quartz, it forms a considerable bulk of the rock. Granite is always a compact rock, it never passes into or alternates with tuffs or breccias. This peculiarity, associated with the crystalline structure of the rock, and the absence of cellular cavities, such as are produced in trappean and volcanic rocks by the expansion of the contained gases, have led to the belief that granite has been formed at considerable depths in the earth, and has crystallised slowly under great pressure either from superimposed strata or deep seas. On this account the granitic rocks have been called 'Plutonic rocks;' and Lyell has applied to them the term 'hypogene,' from *upo*, under, and *ginomai*, to be born. It was formerly supposed that all granitic rocks were formed before the deposition of any of the sedimentary strata, and hence they were named 'Primitive rocks.' But it having been found that granite is associated with formations of various ages, and that even since the beginning of the Tertiary epoch its intrusion among the Eocene strata of Central Europe has raised the Alps more than 10,000 feet above the level of the sea, this name has been entirely dropped. Although granite is not absent from the Secondary and Tertiary strata, it is more frequently associated with the Palæozoic formations; indeed, it appears to be the fundamental rock of the earth's crust. Wherever we reach the base of the stratified rocks, we find them resting upon granite; and whatever the age of the strata thus lying on this igneous rock, we have no reason to suppose that below the granite there occur beds of older date; for, although granite penetrates the stratified rocks, it has not been noticed to spread over them like greenstone, so that wherever it presents itself in a large mass, it is believed that no other rock is beneath it. Some granites, however, occur interstratified with undoubted sedimentary rocks, and it is argued that, as the transition from these sedimentary rocks to the crystalline granite can be traced by gradual stages through mica schist and gneiss, the granite is only the final stage of these metamorphic changes. Many of the granites of Scotland are accordingly believed to be older palæozoic sediments greatly altered. It is not maintained that all granites have such an origin; but no lithological character has yet been observed whereby the igneous granite can be distinguished from that produced by metamorphic action.

Large extents of the earth's surface are covered with granites; occasionally, it is the superficial rock in flat undulating plains, but it most frequently makes its appearance in mountainous regions. It seems probable that sometimes igneous granite has been raised from below as a solid indurated rock; it has, however, generally been in a fluid condition, as is evidenced by the number of veins which are protruded from it into the adjacent rocks.

The varieties of granite depend upon the number and quantity of its mineral constituents, and upon the state of aggregation of these materials. Ordinary granite is composed of felspar, mica, and quartz. The felspar may be either the flesh-coloured potash variety, orthoclase, or the pure white soda variety, albite, or both potash and soda may enter into its composition. The mica varies in colour from a pure silvery white, through the more common brown, into black. The quartz is generally white, seldom dark-gray or brown. The predominance of one or other of the ingredients, or of a particular variety, gives the peculiar colour to the mass, which is generally either red, gray, or white. The red is produced from the predominance of orthoclase; the white, of albite; and the intervening gray from the mica, or sometimes from the quartz. The felspar forms generally a half, and sometimes even more of the bulk of the rock; the mica in one variety, and the quartz in another, are so minute as to be scarcely visible. Sometimes the felspar separates into large and distinct crystals forming a porphyritic granite. The substitution of hornblende for mica produces that variety called Syenite (q. v.); and if talc takes the place of the mica, the rock is called Protigine (q. v.). When the ingredients exist in a compact and finely granular condition, the compound is known as Eurite. Sometimes, especially in veins, felspar and dark quartz are arranged so as to produce an imperfect laminar structure, which, when broken at right angles to the laminæ, presents numerous broken and angular lines that have a faint resemblance to Hebrew characters, whence it is called Graphic Granite.

Granite is largely used as a building material in bridges and engineering-works, and also in public buildings and dwellings. The difficulty of working it makes it expensive, but this is counterbalanced by its great durability. It cannot be cut, like the majority of building-stones, with saws, but is worked first with large hammers, and then with pointed chisels. The success with which the Egyptians operated upon this refractory stone is very extraordinary. They worked and polished it in a way which we cannot excel, if, indeed, we can come up to it, with all the appliances of modern science; and not content with polishing, they covered some of the blocks with the most delicate and sharply cut hieroglyphics!

The granites best known for ornamental purposes are the gray Aberdeen granite and the reddish coloured Peterhead granite. Of this last-mentioned variety, handsome polished columns for public halls have been constructed.

The soil produced by the weathering of granitic rocks should be fertile, as their chemical composition contains the necessary elements. The great hardness of the rock, and its resistance to atmospheric influences, prevent a soil of any thickness being formed; and even where it exists, at least in our temperate regions, it is generally so high and exposed, that it is unfavourable to vegetation; in warmer climates, such soils are frequently very fertile.

GRANT, in English law, the conveyance of real property by deed. Originally, the term grant was confined to the conveyance of incorporeal hereditaments and estates in reversion; according to the maxim that incorporeal property lay in grant, and corporeal property in livery, it being impossible to give actual sasine of that which had no tangible existence, or was not in the possession of the granter. In order to complete the conveyance of a reversion or remainder by grant, it was necessary that the tenant of the particular estate should acknowledge the grantee by attornment. The necessity for attornment was abolished 4 and 5 Anne, c. 16, s. 9. By 8 and 9 Vict. c. 106, it is enacted that estates, corporeal as well as incorporeal, may be conveyed by grant.

GRA'NTHAM, a municipal and parliamentary borough and market-town of England, in the county of Lincoln, is situated on the left bank of the Witham, 23 miles south-south-west of the city of Lincoln, and about 110 miles north-north-west of London. G. has a free grammar-school, with an income from endowment of £800 a year. The parish church, a beautiful structure of the 13th c., has a fine spire 273 feet high. Here Newton was instructed in classics before entering Cambridge. A canal 30 miles long connects this town with the river Trent. The trade is chiefly in malt, corn, and coal. G. returns two members to the imperial parliament. Pop. in 1871, of parliamentary borough, 13,250.

GRANULA'TIONS, the materials of new texture as first formed in a wound or on an ulcerated surface. See INFLAMMATION, CICATRISATION, WOUNDS, ULCER.

GRANVILLE, a fortified town and seaport of France, in the department of La Manche, is situated on a promontory surmounted by a fort, 23 miles north-east of St Malo. It is a badly built, dirty, and uninteresting town; the extensive new pier, built in a sufficiently strong manner to admit of its being mounted with cannon, and the old parish church of gray granite, built in the flamboyant style, being almost the only noteworthy features. Its harbour, though well-sheltered and capable of accommodating 90 ships, is always dry at low water. The principal trade of G. is in the whale, cod, and oyster fisheries. Pop. (1872) 14,747.

GRAPE-SHOT, called also *tier-shot*, consist of bullets or small iron balls piled round an iron pin, holding together a series of parallel iron plates (each the diameter of the cannon used), between which are the shot, kept in their places by holes in the plates. Small 3½-inch or 4-inch shells are also quilted together like grape for firing from mortars at short range, as, for example, in clearing the covert-way of a fortress from the third parallel. In either case, the explosion of the charge bursts asunder the binding, and the shot (or shells) begin to scatter directly on leaving the muzzle of the piece. Grape are very formidable against dense masses of troops; but, of course, only at comparatively short ranges. The shot employed differ in weight from 6 oz. to 4 lbs., according to the calibre of the gun from which they are fired.

GRAPE-SUGAR. See SUGAR.

GRA'PHITE. See BLACK LEAD.

GRA'PPLING-IRON, or **GRAPNEL**, a sort of small anchor, having several pointed claws, used generally in making fast boats and other small vessels. A similar instrument of more formidable dimensions is employed during action for grappling the rigging and yards of a hostile ship preparatory to boarding.

GRA'PTOLITES, a group of fossil zoophytes, apparently nearly related to the recent Sertularia. They had simple or branched polypidoms, formed of a horny substance. The cells in which the polype lived were arranged in a single series on one side of the rachis, or in a double series on both sides; the rachis was generally prolonged beyond the cells at the growing end of the polypidom. Egg capsules have been observed attached to the polypidom, exhibiting a method of reproduction similar to that in the hydroid zoophytes. The generic division of the graptolites has been based on the arrangement of the cells.

Nearly eighty species of graptolites have been described. They are confined to the Silurian strata, and are most abundant in the hard slaty shales, which were the fine mud of the Silurian seas.

GRA'SLITZ, a small town of Bohemia, is situated on the border of Saxony, 20 miles north-north-east of the town of Eger. It has manufactures of cotton goods, paper, looking-glasses, musical and mathematical instruments, and machinery. Pop. (1869) 6549.

GRA'SMERE, the name of a village and lake in Westmoreland, about three miles north-west of Ambleside. The village, which is beautifully situated at the head of the lake, has an ancient church, containing Wordsworth's grave, which is marked by a plain and modestly-fashioned slab. The lake is upwards of a mile long, and about half a mile broad, is oval in form, and encloses a small island. It is girdled about by high mountains, and forms one of the most beautiful scenes in England. Pop. (1871) 805.

GRASS (in Law). The grass growing on land belongs to the person entitled to the soil, and at his death goes to the heir, and not to the executor. The period of entry as to grass-farms in Scotland is

Whitsunday. Where the cattle of strangers are put into the fields of a tenant in Scotland to graze, the landlord cannot sequestrate the cattle for his rent; whereas, in England, he may distrain the cattle, and pay himself the rent.

GRASS CLOTH, a name often, although erroneously, given to certain beautiful fabrics manufactured in the East from different kinds of fibres, none of which are produced by grasses. One of these fabrics is made from the fibre of *Bœhmeria nivea*, popularly called China-grass; another, also known as *Pina Muslin*, from the fibre of *Bromelia Pigna*. See BŒHMERIA and BROMELIACEÆ.—The kinds of cloth really made from the fibre of grasses are extremely coarse.

GRASS OF PARNA'SSUS (*Parnassia*), a genus of plants, generally regarded as belonging to the natural order *Droseraceæ*, but referred by Lindley to *Hypericaceæ*. The calyx is deeply 5-cleft, there are 5 petals, 5 stamens, and 5 scales fringed with globular-headed threads alternate with the stamens, which are regarded by Lindley as bundles of altered stamens; there are four stigmas, and the fruit is a 1-celled, 4-valved capsule with many seeds. The genus consists of a few small herbaceous plants, with flowers of considerable beauty, growing in wet situations in the colder northern parts of the world. Some of them are found within the arctic circle, and to the snow-line of the Alps, Himalaya, and other mountains. The common Grass of Parnassus (*P. palustris*) is an ornament of bogs and wet places in Britain and other parts of Europe, with heart-shaped leaves, mostly radical and on long foot-stalks, and one sessile leaf on the stem, which is about eight or ten inches high, and bears a solitary yellowish-white flower. It flowers in autumn. It is called *Agrostis en to Parnasso* by Dioscorides, whence its modern name.

GRASS OIL, a fragrant volatile oil obtained from the leaves and stems of certain grasses of the genus *Andropogon* (see LEMON GRASS), natives of India. The kind known as *Grass-oil of Nemaur* is produced at the foot of the Vindhya Hills, and is exported from Bombay. It has been ascribed to the grass called Vittievayr or Cuscus (*A. muricatus*); to another species, which Dr Royle supposes to be the *Calamus Aromaticus* of the ancients; and to a third, also like these, a very fragrant grass (*A. Iwarancusa*). It is not improbable that it may be obtained from more than one species. It is obtained by distillation; the grass, being cut when it begins to flower, is bound in small bundles, which are thrown into a boiler with water, and the oil, as it distils over, is received in cold water, from which it is afterwards skimmed. It is of a light straw colour, has a peculiar rich agreeable odour, and is very pungent and stimulating. It is employed in medicine, as a stimulant and diaphoretic, but more frequently as a liniment in chronic rheumatism. Its chief use, however, is in perfumery. It is sometimes called *Ginger-grass Oil*, but is commonly called *Oil of Geranium* by perfumers, and by druggists *Oil of Spikenard*.—Similar to this, but different, and obtained from other species of the same genus, is the oil known as Oil of Lemon Grass (q. v.).

GRASS TREE (*Xanthorrhœa*), a genus of plants of the natural order *Liliaceæ*, natives of Australia, and constituting a very peculiar feature in the vegetation of that part of the world. They have shrubby stems, with tufts of long wiry foliage at the summit, somewhat resembling small palms; a long cylindrical spike of densely aggregated flowers shooting up from the centre of the tuft of leaves. The base of the inner leaves of some species is eatable, and forms, particularly when roasted, an agreeable article of food. It has a balsamic taste; and all the species abound in a resinous juice, which, on exposure to the air, hardens into a reddish yellow inodorous substance with a shining fracture, soluble in alcohol, and useful as a tonic in dysentery, diarrhœa, and other intestinal maladies; used also by the natives of Australia for uniting the edges of wounds, and with an aluminous earth for caulking their canoes, and as a cement for various purposes. The common grass tree (*X. hastilis*) has a stem about four feet high, but sometimes a foot in diameter. It is of very slow growth, and is supposed to be many centuries old when it has reached such dimensions.—Several species are found in Eastern Australia, where their leaves are used as fodder for all kinds of cattle.

Grass Tree (*Xanthorrhœa hastilis*).

GRASSE, a manufacturing town of France, in the department of Alpes-Maritimes, is situated in the midst of flower-gardens, on the southern slope of a hill, 23 miles east-north-east of Draguignan. The streets are steep, narrow, and crooked, but the houses are well built. The principal buildings are the college, hospital, and ecclesiastical school. G. is second only to Paris in its manufactures of essences and perfumes, made from the roses, orange-flowers, heliotropes, mint, &c., which, from the mildness of the climate, are most successfully grown in the vicinity. It has also manufactures of woollen goods, soap, leather, and olive oil; several silk-spinning factories and tanneries; and a considerable trade in oranges, citrons, wax, and honey. Pop. (1872) 12,560.

GRASSES (*Gramineæ* or *Graminaceæ*), a natural order of endogenous plants, containing almost 4000 known species, about one-twentieth of all known phanerogamous plants; whilst the *social* habit of many of them, and the vast number of individual plants within even a limited tract, give them a still greater proportion to the whole phanerogamous vegetation of the earth. They are distributed over all parts of the world; some are characteristic of the warmest tropical regions, and some of the vicinity of perpetual snow; but they abound most of all, and particularly in their social character, clothing the ground with verdure, and forming the chief vegetation of meadows and pastures, in the northern temperate zone. There is no kind of soil which is not suitable to some or other of the grasses; and whilst some are peculiar to dry and sterile soils, others are only found on rich soils with abundant moisture; some grow in marshes, stagnant waters, or slow streams, some only on the sea-coast; none are truly marine. Some grasses are annual, and some perennial; they have fibrous roots; the root-stock often throws out runners; the stems (*culms*) are round, jointed, generally hollow, except at the joints, rarely filled with pith, generally annual, and of humble growth, but sometimes perennial and woody, occasionally—as in bamboos—attaining the height and magnitude of trees. The leaves are long and narrow, alternate, and at the base sheath the culm; the sheath is split on the side opposite to that from which the blade springs; and at the junction of the blade and sheath, there is often a short membranous prolongation of the epidermis of the sheath, called the *ligule*. The flowers are generally hermaphrodite, but sometimes unisexual, and more frequently so in the grasses of tropical than in those of colder climates; they are disposed in *spikelets*, and these again generally in spikes, racemes, or panicles; they have no proper calyx nor corolla, but consist of the parts of fructification enclosed in two series of small bracts, some or all of which are sometimes awned. See AWN. The two outer bracts of each spikelet are called *glumes*. In some grasses, only one glume is properly developed for each spikelet. Within the glumes are the *florets* forming the spikelet, sometimes only one, but often a larger number, each floret having generally two small bracts called *paleæ* or *glumellæ*, the immediate covering of the parts of fructification. The glumes were called the calyx by the older botanists, and the paleæ the corolla, but inaccurately. The stamens are hypogynous, sometimes only one, sometimes six or more, but very generally three, the anthers attached to the filaments by the middle of their back, and easily moved by the slightest breeze. The ovary is simple, one-celled; the styles two or three, sometimes united; the stigmas feathery or hairy. The fruit is a *caryopsis*, the pericarp being incorporated with the seed; the seed consists of a small embryo, lying at the base and on the outside of a large farinaceous albumen, from which arises in great part the extreme importance of this order of plants to man; the farinaceous seeds of some of the grasses being the corn or grain which forms a chief part of human food. The grasses cultivated on this account are noticed in the article CEREALIA and in separate articles. Starch is the principal substance entering into the composition of these farinaceous seeds, and is often extracted from them, either to be used by itself as an article of food, or for other economical purposes, according to the kind. Besides starch, they contain, in greater or less proportions, gluten and other similar substances, on which not a little of their nutritive value depends. The peculiarities of composition of the most important grains are noticed in the article MEAL, or under their separate heads. When, by the process of *malting* (see MALT), great part of the starch of the grain has been converted into sugar, a fermented liquor is made from it, of which BEER or ALE made from barley is the most familiar example; and from this, again, a spirituous liquor—as whisky—is obtained by distillation. Fermented and spirituous liquors are commonly made from different kinds of grain in different parts of the world, particularly barley, maize, rice, and millet.—SUGAR is another important product of grasses, existing in large quantity in the stems of many species, and particularly abounding in the soft internal part of some, as Sugar-cane, Maize, and Shaloo or Sugar-grass (*Sorghum saccharatum*, see DURRA), from which it is extracted for use. The sugar-cane yields far more sugar than all the other plants cultivated on that account in the world. Rum—obtained by fermentation and distillation from sugar—is another well-known product of the sugar-cane, and similar liquors may be obtained from the other sugar-producing grasses.—Besides these uses, grasses are also of great importance as affording pasture and fodder (*hay* and *straw*) for cattle. See FODDER.—The woody stems of the larger grasses are applied to a great variety of economical purposes. See BAMBOO. Those of some of the smaller grasses are much used for thatch, and are also made by plaiting into straw-hats, ladies' bonnets, &c. See STRAW-PLAITING.—The underground runners of some species, as the Marrum Grass and Sea Lyme-grass, make them particularly useful for binding and fixing loose sands.—The stems and leaves of many grasses have fibres of such length and strength that they are twisted into coarse ropes for many purposes in which no great durability is required. Thus, hay and straw ropes are commonly used on every farm in Britain, and different grasses are used in the same way in many parts of the world. Some grasses, as the Moonja (*Saccharum Munja*) of India, are not simply twisted into ropes, but their fibres are first separated by moistening and beating; and the fibres of some, as the Esparto (q. v.) of Spain, are made not only into ropes, but into mats, sacks, and other very coarse fabrics.—The Chinese make paper from the young shoots of bamboo; paper is also made from the straw of rye, wheat, barley, and oats, and might be made from that of many grasses. See PAPER.—The perennial roots and runners of some grasses contain peculiar substances, on account of which they are used medicinally, as those of couch-grass. The stems and leaves of some contain Coumarin (q. v.), and have a very agreeable fragrance when dried, as in the case of the Sweet-scented Vernal Grass (*Anthoxanthum odoratum*) of Britain. A few, chiefly East Indian species, contain other aromatic and fragrant substances in the stem and root, particularly Lemon Grass, Vittievayr, and other species of *Andropogon*, which yield Grass-oil (q. v.).—It has been alleged that the seeds of a few grasses are poisonous, but this in every case requires confirmation, although Darnel (q. v.) in particular has

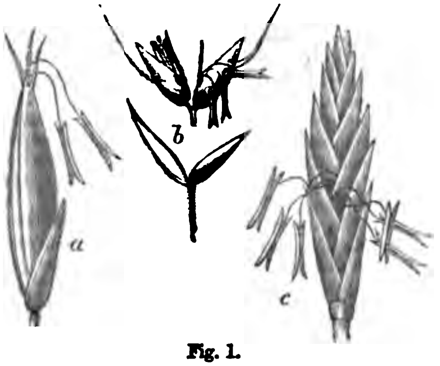


Fig. 1.

a, spikelet with one floret; two anthers: *b*, spikelet with two florets, shewn detached from the glumes; three anthers: *c*, spikelet with many florets; three anthers.

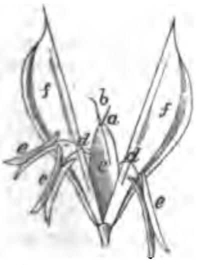


Fig. 2.—Spikelet with One Floret; Three Anthers:
a, the floret; *b*, stigmas; *c*, ovale; *d*, filaments; *e*, anthers; *f*, glumes.

a bad reputation.—The stems, leaves, and glumes of grasses contain a large proportion of silica, particularly the epidermis, so that when large quantities of them are burned, a sort of glass is formed; a fact which requires attention in questions relative to the manures proper for particular crops, and the most profitable alternation of crops in husbandry. The following are the tribes into which botanists have divided the natural order of Grasses, with the names of some of the most important, as examples:

Oryzeæ.	Rice.
Phalareæ.	Maize; Job's Tears (*Coix*); Canary Grass; Foxtail Grass; Soft Grass; Timothy Grass.
Paniceæ.	Millet (of various kinds); Fundi; Guinea Grass.
Stipeæ.	Feather Grass; Esparto.
Agrosteæ.	Bent Grass.
Arundeæ.	Reeds; Marrum Grass; Pampas Grass.
Pappophoreæ.	
Chloreæ.	Cord Grass (*Spartina*); *Cynodon*; *Eleusine.*
Aveneæ.	Oats; Vernal Grass; *Aira.*
Festuceæ.	Fescue; Meadow Grass; Manna Grass; Teff; Cock's-foot Grass; Tussac Grass; Dog's-tail Grass.
	Sub-tribe *Bambusidæ*—Bamboos.
Hordeæ.	Wheat; Barley; Rye; Spelt; Rye-grass; Lyme Grass.
Rottbœlleæ.	Gama Grass.
Andropogoneæ.	Sugar-cane; Shaloo or Sugar Grass; Durra; Lemon Grass; Vittievayr.

The word *Grass* is probably from the same root as Lat. *cresco*, Eng. *grow*.

Among farmers, the term grasses is extended to include, along with the true grasses, other plants cultivated for fodder and forage, such as clover, &c., and these are distinguished by the term *Artificial Grasses*, whilst the true grasses are called *Natural Grasses.*

GRA'SSHOPPER, the English name of many species of insects, forming a family of the order *Orthoptera*, section *Saltatoria*, called *Gryllidæ* by some (chiefly English) entomologists, and *Locustidæ* by others—those who adopt the former name designating the Crickets (q. v.) *Achetidæ.* Locusts (q. v.), however, do not belong to this family, although very closely allied, but are distinguished from it by greater robustness of frame, shorter legs, and shorter antennæ. The antennæ of the grasshoppers are long and threadlike, as in the crickets. The wings of grasshoppers, as of locusts, fold together like the sides of a roof, whilst those of crickets are horizontal when at rest. Grasshoppers, like crickets and locusts, have the thighs of the hinder legs very large and adapted for leaping. But grasshoppers do not leap with so great energy as locusts, nor are they capable of so sustained a flight. There are, indeed, some of the family in which the wings are merely rudimental, and the elytræ or wing-covers of small size. Most of them, however, have well-developed wings; and the wing-covers of the males, as in crickets, have a spot at the base of a talc-like appearance, by the rubbing together of which that chirping sound is produced which is probably connected with the sexual instincts of the insects, but which we have learned to associate with the brightest of green pastures and of sunshiny days. Grasshoppers are herbivorous. They are numerous in most parts of the world. The largest British species is the Great Green G. (*Gryllus viridissimus*, also known as *Locusta viridissima* and *Acrida viridissima*), about two inches in length, and of a fine green colour; a somewhat rare insect in Britain, although not uncommon in some parts of Europe. A green colour prevails among the grasshoppers of Britain, and generally of temperate climates, enabling them more readily to elude observation among the herbage in midst of which they live; but some of the tropical species are richly coloured, and some have very large wings, almost like those of lepidopterous insects. The greater number of grasshoppers feed on grass and the leaves of herbaceous plants, but some prefer the leaves of trees.

Grasshopper, Female (*Gryllus viridissimus*).

GRA'SSUM, in the Law of Scotland, is a lump sum paid by persons who take a lease of landed property. In the case of entailed estates, the heir in possession is generally prohibited from taking large sums in the form of a grassum, and letting the property at a lower rent, because it tends to prejudice those who succeed him in the property. In England, the word is not used, but the word premium in some cases, and fine in others, means the same thing. Where a person is entire owner or freeholder, he is entitled to let his land at any rent he pleases, and to stipulate for a grassum as large as he can get.

GRASSWRACK (*Zostĕra*), a genus of plants of the natural order *Naiades*, one of the few genera of phanerogamous plants which grow amongst seaweeds at the bottom of the sea. The leaves are narrow and grass-like; and the flowers consist merely of stamens and pistils, without any perianth, inserted on the central nerve of one side of a flat thin linear *spadix*, with a leafy *spathe.* The pollen is confervoid.—The Common Grasswrack (*Z. marina*) is a perennial plant, which forms green meadows on the sandy bottom of shallow parts of almost all the European seas, and abounds in creeks and salt-water ditches. It is found in great plenty on the British shores. It becomes white by exposure to the air. The rush-like coverings of Italian liquor-flasks are made of it, and it is much used for packing glass bottles and other brittle ware. It has been long used in Holland, Gothland, and Iceland for stuffing pillows and mattresses, and this use has of late years very much extended, so that the plant has become an article of commerce, under the name of *Alga marina*, or more commonly, but incorrectly, *Alva marina* (Ger. *See-gras*).

GRATE, the iron cage which supports the coal for a common fire. Considerable improvements have been made of late years in the construction of common domestic grates. Our forefathers simply added an iron cage to the old form of fireplace built originally for burning a pile of wood. This was a large square-sided recess, with a very wide opening for the chimney. Count Rumford pointed out the disadvantages of this, and the principles upon which they should be remedied. See Chimney. In the modern grate, the filling up of the square cavity recommended by Count Rumford, and also his plan of lowering and narrowing the throat of the chimney, are usually effected by iron plates forming part of the grate. These plates are readily heated, and with equal readiness radiate and reflect the heat into the room, and thereby effect a considerable saving of coal, besides which the grate itself is brought forward level with, or even projecting beyond, the walls of the room, whereby the radiation from the heated coal is utilised to the utmost. One of the most effective as well as elegant forms of grate is that which consists simply of a large square iron plate set nearly flush with the wall, in the middle of which is a hemispherical cavity with bowed bars in front, and a trapped opening into the chimney in the upper part of this cavity. When there is a fair draught, this form of grate gives a good fire, and effects the maximum economy of fuel for an open fireplace (which of course is always somewhat wasteful compared with a stove). The curved surface behind and above the fire radiates and reflects into the room from every part of its surface, and the plate flush with the wall, which is heated by conduction, may be regarded as a part of the room, and thus the main condition of economy is effected, viz., throwing as much as possible of the heat into the room, and allowing as little as possible to go up the chimney. A lining of firebrick or of fireclay, moulded to the form of the back of the grate, is useful in retaining the heat which is necessary for complete combustion of coal; the firebrick, being a bad conductor and an excellent radiator, becomes red-hot on its surface next to the coal, and this heat is not carried away, but is radiated into the fire, and assists in burning the carbon of the smoke. The conditions for securing an effective draught are treated under CHIMNEY.

GRA'TIAN, the collector of the well-known body of canon law which is commonly cited under the title of *Decretum Gratiani*. It is singular, however, that although few authorities have been so frequently cited, or have obtained so wide and permanent acceptance as this celebrated collection, hardly anything is known of the collector's own personal history. The sum of our knowledge regarding him is, that he was a native of Chiusa in Tuscany, and that he became, in later life, a Benedictine monk of the monastery of St Felix in Bologna. The date commonly assigned to G.'s collection is 1141 or 1151; its title, however, *Decretum*, or *Concordia Discordantium Canon*, is believed to be of later origin. How far the collection is the work of G. himself, or how far he was indebted for his materials, and even for their arrangement, to the labours of earlier collectors, it is difficult to determine. The work consists not only of the decrees of councils and popes down to Innocent II. (including the spurious ISIDORIAN DECRETALS, q. v.), but also of passages from the Scripture, from the Fathers, and even from the Roman law. It is divided into three parts. The first regards the hierarchical constitution of the church, and chiefly relates to doctrinal and moral subjects. It is divided into 'distinctions.' The second treats of external jurisdiction, under the head of 'causes' and 'questions.' The third regards the inner life of the church—the liturgy and the sacraments. From what has been already said regarding his adoption of the Isidorian decretals, it will be inferred that in point of criticism G.'s authority is of little value, and, in general, it may be added that no authority is given to any document beyond what it intrinsically possesses, from the fact of its being placed in G.'s collection. For the other collectors of the canon law, see CANON LAW. The date of G.'s death is unknown.

GRATIA'NUS, AUGUSTUS, eldest son of Valentinian I., by his first wife Severa, was born at Sirmium in Pannonia, on the 19th of April 359 A.D. While he was still *nobilissimus puer* (or heir-apparent), he was created consul, and in 367, was elevated by his father to the rank of Augustus at Ambiani, or Amiens, in Gaul. In the following year, he accompanied his father in his expedition against the Alemanni, in order that he might be accustomed to warfare. On the death of Valentinian, the troops elevated G. to the throne, giving him at the same time as a colleague his half-brother Valentinian II. Gaul, Spain, and Britain fell to G.'s share; and as his brother was only four years old, G. is supposed by many authorities to have been the monarch *de facto* of the rest of the Western Empire, fixing his residence at Treviri (now *Treves*). During the first part of his reign, a fierce warfare was carried on against the tribes who possessed the Danubian provinces and Illyricum; and he was on the point of marching into Thrace, to assist his uncle Valens against the Goths, when he was suddenly called upon to defend his dominions against the Lentienses, a tribe of the Alemanni. After the invaders had been defeated, G. advanced towards the Eastern Empire, but while on the way, he learned that his uncle Valens had been defeated and killed by the Goths near Adrianople (August 378). The sovereignty of the Eastern Empire then devolved upon G., but feeling his inadequacy to the task of ruling the whole empire, he recalled Theodosius (q. v.) from Spain, and appointed him his colleague on the 19th January 379. G. possessed some admirable virtues: he was pious, chaste, and temperate; his understanding was well cultivated, although not strong, and his eloquence attractive. But his character was too yielding and pliant, and he was consequently often led to the commission of gross acts of cruelty and tyranny, utterly foreign to his nature. His persecution of the pagans, and afterwards of heretic Christians, made him a great favourite with orthodox ecclesiastics, but rather alienated the affections of his subjects generally, while his fondness for frivolous amusements, and unworthy associates, excited the contempt of the army, so that when Maximus was proclaimed emperor by the legions in Britain, crowds of the disaffected flocked to his standard. G. was defeated by him near Paris, and afterwards fled to Lyon, where he was overtaken and killed by Andragathius, whom Maximus had sent in pursuit of him, on the 25th August 383.

GRATI'OLA, a genus of plants of the natural order *Scrophularineæ*, having a 5-partite calyx, the upper lip of the corolla bifid, the lower trifid, only two stamens fertile, and the anthers pendulous. *G. officinalis*, sometimes called HEDGE HYSSOP, is found in meadows and on the margins of ponds and river-banks in most parts of Europe, but not in Britain. It has sessile lanceolate serrulated leaves, and axillary solitary flowers. It is extremely bitter, acts violently as a purgative, diuretic, and emetic; and in overdoses is an acrid poison. It is administered in cases of worms, jaundice, dropsy, scrofula, mania, and venereal diseases; but requires to be used with caution. It is said to render some of the Swiss meadows useless as pastures. It was formerly so highly esteemed as a medicine, that the name of *Gratia Dei* (Grace of God) was given to it, and for the same reason it is known in France as *Herbe au Pauvre Homme* (Poor Man's Herb). It is said to be the basis of the famous gout medicine called *Eau medicinale*.—*G. Peruviana*, a South American species, has somewhat similar properties. These properties are supposed to depend upon a bitter resinous principle called *Gratioline*.

GRATTAN, THE RIGHT HONOURABLE HENRY, was born in Dublin 3d July 1746. His father was recorder and M.P. for that city until his death in 1766. The year after that event, having completed his university studies with distinction at Trinity College, Dublin, G. entered as a student of law at the Middle Temple, London, where, however, he neglected the pages of Blackstone, to listen to the living oratory of parliament, and in particular of Lord Chatham. In 1772, he was called to the Irish bar, and in 1775 was returned to the Irish parliament as representative for the borough of Charlemont, for which he sat until 1790, when he was elected as one of the representatives of the city of Dublin, to such an extent had his patriotism and eloquence recommended him to the Irish people. Mainly to him was owing, among other things, the partial abolition of the heavy restrictions on Irish commerce. But his popularity ebbed as it had flowed (and oftener than once) in the hearts and huzzas of his impulsive and therefore inconstant countrymen. In 1797, he declined to come forward for Dublin, and went into temporary but undeserved eclipse. In 1800, he was returned for the borough of Wicklow, to oppose the Union, and that was to fight for the people's idea of the constitution. But the union was effected in spite of him, and in 1805 he was returned to the imperial parliament for the borough of Malton, in Yorkshire. Next year, he was induced to stand for Dublin, and was re-elected. He sat for it in successive parliaments till his death, which happened on 4th June 1820, in London, to which he had gone when in a weak state of health, contrary to the advice of his physicians, to advocate, as he had been wont, the cause of Catholic emancipation.

G.'s public and private character was unimpeachable. For the vacillations of his popularity in Ireland, his countrymen had reason to be ashamed, and it is certain that he now holds a proper and exalted place in the esteem of the people, for whom he laboured with such sincerity, integrity, and genius. The history of his life is in great measure the history of the Irish constitution, and entirely the history of the parliament of Ireland. The history of his *Life and Times*, in four volumes, has been published by his son.

As an orator, he stands in the first rank. His style is full of point, rapidity, antithesis, and poetic suggestiveness. His eulogy on Chatham, and his invective against Bonaparte, are not surpassed in British eloquence. Byron declares him to be an orator—

> With all that Demosthenes wanted, endowed,
> And his rival or master in all he possessed.

His speeches are collected and published (4 vols. 1821) by his son and biographer.

GRATU'ITOUS DEED, in the Law of Scotland, means a deed granted without any value received. If it is made in favour of a third party, in order to defeat creditors, it is null and void, by stat. 1621 c. 18. There is this peculiarity, also, that when a person is too generous, and contracts voluntarily to give away property at a future period, if he become destitute in the meantime, the court will, at least where the deed was in favour of children or grandchildren, retain sufficient for his own subsistence. This is in imitation of the Roman law as to *beneficium competentiæ*, but the Roman law went further. Such a provision is wholly unknown in England. In England, gratuitous deeds are usually styled Gifts (q. v.) or Voluntary Conveyances (q. v.), according to circumstances.

GRÄTZ, the capital of the crown-land of Styria, in Austria, is a picturesque old town, built on both sides of the Mur, and encircled by fine gardens and pleasure-grounds. It is 140 miles south-south-west of Vienna, by the Vienna and Trieste Railway. The civil population amounts (1869) to 80,732. The inner town, which is connected with the suburb on the western side of the river by two chain and two wooden bridges, is surrounded by walls and by a promenade (formerly the glacis) shaded with trees, has narrow and crooked streets, and is not remarkable for cleanliness. It is worthy of notice, however, from the number of old buildings which it contains, as the cathedral of St Agidi, built in the 14th c.; the ancient castle of the Styrian dukes, which possesses many curious relics of antiquity; the Landhaus, where the nobles of the duchy held their meetings; the university, founded in 1585, with its library containing 53,000 volumes; its museum, &c., the arsenal, and various palaces belonging to the Styrian nobility. G. is well provided with gymnasia and other public educational establishments for the laity, and seminaries for the clergy. As the seat of government for the circle, G. has special courts of law and administration, and is a place of considerable importance. It has important manufactures of steel and iron wares, cotton, linen, and woollen fabrics, leather, paper, saltpetre, &c. From its position on the direct line of railway-communication between Vienna and Trieste, it is favourably situated as an intermediary station for the trade of the Austrian capital and the Adriatic provinces. A handsome new university is in course of erection in the immediate vicinity of G., and will, when completed, form one of the finest buildings of the kind in Germany.

GRAU'DENZ, an old town and important fortress of Prussia, in the province of West Prussia, stands on the right bank of the Vistula, 60 miles in direct line south of Danzig. A bridge of boats, 2780 feet in length, here crosses the river. G. contains numerous seminaries and educational establishments. It carries on a trade in corn and tobacco, and manufactures of woollens and cottons, &c. The town is fortified by a wall; and about a mile north of it on a hill, and in a position that commands the course of the Vistula, is the bomb-proof fortress of Graudenz. Pop. (1871) 15,559, including the garrison.

GRAU'WACKE. See GREYWACKE.

GRAVE ROBBING. The offence of taking up dead bodies has often been attempted to be declared felony by act of parliament; but it is only a misdemeanour, punishable by fine and imprisonment. If, however, the shroud, coffin, or any property in the nature of a chattel is taken away from the grave, the party may be indicted for felony in stealing these. See ANATOMY (in Law).

GRAVE STONES. The right to grant or refuse permission to erect grave stones, tombs, or monuments in the church or churchyard, in England, is vested in the ordinary, who is generally the bishop. In Scotland, a similar power is vested in the heritors, i. e., the proprietors of the lands in the parish.

GRAVEL, the name given to aggregations of water-worn and rounded fragments of rocks, varying in size from a pea to a hen's egg. When the fragments are smaller, the deposit is sand; when larger, it is called shingle. Beds of gravel occur in formations of every age. While the materials have been a long time in being prepared, and have travelled perhaps a great distance from the mother-rock, gravel deposits have been formed speedily and by the action of a strong current of water. They form very irregular and limited deposits, occurring generally as banks or hummocks in strata of sand. Unless in the most recent deposits, they almost always form a hard rock called conglomerate or puddingstone, the pebbles being compacted together by some infiltered current, which is most frequently iron, lime, or silex. Even so recent as the Glacial period, gravels are sometimes formed into a compact concrete, though these and later deposits are generally loose. Mr Prestwich has divided the Pleistocene gravels into 'High Level' and 'Low Level Gravels.' The high level gravels are the more ancient; they have been deposited subsequently to the formation of the present valleys, but apparently at a time when there was much more water in the valleys than there is now. The low level gravels have been produced by the present rivers.

GRAVEL. See Calculus.

GRAVELINES, a small fortified town and seaport of France, in the department of Nord, is situated in a marshy locality at the mouth of the Aa, 12 miles south-west of Dunkerque. Although now a desolate-looking town, with grass growing in its streets, it is of importance in a historical point of view. Here the Count d'Egmont obtained a victory over the French army commanded by the Marechal de Thermes in 1558; a victory which compelled the French to accept the severe conditions of the peace of Cateau-Cambrésis. Ten years later, it was taken by Louis XIV., who had it fortified by Vauban. The inhabitants are employed chiefly in the herring and cod fisheries, and the trade in liqueurs, timber, salt-fish, &c. The harbour has now become useless from neglect. Pop., with garrison (1872), 7733.

GRAVESEND, a market-town, municipal borough, and river-port of England, in the county of Kent, is situated on the right bank of the Thames, 33 miles west-north-west of Canterbury, and 24 miles east-south-east of London by the North Kent Railway. It occupies a somewhat commanding position on the first rising ground after entering the river; and consists of the old town, with narrow, inconvenient, and not too cleanly streets, and of the new town, west of the older portion, with handsome streets, squares, and terraces. G. is not famous for its architecture. In the vicinity are extensive market-gardens, great part of the produce of which is sent to London. Many of the inhabitants are employed in fishing. G. forms the limit of the port of London. Here pilots and custom-house officers are taken on board of vessels going up the river. For centuries, the prosperity of the town has depended on its connection with the metropolis. The salubrious air and beautiful scenery at G. render it a favourite watering-place with Londoners. It carries on some ship-building and a considerable trade in supplying ships' stores. Population of municipal borough (1871), 21,260; of parliamentary borough, 27,493.

G. was originally a *hythe*, or landing-place, and is mentioned as such in Domesday. Around this landing-place a town grew up soon after the Conquest. Here the fleets of the early voyagers, as that of Sebastian Cabot in 1553, and of Martin Frobisher in 1576, used to assemble; and here the lord mayor, aldermen, and city companies were wont to receive all strangers of eminence, and to conduct them up the river in state, forming processions, which, says the historian Froude, were 'spectacles scarcely rivalled in gorgeousness by the world-famous weddings of the Adriatic.'

GRAVI'NA, a commercial and industrious episcopal town in the south of Italy, in the province of Bari, is situated on a hill above the left bank of a stream of the same name, 37 miles south-west of the town of Bari. It contains about 10,500 inhabitants, and occupies the site of ancient *Blera*, one of the stations on the Via Appia, which passed at Poggio Orsino, about a mile from the town. In 995, it sustained a memorable siege against the Saracens. It was a favourite hunting-place of the Emperor Frederick II. The neighbourhood possesses rich pastures, and raises a celebrated breed of horses, in which the inhabitants do a large trade at their annual cattle-fair.

GRAVITA, an Italian term used in music, signifying that it is to be performed with an earnest and dignified expression, while the movement progresses in a slow, marked, and solemn time.

GRAVITATION, GRAVITY. All bodies, when raised into the air, and left unsupported, fall to the earth in lines perpendicular to it. The force which causes them to do so is termed gravity, and, universal experience shews, acts towards the earth's centre; more strictly, it acts perpendicularly to the surface of still water. But if a body, as a stone, be projected obliquely into the air, it is made to describe a curved path, having a highest point, vertex, or apogee; and when it meets the earth in its descent, its direction is not towards the centre, but inclined to it at the angle of projection. See Projectiles. Observing this, and that the body, if not interrupted by the earth's surface, would continue to move in a curve, with its tangent always away from the centre, it is easy to imagine that if not interrupted, it might circulate round the centre as the moon does round the earth. Next, knowing that the force of gravity is exerted at all accessible heights above the earth, the question arises—May it not be exerted as far off as the moon? which we know to be influenced by *some* force which continually deflects her from the tangent to her orbit, and makes her circulate round the earth. See Central Forces. Observing now the time of revolution of the moon, and calculating its Centrifugal Force (q. v.), which we know must equal the centripetal force, we put the question: Is this force the same as gravity? The answer is, that it is a force 3600 times less energetic. If, then, gravity be the force which really holds the moon to her path, it must be explained why it acts upon her so much more feebly than it would, were she a body on the earth's surface. The explanation is given at once if we suppose gravity to be a force whose energy diminishes with increase of distance, and is inversely as the squares of the distances at which it is exerted; for the distance of the moon from the earth's centre is just about 60 times that of the earth's surface from its centre, and $3600 : 1 :: 60^2 : 1$. We infer that it does so from the fact, that there is nothing inadmissible in such a diminution of energy with increase of distance—that, on the contrary, there are many analogies for it, as in the emanations of light and heat; and in the argument drawn from the necessity of otherwise supposing some other force than gravity to be employed in deflecting the moon, and the force of gravity to cease at some unknown level. On these views, and a generalisation to be afterwards mentioned, Newton is understood to have at first rested his law of universal gravitation: 'Every particle of matter in the universe attracts every other particle with a force directly proportioned to the mass of the attracting particle, and inversely to the square of the distance between them'—a law, the truth of which, since it was first broached, has been put beyond all question by the most complete body of predictions, fulfilled to the letter, that can be cited in support of any law of nature.

Before, however, the argument on the extension of terrestrial gravity to the sphere of the moon could have become pregnant with so great a result, much investigation had to take place in other fields; and, in fact, Newton had, previously to conceiving the law, explained the three great Keplerian laws of order obtaining in the solar system by reference to an attractive force residing in the sun. These laws are—1. That the planets revolve round the sun in ellipses, having the sun for a common focus: 2. That every planet moves in such a way that the line drawn from it to the sun sweeps over equal areas in equal times: 3. That the squares of the times occupied by the several planets in their revolutions in their elliptic orbits, are proportional to the cubes of their mean distances from their common focus, the sun. From the law of equal areas, Newton inferred that every planet is retained in its orbit by a force of attraction directed towards the centre of the sun; from the orbits being elliptical, he inferred that in each case this force varies in intensity according to the inverse square of the bodies' distance from the sun; while from the third law he inferred the homogeneity of the central force throughout the solar system. It was then, after being familiar with the notion of terrestrial gravity, and its action, through the researches of Galileo, Huyghens, and Hooke, and with the notion of a central force acting inversely as the square of the distance of its object, through his explanations of the laws of Kepler, that he put to himself the question: Is not the force with which the moon gravitates to the earth the same with gravity?—the force which causes a stone to fall on its surface. A question answered affirmatively on the supposition of gravity, like the sun's attraction, being a force diminishing with increase of distance, and according to the same law. The result was to bring the whole solar system, the planets and the sun, and satellites and their planets—the satellites being observed to obey the same laws of order with reference to their primaries that the latter obeyed in reference to the sun—under the law of gravitation. And the imagination lifted up by the grandeur of the conception, would refuse to limit the operation of that law to our own system, were there no facts to entitle us to extend it beyond. The phenomena of double stars, however, of themselves justify the extension and the statement of the law as we have given it in universal terms. It may be observed, in conclusion, that the Keplerian laws, which may be said to have been the basis of Newton's researches, are, owing to perturbations caused by the mutual action of the planets, &c., only approximately correct; and that these perturbations afford, when examined, a further proof of the truth and universality of the law of gravitation.

For a notice of speculations as to the nature of the law of gravitation, see Force; see also Falling Bodies, Projectiles, &c.

GRAVITY, Specific. See Specific Gravity.

GRAY, a small town of France, in the department of Haute-Saône, is situated on the slope of a hill overlooking a beautiful meadow, on the left bank of the Saône, 26 miles west-north-west of Besançon. It is commanded by the remains of an ancient castle, the residence in former times of the Dukes of Burgundy, and has a pleasing appearance from a distance, although its streets are crooked, narrow, and steep. G. is an important entrepôt for goods from the north-eastern districts of France, which are conveyed by the Saône to the south. Its trade is chiefly in corn, flour, timber, wine, iron, and colonial produce. Pop. (1872) 6339.

GRAY, Asa, an eminent American botanist, born at Paris, Oneida County, New York, November 18, 1810. He took his degree of M.D. in 1831, but soon relinquishing the practice of medicine, he devoted himself, under Professor Torrey, to his favourite study of botany. In 1834 he received the appointment of botanist of the United States' Exploring Expedition; but as a long delay took place before it was ready to sail, he resigned his post in 1837. He was afterwards appointed Professor of Botany in the university of Michigan; but before he had entered upon the duties of that office he was elected, in 1842, Fisher Professor of Natural History at Harvard University, Cambridge, Massachusetts. In addition to his prelections at Cambridge, Professor Gray has delivered some courses of lectures at the Lowell Institute, in Boston. He ranks among the leading botanists, not only of America, but of the age. In his numerous writings he has shewn equal ability in communicating elementary knowledge and in elucidating recondite theories. He came forward at a time when the old artificial systems of botany were giving way to the natural system which has taken their place, and he was the first in America, in conjunction with Dr Torrey, who arranged the heterogeneous assemblage of species upon the natural basis of affinity. In 1836 he published his *Elements of Botany*, afterwards enlarged into the *Botanical Text-book;* and in 1838 he commenced, with Dr Torrey, the *Flora of North America*, to be completed in three large volumes, but still unfinished. In 1848 appeared the *Manual of Botany for the Northern United States*, and the first volume of the *Genera Borealia Americana Illustrata*, of which another volume has since been issued. Among his remaining works may be mentioned: *Botany of the United States' Pacific Exploring Expedition, under Captain Wilkie* (1854—1858); *How Plants Grow; Lessons in Botany; Structural and Systematic Botany;* a revised edition of the *Botanical Text-book*, with 1300 illustrations; *Flora of the Southern United States; School and Field Book of Botany* (1869); and *Botany for Young People* (1869). Professor Gray, who visited Europe in 1838—1839, and again in 1850—1851, has also contributed many papers to scientific periodicals and the transactions of learned societies.

GRAY, Thomas, an English poet, was born in London on the 26th December 1716. His father, Philip Gray, a money-scrivener, was of a disposition so violent, that his wife was obliged to separate from him; and it was mainly through her exertions that her son was placed at Eton, and afterwards at Cambridge. At Eton, he made the acquaintance of Horace Walpole, the son of the prime minister; and when his college education was completed, he accompanied his friend on a tour through France and Italy. After spending a year in the search of the picturesque and in the exploration of picture-galleries, the friends quarrelled, and G. returned to England, and went to Cambridge to take his degree in civil law. At the university, the greater portion of his life was spent, breathing the serene air of noble libraries, and corresponding with friends, as only the men of that day could correspond. In 1756, in consequence of a practical joke, he removed from St Peter's College to Pembroke Hall. He had a just appreciation of the natural beauty of his native country, and rambled in Scotland, Wales, and the English lake counties. He made notes wherever he went, and wrote copious descriptions of what he had seen to his literary friends. He published his *Ode to Eton College* in 1747, and his *Elegy written in a Country Churchyard* two years afterwards. His *Pindaric Odes* appeared in 1757; but however much they might dazzle the imagination with brilliant imagery, and charm the ear with involved and intricate harmony, they did not touch the popular heart like the *Elegy*. On the death of Colley Cibber, he was offered, but declined, the post of poet-laureate. Shortly after he was appointed Professor of Modern History. Fastidious in his tastes, fond of books and lettered ease, indisposed to mingle in the great world, but delighting to comment upon it in letters to friends, blessed with a reputation peculiarly dear to a scholar's heart, comparatively rich, his life glided on imbittered but by one enemy—gout. Dining one day in the college hall, he was severely attacked, and after suffering a week, he died on the 30th July 1771, aged 55 years. He was buried by the side of his mother at Stoke near Eton.

The poetry of G., with the exception of the *Elegy*—which everybody knows—has never become popular; yet in its own sphere it is very perfect; delicately if not richly imaginative, curiously studded with imagery; exquisitely finished, like miniatures painted on ivory. But his subjects are often remote, and out of the track of ordinary human feelings.

GRAY, in Heraldry, signifies a badger.

GRA'YLING (*Thymallus vulgaris*), a fish of the family *Salmonidæ*, and of a genus distinguished from salmon, trout, &c., by smaller mouth and much smaller teeth, and by the greater size of the dorsal fin. The scales are also much larger. The G. is found in many streams in England, but is, however, very local; and of two rivers in the same neighbourhood, one often contains it, and the other does not. A supposition that it was brought to England by the monks, is unsupported by any evidence. It is found in the Eden and the Esk in Cumberland, in the Clyde in Lanarkshire, and in the Orkney Islands. It is plentiful in many parts of Europe, and equally in Switzerland and in Lapland. It inhabits clear streams, with rocky or gravelly bottoms, and 'seems to require an alternation of stream and pool.' It will live in clean newly made ponds in hard soil, although it does not breed in them, but will not live in those of muddy bottom. Its food consists chiefly of flies and aquatic larvæ, and it is taken by angling in the same manner as the trout. It sometimes attains the weight of four or five pounds. The back and sides are silvery gray, marked with numerous longitudinal dusky streaks; the dorsal fin is spotted, the spots arranged in lines across the fin. The abdominal line is almost straight, the dorsal line is considerably elevated. The G. is greatly esteemed for the table, but requires to be cooked when newly caught, when it has an odour which has been compared to that of wild thyme. It spawns in April or May, and is in the best condition when trout are out of season, in October and November.—There are several other species of *Thymallus*, none of which are British. One of them, *T. signifer*, a very beautiful fish, inhabiting the clear affluents of the Mackenzie River, is called *Hewlukpowak*, or the *fish with the winglike fin*, by the Esquimaux. It is said to afford excellent sport to the angler; although the streams in which it is found are visited by few anglers for mere amusement.

Grayling (*Thymallus vulgaris*).

This beautiful fish is very local in its distribution, and although hardly found in Scotland, is abundant in most of the Scandinavian rivers. Angling for grayling is excellent sport. It rises to the same flies as those which are used for trout: it also takes worms, maggots, and other small larvæ and insects. From July till the end of October are the best months for grayling fishing, but in fine open days they afford sport through the winter.

GRAY'S INN, one of the four Inns of Court having the sole power of calling persons to the degree of barrister-at-law. See INNS OF COURT.

GRAZALE'MA, a small town of Spain, in the province of Cadiz, and situated about 60 miles east-north-east of the city of that name in a strong position on a rocky hill approachable only by a narrow and easily defended ledge, between the Sierra de Ronda on the east, and the Cerro de S. Cristoval on the west. It was compared by the French (a whole division of whom were here repulsed by the inhabitants) to a land Gibraltar. A great deal of smuggling, and, it is suspected, robbery, is carried on by the inhabitants. Pop. 5000.

GRAZIO'SO, an Italian term in Music, meaning with graceful expression.

GREASE, a term of general application to all oily or fatty matters, but generally to those having some degree of solidity, as tallow. It is more specially applied to fatty matters which are so deteriorated with dirt or other impurities as to be unfit for candle-making and other manufactures requiring some degree of purity in the material. Grease is largely employed as a lubricant for machinery, and especially for the wheels of carriages. The grease employed for the axles of carriages and carts consists of the most inferior kinds of grease mixed with a little tar.

In commerce, the term Mares' Grease is now well known. It is the fat of horses which are killed in large numbers at Buenos Ayres and Monte Video; and their products, consisting of hides, grease, bones, and hair, are largely exported to this and other countries. Owing to the practice of slaughtering the mares chiefly, this particular kind of fat has been designated *Mares' Grease*. It is a very oily fat, and so penetrating, that it is difficult to make casks sufficiently tight to prevent leakage. It is used for lubricating machinery, for which it is well adapted.

RAILWAY GREASE is, in reality, a kind of soap, a small portion of soda being mingled with the materials to effect an imperfect saponification. The object is to prevent the too rapid melting of the material, which, without this precaution, would be excessively rapid, owing to the heat caused by the friction of wheels revolving with such rapidity. It is also made of very superior materials, and consists generally of the vegetable fats called cocoa-nut oil and palm-oil; sometimes animal fat is used. This composition is placed in small metal boxes on the axles, with which they communicate by a small hole, so that, as the axle heats the surrounding parts, the grease in the boxes melts, and runs through the little orifice on to the axle. See BEAR'S GREASE; also GREASE in SUPP., Vol. X.

GREAT BASIN, or **FREMONT'S BASIN**, a remarkable tract of country in North America, lying in the west of Utah Territory, and bounded on the W. by the Sierra de Nevada, and on the E. by the

Wahsatch Mountains. It is said to be 500 miles in extent from east to west, and about 350 from north to south; is girdled round on every side by high mountains, while detached groups cross its whole area; and lies at an elevation of about 5000 feet above sea-level. The Humboldt River Mountains, with an elevation of from 5000 to 7000 feet above the surrounding country, traverse the plateau near its centre. This basin contains many lakes and rivers whose waters never reach the ocean, but are either taken up by evaporation, or are lost in the more arid districts. The G. B. is essentially a desert. Some portions of it are covered by a yielding mass composed of sand, salt, and clay; others by a crust of alkaline and saline substance.

GREAT BEAR LAKE. See BEAR LAKE, GREAT.

GREAT BRITAIN. Under this head are noticed—1. The Island of Great Britain—its geology and geography; 2. The United Kingdom of Great Britain and Ireland—its general statistics, &c. Historical sketches of England and Scotland down to the union of the two kingdoms are given under their respective names; the history of Ireland to its union with Great Britain is also given under its own name, together with its geography.

The ISLAND OF GREAT BRITAIN—so called to distinguish it from Britannia Minor, or Little Britain (see BRETAGNE) in France—lies between lat. 49° 57′ 30″ and 58° 40′ 24″ N., and between long. 1° 46′ E. and 6° 13′ W., and is the largest island in Europe. It is bounded on the N. by the Atlantic, on the E. by the North Sea, on the S. by the English Channel, and on the W. by the Atlantic, the Irish Sea, and St George's Channel. The most northerly point is Dunnet Head, in Caithness; the most southerly, Lizard Point, in Cornwall; the most easterly, Lowestoft Ness, in Suffolk; and the most westerly, Ardnamurchan Point, in Argyleshire. Its greatest length is about 608 miles, and its greatest breadth (from Land's End to the east coast of Kent) about 320 miles; while its surface contains about 89,600 square miles.

Geology.—The geology of G. B. is of peculiar importance. The rocks of the earth's crust having been first systematically studied and expounded here, British geologists have given to the world the names whereby the various strata are known, and British rocks form the typical series of the earth's strata. The whole recognised series of stratified deposits occur in Britain, one or two only being more fully developed elsewhere; and it is only in these singular cases that the foreign equivalents are taken as the types. British geology is no less important from the influence it has had in the development of the country. The mineral wealth, especially the coal and the iron, are the real sinews and muscles of Britain's mighty power. No other country has similar advantages in such an area.

We shall, in this sketch of the distribution of the British rocks, follow the order of the strata, beginning with the lowest and oldest. It may be said that, in general, the mountainous regions of the north and west are formed of the oldest sedimentary rocks, and that, as we move south-eastwards, we gradually pass over newer strata, until, in the east of England, we come to the only extensive Pleistocene deposits in the country.

The base rocks of the whole series occur in the Outer Hebrides, in Tiree and Coll, and along the western shores of Sutherland and Ross. The true position of these strata has been only recently determined by Murchison and Geikie, who, noticing that their strike was at right angles to the beds resting above them, discovered that they were older than the superimposed Cambrian rocks. They consider them to be the equivalents of the *Laurentian system*, described by Sir W. Logan in Canada. The predominant rock is crystalline gneiss. A band of limestone occurs on the north-east shore of Loch Maree, but this has hitherto proved unfossiliferous.

Resting on the convoluted edges of this old gneiss, on the mainland, and forming the basement rocks in Cumberland, Anglesey, and North Wales, we have the *Cambrian series* of deposits. In Scotland, these rocks are brownish-red sandstones and conglomerates; in England and Wales, they are composed of sandstones, gritstones, and slates. A few fossils, chiefly impressions of supposed fucoid plants, annelid tracks, and zoophytes, have been found in the slates.

The *Silurian measures* occupy a large portion of the surface of the country. The typical rocks occur in Wales, extending over the western portion of the principality from Pembroke to Denbigh, and including the northern portions of Pembroke, Caermarthen, and Brecknock, the whole of Radnor and Montgomery, the south-west of Denbigh, and the whole of the counties to the west. The oldest or Lower Silurian beds are next the coast. The series consists of an immense thickness of shales, slates, and sandstones, with intercalated limestones more or less pure. Immense tracts have hitherto proved devoid of fossils; in other districts, the calcareous rocks are almost entirely composed of the remains of marine invertebrate animals, while the shales abound in zoophytes and crustacea. The high lands in the north of Lancashire and south of Westmoreland are Silurian; but it is in Scotland where these strata are most extensively developed; indeed, almost the whole country consists of Silurian strata, with the exception of a large trough in the centre, occupied with newer rocks. A line drawn from Dunbar to Girvan forms the northern limit of these beds in the south of Scotland. Except the lower half of the valley of the Tweed, the whole region from this line to near the base of the Cheviots is Silurian. The rocks are chiefly greywacke, with scattered beds of impure limestone. The chief fossils are graptolites, crustacea, and mollusca. The lead-mines of Wanlockhead and Leadhills are in this district. A line drawn from Stonehaven to Helensburgh would mark the termination of the Silurian strata, which compose the whole of the north of Scotland, with the exception of the newer beds on the north-east coast, and the Laurentian and Cambrian series already described. All the series is greatly metamorphosed; the lower strata are converted into quartzose flagstones and quartz rock, the upper into chlorite and mica-slate, and quartzose and gneissose rocks.

The *Old Red Sandstone strata*, consisting of conglomerates, coarse and fine grained sandstones, and dark-coloured schists, with the characteristic fossils of ganoid and placoid fish, overlie the Silurians in several districts in Scotland. Nearly all Caithness and the seaward portions of Sutherland, Ross, Cromarty, Inverness, Nairn, and Moray, belong to these strata. A broad band, rising on the east coast between Stonehaven and St Andrews, stretches across the country to Helensburgh and Dumbarton on the west. The same strata appear again in Haddington, Berwick, and Roxburgh, in Lanark, and in Ayrshire. An extensive tract of these strata occurs in South Wales and the neighbouring English counties, extending from the Silurian district to the Severn and the Bristol Channel, and containing in a large basin the South Wales coal-field. The highly fossiliferous strata of North Devon, and of South Devon and Cornwall, belong to this period. They consist of slates, sandstones, and limestones, and contain numerous corals and shell-fish.

The strata of the *Carboniferous period* may be said to occupy a broad tract extending from the Bristol Channel to the base of the Cheviots. They are not continuous between these limits, but are broken up in some places by the appearance on the surface of older strata, while in others they are covered by newer deposits. The various detached coal-fields are—(1) the South Wales, in Glamorgan and Pembroke; (2) the Bristol, and (3) the Forest of Dean, in Gloucester; (4) the Forest of Wyre, in Worcester; (5) Shrewsbury, and (6) Colebrook Dale, in Shropshire; (7) North and (8) South Staffordshire; (9) Warwickshire; (10) Leicestershire; (11) Flint and Denbigh; (12) Lancashire; (13) York and Derby; (14) Cumberland; and (15) Northumberland and Durham. In the northern portion of this great tract of coal measures, where the millstone grit and carboniferous limestone are largely developed, no seams of coal of any value are contained. The limestone in Derby is rich in metallic ores. The carboniferous strata of the north of England extend beyond the Cheviots into Scotland, forming a narrow band from the Solway to the North Sea, in the counties of Dumfries, Roxburgh, and Berwick. The only coal-field in this district is one of small extent at Canonbie, in Dumfriesshire. The carboniferous strata in Scotland, with the exception just stated, are confined to the immense trough between the Silurian measures on the south and the Old Red Sandstone on the north, which is completely occupied by them, except where the Old Red Sandstone rises to the surface. Considerable tracts of sandstone and limestone without coal break up the true coal-bearing measures into the following coal-fields: the Mid-Lothian, the Fife, the Lanark and Stirling, and the Old Cumnock, in Ayrshire. Besides coal, the whole of the carboniferous series contain immense stores of argillaceous carbonate of iron, the ore from which is produced the great bulk of the iron used in the country. The sandstones of this period form beautiful and durable building-stones, the limestones are of great commercial value, and many of the less indurated shales are good fireclays.

Permian strata, consisting of magnesian limestone and sandstone coloured with oxide of iron, occupy a considerable area in Durham, and border the carboniferous rocks in Dumfries, Cumberland, Westmoreland, Lancashire, Cheshire, Shropshire, Stafford, Worcester, Warwick, Nottingham, and York, and in Glamorgan. The sandstone is quarried for building.

The typical triple series of the *Triassic measures* occur in Germany; the British representatives consist of variously coloured sandstones and marls. They occupy a considerable surface in Lancashire, Cheshire, Shropshire, and Stafford, and extend as a ribbon of varying breadth, from the mouth of the Exe, through Devon, Somerset, Gloucester, Worcester, Warwick, Leicester, Nottingham, York, and Durham, to the coast at Hartlepool. The only deposits of rock-salt in Britain occur in the Triassic rocks of Cheshire and Worcestershire.

The *Lias* consists of white sandstones, limestones, shales, marls, and alum slates. They abound in fossils, especially in the remains of reptiles, fishes, mollusca, and encrinites. The strata of this age occupy a band between the Trias and the Oolite, extending from Lyme Regis to the mouth of the Tees. Two small tracts of Lias occur, the one in Glamorgan, and the other in Shropshire. In Scotland, small patches exist at Brora in Sutherland, and in the islands of Skye, Eigg, and Mull.

The *Oolite measures* are composed of an extensive series of limestones, sandstones, and shales, which occupy a belt of nearly 30 miles broad, from Yorkshire to Dorsetshire, passing through Lincoln, Northampton, Huntingdon, Bedford, Buckingham, Oxford, and Wilts. The best building materials in England are obtained from these strata. Oolite strata occur in Scotland at Brora and in Skye. In the Brora Oolite, a seam of coal 3½ feet in thickness has been worked for upwards of a century. It is the thickest bed of pure vegetable matter detected in any Secondary formation in Britain.

The fresh-water *Wealden series*, with their abundant remains of reptiles, fishes, shells, and insects, occur in Kent and Sussex, in the Isle of Wight, and in the south of Devon.

The beds of the *Cretaceous period*, consisting chiefly of chalk with intercalated sands and clays, all very rich in fossil remains, occupy a broad tract to the east of the Oolite strata, and parallel to them. Beginning a little north of Flamborough Head, they may be traced through York and Lincoln, then across the Wash into Norfolk, Suffolk, Hertford, Buckingham, Oxford, Berks, to Hampshire, where they separate into three arms, the one extending south-westward through Wilts and Dorset to the south coast; another taking a south-east direction to Beachy Head; and the third stretches as a narrow band in an easterly direction through Surrey and North Kent, widening out as it nears the coast, where it occupies the district between Ramsgate and Folkstone.

Eocene strata, consisting of clays, sands, and marls, abounding in fossils which apparently indicate a sub-tropical climate, occupy the valley of the Thames, from Hungerford to the sea, and from Canterbury to Saxmundham, as well as a large district in Dorset, Hants, and Sussex, from Salisbury west to Dorchester, and east almost to Hastings.

Unless the beds in Mull, containing the numerous impressions of leaves of exogenous plants, are *Miocene strata*, there are no representatives of this period in Britain.

The *Pliocene deposits* of ferruginous shelly sand and marl known as red crag occur chiefly in Suffolk. The still more recent *Pleistocene deposits* of fresh-water sand and gravel, and mammaliferous crag, are found on the coasts of Norfolk, Suffolk, Essex, and Kent. The till and glacial beds of the same age are scattered as superficial deposits over large districts in Britain. Fossiliferous beds of this age occur in Caithness, in the valley of the Clyde, and in Lancashire; they contain remains of mollusca, many of which still live in the seas of boreal America.

Minerals—Coal.—From the collieries in Britain in 1871 were raised 117,439,251 tons of coal. The greatly increasing consumption of coal has originated fears as to the possibility of the exhaustion of our mineral fuel. It appears that, while in 1820, only 15,000,000 tons were raised, in 1840, the amount had reached 30,000,000, and in 1860, it was nearly 84,000,000. At the same rate of increase, the known coal, within a workable distance from the surface, would last at least 100 years. But the consumption, during the last 20 years of the century, would, at the present increasing ratio, amount to 1464 million tons a year, a quantity vastly greater than can possibly be used. We need not, therefore, now begin to fear lest our coal-fields should be speedily used up.

Iron.—Formerly, the only iron produced in the country was obtained from the greensand of the south-east of England, and from the brown hæmatite of the Dean Forest. The ore was smelted with charcoal. But the introduction of coke and coal for smelting, and the discovery of numerous additional and unthought-of deposits, especially in connection with coal-bearing strata, has immensely increased the production of iron, and met the greatly increased demands for this important metal. In 1760, when charcoal alone was used for smelting, not more than 25,000 tons of iron were produced; while in 1860, no less than 3,826,752 tons were obtained from 8,024,206 tons of ore. The market value of the metal was £12,703,950. In 1871, the total iron ore production of the United Kingdom, of which returns were received, amounted to 16,334,884 tons, of the value of £7,670,572. The most important ore is the ferruginous shale, or impure argillaceous carbonate of iron, which occurs in connection with every coal-field in Britain. The brown and red hæmatite, associated with the oldest Palæozoic rocks, yield also a large amount of metallic iron.

Tin is obtained from only two counties—Cornwall and Devon. In 1868, the 143 mines produced 9300 tons of metallic tin, worth £901,400.

Copper is principally obtained from the same two counties. There are about 160 different mines, which produced, in 1868, 157,335 tons of ore, yielding 9817 tons of metallic copper, worth £761,602. In 1860 there was a yield of 13,789 tons of ore, producing 935 tons of metal, worth £100,691, chiefly from the counties of Lancaster, Caermarthen, and Anglesey, very small quantities being supplied from mines in Cumberland, Chester, Cardigan, and the Isle of Man.

Lead and *Silver* are obtained from the same ore from numerous mines in Palæozoic districts. The most productive English mines are in Northumberland, Durham, Cumberland, York, and Derby, in Shropshire, and in Cornwall and Devon. Small quantities are obtained in Somerset, Westmoreland, Stafford, and Chester. All the Silurian counties of Wales contain mines. The Isle of Man yields nearly 3000 tons of ore. In Scotland, the most productive mines are at Wanlockhead and Leadhills; Argyle, Perth, and Kirkcudbright also supply small quantities. The total amount of ore raised in 1868 was 95,236 tons, yielding 71,017 tons of metal, worth £1,378,404. From this there were separated 835,542 ounces of silver, worth £229,773.

Zinc is obtained from Cornwall and Devon, Cardigan and North Wales, Derby, Cumberland, and the Isle of Man. The produce in 1868 was 12,781 tons of ore, valued at £39,191. The metallic zinc obtained from this amounted to about 3800 tons, valued at £75,435.

Sulphur Ores (iron pyrites) were raised in different parts of G. B., chiefly in Cornwall, to the extent, in 1868, of 76,484 tons, worth £53,636.

The following minerals are also raised in Cornwall, viz., arsenic, manganese, gossan, nickel, silver-copper, fluor-spar, and wolfram.

Salt occurs in Cheshire and Worcestershire: no less than 1,513,840 tons were produced in 1868.

The mineral produce of G. B. amounted in 1868 to £43,525,524.

Physical Geography.—The physical features of a country are intimately connected with its geological structure. The older Palæozoic rocks produce mountainous regions, intersected with deep and narrow valleys. The newer strata seldom rise to a great height. Their high lands are rounded undulations of the strata, except where igneous rocks are intruded, and the valleys are broad and shallow. In Scotland, we have, consequently, two extensive mountainous districts, occupied chiefly with rocks of Silurian age, and an intervening valley filled up with Old Red Sandstone and Carboniferous measures. The northern mountain region is intersected by the Great Glen, which is a fissured anticlinal axis in the Silurian strata. It is difficult to group the mountains in this district. The Grampians from Aberdeen to Argyle shew the most marked linear arrangement; the greatest eminence in this range is Ben Lawers (3945 feet). Between the Grampians and the Great Glen a succession of great eminences occur, the highest of which, and the culminating point of the whole British Isles, is Ben Nevis (4406 feet). To the north of the valley of the Caledonian Canal, the region is a confused mass of mountains, reaching in Ben Attow a height of 4000 feet. Caithness consists of plains of undulating sandstone, covered with drift; the headlands and sea-cliffs in this county are bold and striking. The coast-line of the Palæozoic region of the north of Scotland is repeatedly broken by numerous and large friths or sea-lochs, and the interior abounds in picturesque lakes. The Silurians of the south of Scotland form an extensive mountain range crossing the island from St Abb's Head to Stranraer. The rocks are less indurated than in the north, and the scenery is consequently not so wild. The mountains have generally broad flattened forms, intersected by deep pastoral glens, which widen out into broader valleys and dales. The principal heights are Hartfell (2790 feet) and Black Larg (2890 feet). The great central valley of Scotland embraces the basins of the Clyde, Forth, and Tay. It contains several tracts of rich table-land, and is frequently broken through by igneous rocks, chiefly trappean, which project into bold and picturesque hills.

England and Wales, in the Cambrian and Silurian districts, have the same mountainous character as similar districts in Scotland; but as so much of England is occupied with newer strata, it may be considered on the whole as a level country, traversed by ridges of varying elevation, which form the water-sheds of the country. The range, beginning with the Cheviot Hills, is continued from the borders of Scotland southwards, as the Pennine range, through Northumberland, Cumberland, Westmoreland, Lancashire, and Yorkshire, to the middle of Derbyshire; it varies in height from 1200 to 3000 feet, reaching its highest summit in Crossfell, Cumberland, which is 3383 feet high. The band of Lias and Oolite, extending from Yorkshire to Dorset, forms a tortuous range of table-land, rising sometimes into hills to the height of 1500 feet, and throughout its course presenting generally a bold escarpment to the west, and having a gentle slope to the east. To the west of this range of table-land are the valleys of the Yorkshire Ouse, the Trent, and the Severn; on the east, the Great Ouse and the upper portion of the Thames. Beyond these two rivers, the country rises into a range of low chalk-hills, which follow the cretaceous strata from Norfolk to Wilts, dividing with the strata into three ranges, two of which take an easterly direction through Sussex and Surrey and Kent, bordering the Wealden strata, and forming the South and North Downs. Devon and Cornwall are mountainous, from the intrusion of granite and other igneous rocks through the Palæozoic strata.

The details of the physical geography are given under the names of the several counties, lakes, rivers, &c.

Climate.—The climate of G. B. derives its peculiar character from the insular situation of the country, taken in connection with the prevailing direction of the winds. It is mild and equable in a remarkable degree, the winters being considerably warmer, and the summers colder than at places within the same parallels of latitude. For at least three months, the mean monthly temperature ranges between 50°·0 and 60°·0; for other three months it continues about 60°·0, or occasionally a little higher, seldom more than three degrees; and for the remaining six months it ordinarily ranges between 36°·0 and 48°·0. Since the Reports of the Registrar-general clearly prove that the temperature most conducive to health is between 50°·0 and 60°·0, it follows that, as far as concerns temperature, the climate of G. B. is one of the healthiest in the world.

As appears from data furnished by the Reports of the English and Scottish Meteorological Societies, the mean temperature of England is 49°·5, and of Scotland 47°·5. The mean temperatures of the following places, arranged according to the latitude, have been deduced from the same sources: Guernsey, 50°·2; Truro, 51°·3; Ventnor, 51°·5; Barnstaple, 50°·8; Aldershott, 49°·4; Greenwich, 49°·5; Bedford, 49°·3; Derby, 48°·8; Liverpool, 48°·9; Manchester, 48°·0; Isle of Man, 47°·8; Scarborough, 47°·0; Milne-Graden (Berwick), 46°·8; Dalkeith, 46°·9; Rothesay, 47°·8; Greenock, 47°·9; Arbroath, 46°·6; Culloden, 46°·8; Tongue, 46°·5; Sandwick (Orkney), 45°·6; and Bressay (Shetland), 45°·3. There is thus a difference of fully six degrees between Ventnor, in the Isle of Wight, and Shetland. As this difference is chiefly attributable to the difference of their latitudes, it follows, that it will become greater as the force of the sun's rays increases; and hence, while the winter temperatures are respectively 42°·2 and 39°·5, the summer temperatures are 61°·8 and 53°·4. A pretty regular decrease of temperature, with an increase of latitude, will be observed, particularly if the places on the west side of the island be regarded as a distinct series by themselves. It will appear, on examination, that the temperatures of places on the west are about a degree in excess of those of places in the same latitudes, but at some distance from the Atlantic. In winter, the differences between the west and the other parts of the country are still greater. Thus, whilst the winter temperature of Truro is 45°·0; Guernsey, 43°·8; Ventnor and Barnstaple, 42°·2; Isle of Man, 41°·8; Liverpool, 40°·6; and Greenock, and the whole of the west coast of Scotland as far as Shetland, 39°·5—that of Greenwich is 37°·9; Nottingham, 37°·3; York, 37°·1; Scarborough, 38°·8; Dalkeith, 37°·0; Arbroath, 37°·1; and Culloden, 38°·2.

The south-west winds are the most prevalent throughout the year, except in April and May, when they give place to the north-east winds. The notoriously dry and parching character of the latter render them very deleterious to health. On the other hand, the south-west winds, coming from the Atlantic, are moist and genial, and it is on their greater frequency—being, as compared with the north-east, in the proportion of two to one—that the salubrity of the climate in a great measure depends.

In those districts of England where hills do not interfere, the annual rainfall is about 25 inches, and in similar parts of Scotland about 28 inches; but these amounts, which may be considered as the minimum falls, are variously increased by proximity to hills, according as the place is situated in the east or west of the island, viewed in relation to the direction of the wind which brings the rain, and by its lying to the wind or lee side of these hills. Since it is the south-west winds which bring the rain, the heaviest falls take place among the hills in the west of the country; and it may be here observed that, in the west, where there are no hills lying to the north-west, west, or south-west, the annual rainfall is about the minimum. The annual rainfall in Cornwall, Wales, Cumberland, and the West Highlands, may be estimated at from 45 to 65 inches. In some places, however, this amount is far exceeded. At Seathwaite, in Cumberland, for instance, the rainfall is truly tropical, the mean annual amount being 127 inches; in 1861, it was 182 inches; and in the month of November of that year the enormous quantity of 35·41 inches fell at this station. At Tyndrum, in Perthshire, 134·5 inches fell in 1861; and at this place, and among the Arrochar Hills, the monthly rainfall is occasionally between 20 and 30 inches.

Natural History.—The natural history of G. B. corresponds generally with that of continental Europe (q. v.). Very few species, either of plants or animals, are peculiar to Great Britain. The flora of the greater part of the island most nearly resembles that of Germany; but in the south of England there is, as might be expected, a closer correspondence with that of the north-west of France; and some plants found in the Channel Islands and on the French coast appear nowhere in Britain but in the south-west of England. The mountains of Wales, Cumberland, and Scotland have a vegetation resembling that of Scandinavia more than that of the mountains of Central or Southern Europe. The state of the case is much the same as to the fauna. There are, however, many remarkable instances both of plants and animals, which, from these apparent relations to continental Europe, might be expected in G. B., and which are not indigenous to it. As examples, may be mentioned, among plants, the Norway spruce, and among animals, the lemming, both common in Scandinavia. The progress of civilisation and of cultivation has completely banished from G. B. many of the animals which were once numerous, as bears, wolves, &c. But on the contrary, many plants which were unquestionably introduced by man, have become thoroughly naturalised.

Ethnology.—The present population of the island of G. B. is the result of successive waves of immigration and conquest. When the Romans invaded Britain (54 B. C.), the inhabitants were Celtic; and they continued to be essentially so until the 5th and 6th centuries, when—the Romans having previously retired—the level parts of the country were gradually overrun and subdued by German tribes from the opposite coasts. Then followed invasions of Danes and other Scandinavian nations, and lastly the Norman Conquest. As the Normans, however, were originally from Scandinavia, they cannot be considered as adding any new ethnological element; so that the inhabitants of England (excepting Wales) and of the Lowlands of Scotland may be considered as sprung from an amalgamation of the original Celtic with German and Scandinavian blood, the latter having predominated so as to determine the language, institutions, and character of the resulting race. Wales and the Highlands of Scotland are still inhabited by representatives of the ancient Celtic tribes. See WELSH LANGUAGE AND LITERATURE; SCOTLAND; PICTS; IRELAND; CELTIC NATIONS; BRITANNIA; and ANGLO-SAXONS.

Notwithstanding the union of the two kingdoms into which the island was once divided, the distinction, for certain purposes, is still kept up. England (including Wales), the larger and southern division, extends as far north as the parallel of 55° 48′, the boundary-line running between Berwick-on-Tweed and the Solway Firth (see BORDER, THE); its greatest length is about 400, and its greatest breadth about 320 miles. Area, about 58,300 square miles. England resembles to some extent a triangle in shape, its southern shore forming the broad base, and its east and west coasts gradually approaching until the apex is reached at Berwick-on-Tweed. Scotland occupies the northern part of the island; its greatest length (from the Mull of Galloway to Dunnet Head) is about 287 miles; its greatest breadth (from Peterhead to Ardnamurchan Point) about 182 miles; elsewhere, however, the breadth is much less. Between Alloa, on the Forth, and Dumbarton, on the Clyde, it is only 33 miles; between the head of Loch Broom, on the west coast, and of Dornoch Firth, on the east, only 26 miles; and north of Inverness, the average breadth does not exceed 70 miles. The entire area is about 31,300 square miles. The greater part of the surface of Scotland is irregularly distributed into mountain and valley, a very small proportion spreading into level plains. The eastern coast forms a waving, continuous, and rarely broken line; but the western is extremely irregular, being deeply indented with bays and arms of the sea, and exhibiting steep promontories and mountainous islands. The whole country is physically divided into *Highlands* and *Lowlands*—the former comprehending the north-west, west, and central portions; the latter, generally speaking, the east coast, and the country south of the Forth and Clyde.

Islands.—The island of G. B. is surrounded by the Isle of Man, Anglesey, the Scilly Isles, the Isle of Wight, the outlying Channel Islands, the Shetland Isles, the Orkneys, and the Hebrides, each having generally a mainland encircled by small islands and rocks, bare or scantily covered, which sea-fowls inhabit, fishermen in their boats visit, and shepherds sometimes dwell in during summer. The coast against the North Sea has few islands, except Thanet, Sheppey, and some lowlands, which are isolated at high water. Coquet, Staples, Holy Island, May Island, Inchkeith, and Inchcolm, are the only ones inhabited. The Orkneys and the Shetlands lie to the north. St Michael, Looe, and the Isle of Wight, are the only islands on the south coast, except those sometimes connected with the land, and the Channel Islands off the coast of Normandy. All the other islands lie on the west coast, extending from the Scilly Isles, through Anglesey and Man, to the Island of Lewis. According to the census of 1851, there were about 500 of these islands and rocks, of which only 175 were inhabited; but in 1861 a more careful enumeration was made, when it was ascertained that Scotland alone had 787, of which 186 were inhabited. The number belonging to England is not stated.

For administrative purposes, G. B., with its surrounding islands (excepting the Channel Islands and the Isle of Man, which are under peculiar jurisdiction), is divided into 84 counties or shires. The following tables exhibit their several areas and populations:

ENGLAND.

Counties.	Area in Stat. Acres.	Inhabited Houses, 1871.	Population, 1871.	Population, 1861.
Bedford,	295,582	30,508	146,256	135,265
Berks,	451,210	39,612	196,445	176,103
Buckingham,	466,932	37,162	175,870	166,597
Cambridge,	525,182	40,091	186,363	175,950
Chester,	707,078	110,743	561,131	505,153
Cornwall,	873,600	73,956	362,098	369,323
Cumberland,	1,001,273	44,069	220,245	205,298
Derby,	658,803	78,530	380,538	339,377
Devon,	1,657,180	105,175	600,814	584,531
Dorset,	632,025	39,404	195,544	188,651
Durham,	622,476	114,658	685,045	509,018
Essex,	1,060,549	92,359	466,427	404,614
Gloucester,	805,102	102,347	534,320	485,502
Hereford,	534,823	26,380	125,364	123,659
Hertford,	391,141	39,330	192,725	173,294
Huntingdon,	229,544	14,031	63,672	64,297
Kent,	1,039,419	151,171	847,507	733,675
Lancaster,	1,219,221	530,431	2,818,904	2,428,744
Leicester,	514,164	58,559	268,764	237,402
Lincoln,	1,775,457	94,119	436,163	411,997
Middlesex,	180,136	321,021	2,538,882	2,205,711
Monmouth,	368,399	35,488	195,391	174,670
Norfolk,	1,354,301	99,599	438,511	435,422
Northampton,	630,358	51,970	243,896	227,727
Northumberland,	1,249,299	62,415	386,959	343,028
Nottingham,	526,076	68,604	319,956	293,784
Oxford,	472,717	37,837	177,956	172,266
Rutland,	95,805	4,772	22,070	21,851
Salop,	826,055	50,766	248,064	240,876
Somerset,	1,047,220	92,105	463,412	444,725
Southampton,	1,070,216	98,172	543,837	481,495
Stafford,	728,468	167,487	857,333	746,584
Suffolk,	947,681	76,496	348,479	336,271
Surrey,	478,792	168,109	1,090,270	830,685
Sussex,	936,911	75,200	417,407	363,648
Warwick,	563,946	131,775	633,902	561,723
Westmoreland,	485,432	12,674	65,005	60,809
Wilts,	865,092	54,821	257,202	249,445
Worcester,	472,165	70,084	338,848	307,601
York, E. Riding,	768,419	56,430	269,505	240,359
" City,	2,720	9,141	43,796	40,377
" N. Riding,	1,350,121	58,539	291,589	244,804
" W. Riding,	1,709,307	382,787	1,831,223	1,507,511
Total of England,	32,590,397	4,008,877	21,487,688	18,949,930

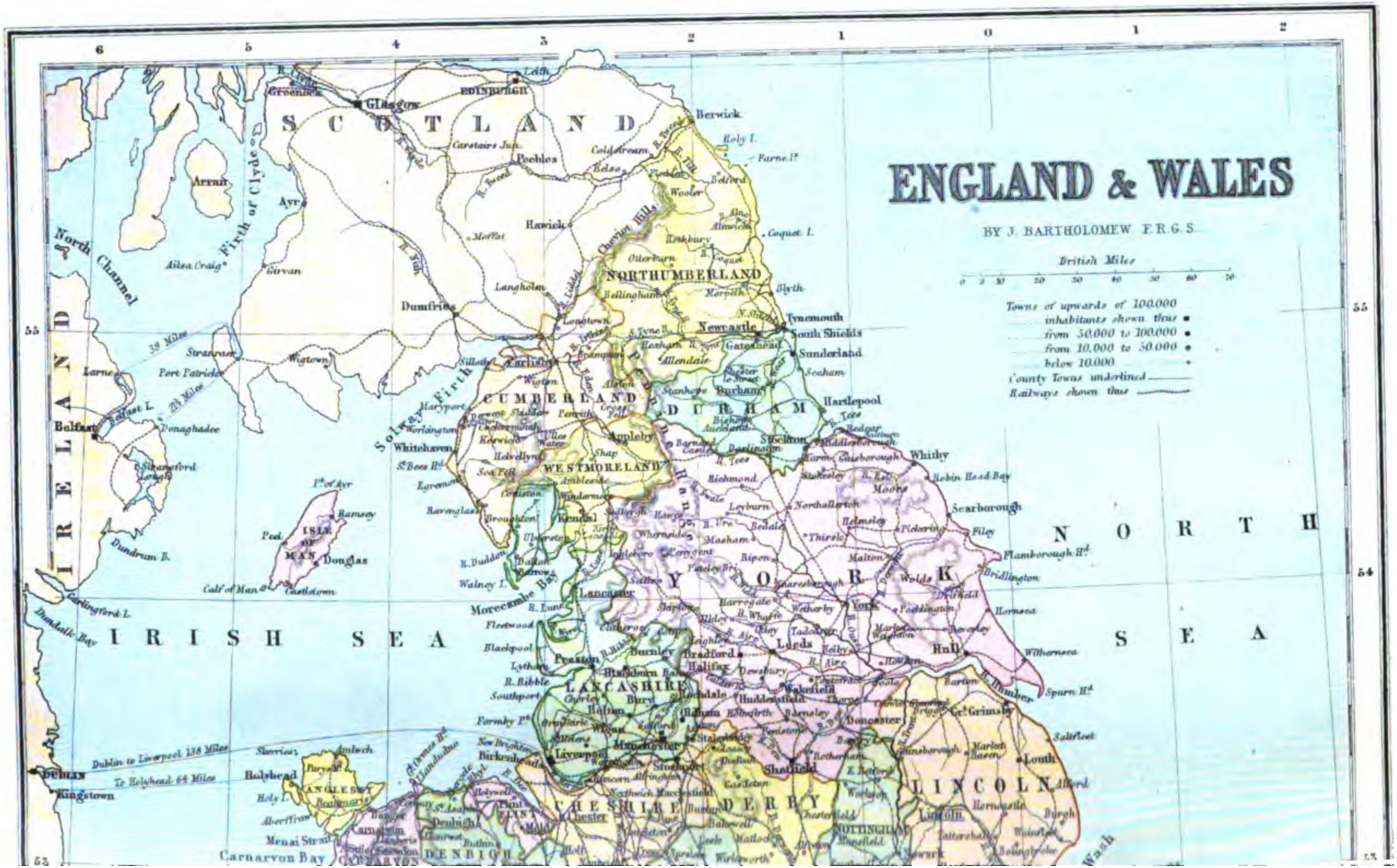
WALES.

Counties.	Area in Stat. Acres.	Inhabited Houses, 1871.	Population, 1871.	Population, 1861.
Anglesey,	193,453	12,175	50,919	54,546
Brecon,	460,158	12,644	59,904	61,627
Cardigan,	443,387	16,482	73,488	72,255
Caermarthen,	606,331	24,603	116,944	111,757
Caernarvon,	370,273	23,303	106,122	95,668
Denbigh,	386,052	22,309	104,266	100,862
Flint,	184,905	16,626	76,245	69,870
Glamorgan,	547,494	73,409	396,010	317,751
Merioneth,	385,291	10,159	47,369	38,888
Montgomery,	483,323	13,936	67,789	67,075
Pembroke,	401,691	19,568	91,936	96,093
Radnor,	272,128	4,941	25,428	25,403
Total of Wales,	4,734,486	250,155	1,216,420	1,111,795

SCOTLAND.

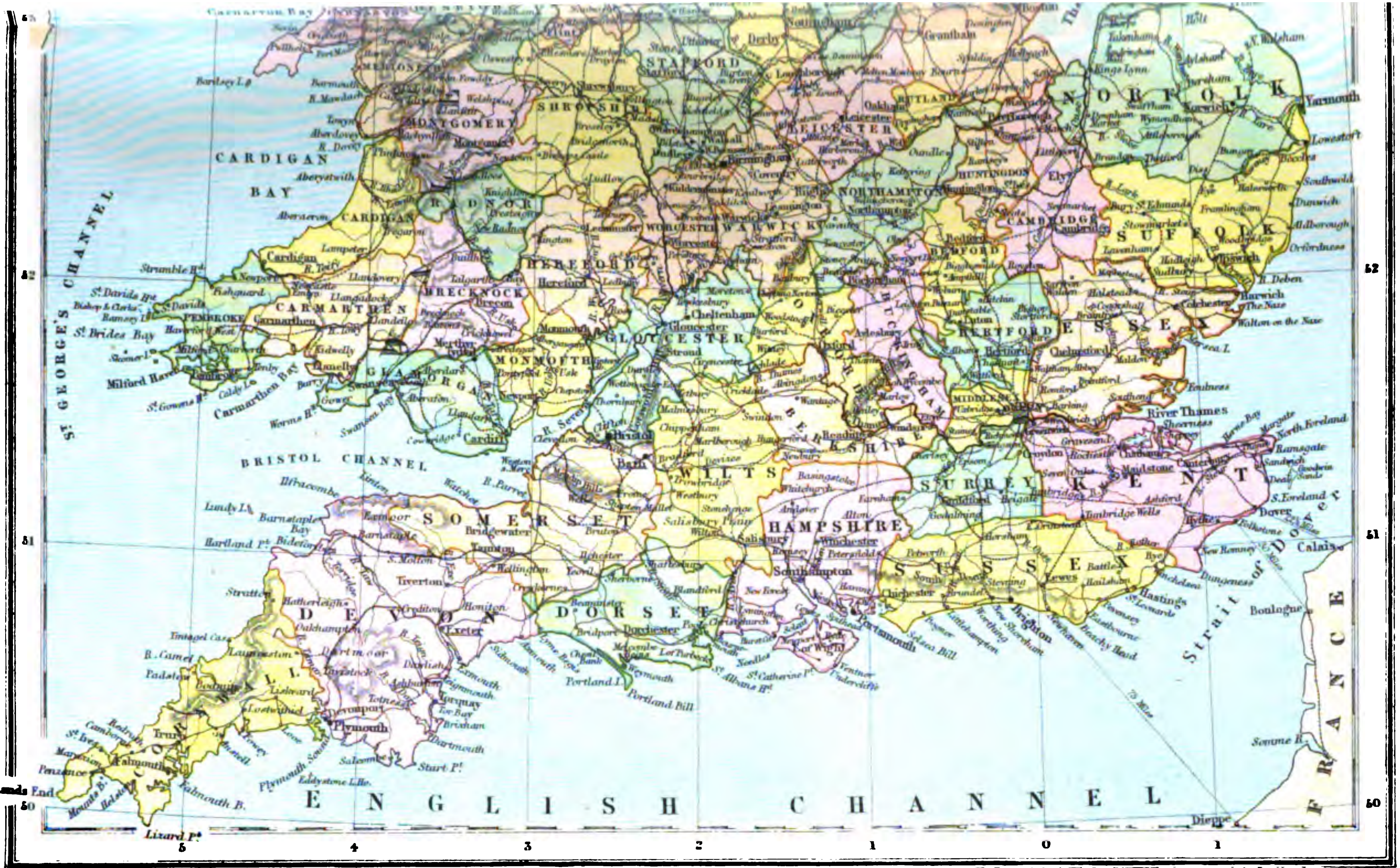
Counties.	Area in Stat. Acres.	Inhabited Houses, 1871.	Population, 1871.	Population, 1861.
Aberdeen,	1,260,625	34,589	244,603	221,380
Argyle,	2,083,126	13,497	75,679	80,995
Ayr,	735,262	26,798	200,809	198,959
Banff,	439,219	11,603	62,023	59,234
Berwick,	297,161	6,491	36,486	36,614
Bute,	143,997	2,433	16,977	16,188
Caithness,	455,708	7,474	39,992	41,216
Clackmannan,	31,876	3,316	23,747	21,449
Dumbarton,	172,677	7,638	58,857	52,035
Dumfries,	705,946	18,646	74,808	75,877
Edinburgh,	234,926	27,856	328,379	273,869
Elgin or Moray,	340,000	8,452	43,612	42,692
Fife,	328,427	27,056	160,735	154,555
Forfar,	569,840	25,663	237,567	204,365
Haddington,	179,142	7,179	37,771	37,623
Inverness,	2,723,501	16,575	87,531	87,435
Kincardine,	248,284	6,661	34,630	34,461
Kinross,	49,812	1,517	7,198	7,975
Kirkcudbright (Stewartry),	610,343	7,457	41,859	42,430
Lanark,	568,868	47,962	765,339	631,559
Linlithgow,	81,114	6,255	40,965	38,845
Nairn,	137,500	2,029	10,225	10,065
Orkney & Shetland,	598,726	11,955	62,882	64,094
Peebles,	227,869	2,187	12,330	11,408
Perth,	1,664,690	22,134	127,768	133,511
Renfrew,	162,428	13,551	216,947	177,407
Ross & Cromarty,	2,016,375	15,713	80,955	81,280
Roxburgh,	428,494	7,829	53,974	54,109
Selkirk,	166,524	1,741	14,005	10,449
Stirling,	298,579	13,275	98,218	91,926
Sutherland,	1,207,188	4,914	24,317	25,208
Wigton,	327,906	6,739	38,830	42,038
Total of Scotland,	19,496,133	412,185	3,360,018	3,061,251

THE UNITED KINGDOM OF GREAT BRITAIN AND



ENGLAND & WALES

BY J. BARTHOLOMEW F.R.G.S.



Printed in Colours by

W. & A.K. Johnston, Edinburgh

W. & R. CHAMBERS. LONDON & EDINBURGH.

Ireland is, since the union of Ireland, the full official designation of the country more generally known as Great Britain, Britain, or the United Kingdom. In addition to the home territories, G. B. possesses a multitude of dependencies scattered over every part of the globe, and constituting 'an empire on which the sun never sets.'

The following tables exhibit the extent and population of the several constituent parts of this empire, according to the latest available accounts :

UNITED KINGDOM.

	Area in English Square Miles.	Population according to the Census of					
		1821.	1831.	1841.	1851.	1861.	1871.
Great Britain—							
England,	50,922	11,281,883	13,090,523	15,002,443	16,921,888	18,949,930	21,495,131
Wales,	7,397	718,353	806,274	911,705	1,005,721	1,111,795	1,217,135
Scotland,	31,324	2,091,521	2,364,386	2,620,184	2,888,742	3,061,251	3,360,018
	89,643	14,081,762	16,261,183	18,534,332	20,816,351	23,122,976	26,072,284
Ireland,	32,481	6,801,827	7,767,401	8,175,124	6,551,970	5,792,055	5,411,416
Islands—							
Guernsey, &c.,	50	20,827	26,128	28,521	33,719	35,362	33,969
Jersey,	62	28,600	36,582	47,544	57,020	56,078	56,627
Man,	282	40,081	41,000	47,975	52,387	52,339	54,042
Army, Navy, &c.,	....	307,790	277,017	216,079	225,916	275,900	229,000
Total,	122,518	21,280,887	24,409,311	27,049,575	27,737,363	29,334,710	31,857,338

COLONIES AND FOREIGN POSSESSIONS.

Colonies.	Area in Sq. Miles.	Population, 1871.
India,	910,853	151,146,516
Straits Settlements,	1,225	307,951
Ceylon,	24,454	2,405,287
Mauritius,	708	316,042
Labuan,	45	4,898
Hong Kong,	32	124,198
Australia—		
New South Wales,	323,437	503,981
Victoria,	86,831	729,654
South Australia,	383,328	185,626
Western Australia,	978,000	25,084
Queensland,	678,000	115,567
Tasmania,	26,215	100,765
New Zealand,	106,259	256,393
Fiji Islands,	8,034	148,140
Falkland Isles,	7,600	811
Natal,	16,145	250,352
Cape of Good Hope,	200,610	566,158*
St Helena,	47	6,444
Gold Coast,	6,000	151,346†
Sierra Leone,	468	55,374‡
Gambia,	21	14,190
North America—		
Dominion of Canada, consisting of		
Ontario,	121,260	2,001,994
Quebec,	210,020	1,389,475
New Brunswick,	27,105	285,777
Nova Scotia,	18,660	387,800
British Columbia,	213,000	34,816§
Manitoba,	14,840	11,963
Prince Edward Island,	2,173	94,021
Newfoundland,	40,200	146,536‡
Bermuda,	24	12,121
Honduras,	13,500	25,635
West India Islands—		
Bahamas,	3,021	39,162
Turk's Island,	420	4,723§
Jamaica,	6,400	441,255§
Virgin Islands,	57	6,051§
St Christopher,	103	24,440§
Nevis,	50	9,822§
Antigua,	183	37,125
Montserrat,	47	8,931
Dominica,	291	28,517
St Lucia,	250	32,996
St Vincent,	131	35,688
Barbadoes,	166	162,042
Grenada,	133	37,795
Tobago,	97	17,304
Trinidad,	1,754	109,638
British Guiana,	76,000	193,491
Gibraltar,	1⅞	15,782‡
Malta,	115	136,339

Most of the subjects which enter into a complete account of the United Kingdom are treated under separate heads. We can only afford space here for the following brief indications of a general kind :

Agriculture.—The soil of G. B. is almost exclusively devoted to the production of the two primary necessities of society—bread-stuffs (chiefly wheat, barley, and oats), and grass, roots, &c., as food for domestic animals. For this purpose, both the soil and the climate are admirably suited. M'Culloch estimated the number of acres in England under grain crops in 1852—1853 at 6¼ millions (wheat, 3 millions; barley, 1; oats and rye, 2; beans and peas, ¼), and the total produce at 27¼ million quarters—value £37,000,000. The produce of potatoes, turnips, rape, and clover is estimated at £26,000,000. The annual value of the pastures and meadow-hay is immense. In 1857, according to the careful statistics collected by the Highland and Agricultural Society of Scotland, there were in Scotland 3,556,572 acres under rotation, the chief crops being grass and hay, 1,459,805 acres; oats, 938,613 acres, yielding 32,750,763 bushels; wheat, 223,152, yielding 6,154,986 bushels; barley, 196,387, yielding 6,564,429 bushels; turnips, 476,691 acres, yielding 6,690,109 tons; potatoes, 139,819 acres, yielding 430,468 tons. The live-stock amounted to 6,989,368—viz., 185,409 horses, 974,437 cattle, 5,683,168 sheep, and 146,354 swine. The total extent of land returned in 1872 as being under all kinds of crops, bare fallow, and grass was 31,004,173 acres in Great Britain, 15,746,547 acres in Ireland, 88,573 acres in the Isle of Man, 18,026 acres in the island of Jersey, and 12,007 acres in the islands of Guernsey, Alderney, &c., making a total for the United Kingdom of 46,869,326 acres. The total acreage of land returned as under cultivation in Great Britain has been larger in each year since the returns were first collected from all occupiers of land in 1868. The live-stock in the United Kingdom in 1872 was as follows: The number of horses included in the agricultural returns was 1,808,259; the number licensed in Great Britain was 857,048; the number of other than agricultural horses exempt from licence duty was probably about 35,000; and the number belonging to the army at home may be stated at 15,000, which would bring the total number of horses in the United Kingdom up to 2,715,000. The total number of cattle returned for the United Kingdom in 1872 was 9,718,000; of sheep the total number was 32,246,000; and of pigs, 4,178,000. Of these numbers of live-stock, Great Britain (exclusive of the islands) possessed 2,150,000 horses, and Ireland 540,000; giving a proportionate number, per 100 acres of land under cultivation, of 6·9 in Great Britain, and 3·4 in Ireland. Of cattle of all kinds there were 5,624,000 in Great Britain, or 18·1 per 100 acres; and 4,057,000, or 25·8 per 100 acres, in

---

* In 1865. † In 1850. ‡ In 1868. § In 1861.

Ireland. Sheep numbered 27,921,000, or 90·0 per 100 acres, in Great Britain, and not more than 4,262,000, or 27·1 per 100 acres, in Ireland. There were 2,771,000 pigs, or 8·9 per 100 acres, in Great Britain, exclusive of those kept by cottagers and in towns; and 1,385,000, or 8·8 per 100 acres, in Ireland.

Manufactures.—The following table exhibits the condition of the textile manufactures:

	Factories in				Horse-power in				Hands employed.			
	1838.	1850.	1856.	1870.	1838.	1850.	1856.	1870.	1838.	1850.	1856.	1870.
Cotton,	1,819	1,932	2,210	2,483	59,803	82,555	97,132	309,870	259,104	330,924	379,213	420,588
Woollen,	1,322	1,497	1,505	1,829	20,617	22,144	25,901	62,302	54,808	74,443	79,091	109,300
Worsted,	416	501	525	630	7,176	11,515	14,904	51,035	31,628	79,737	87,794	106,125
Flax,	392	393	417	500	11,089	14,292	18,322	56,995	43,557	68,434	80,262	38,931
Silk,	268	277	460	696	3,381	3,711	5,176	8,589	34,303	42,544	56,137	47,461
Total,	4,217	4,600	5,117	6,138	102,069	134,217	161,435	488,791	423,400	596,082	682,497	722,405

The jute trade is rapidly rising into importance, especially in Scotland. In 1861 there were 36; in 1868, 41; and in 1870, 63 jute factories in the United Kingdom; and the horse-power, both steam and water, put forth in this manufacture was 15,352.

For other great branches of industry, see Iron, Paper, Pottery, &c.

Imports and Exports.—The following table exhibits the value of the imports and exports for the years 1857, 1858, 1861, and 1871:

	1857.	1858.	1861.	1871.
Imports,	£187,844,441	£164,583,832	£217,351,881	£329,855,143
Exports, British Produce,	122,066,107	116,608,756	125,115,133	222,519,777
Exports, Foreign and Colonial Produce,	24,108,194	23,174,023	35,694,297	59,860,949
Total Exports,	£146,174,301	£139,782,779	£160,809,430	£282,380,726
Total Imports and Exports,	£334,018,742	£304,368,611	£378,161,311	£612,235,869

The chief imports are raw cotton, corn and flour, sugar, wool, silk manufactures, and tea; the chief exports are cotton manufactures, woollen and worsted manufactures, iron and steel, linen manufactures, coals and culm, and machinery.

Gold and Silver Bullion and Specie.—The computed real value of the gold and silver bullion and specie brought into the United Kingdom in 1858 was £29,493,190; in 1859, £37,070,156; in 1860, £22,978,196; and in 1861, £18,747,045. Of this quantity, Australia sent by far the most—viz., in 1858, £9,066,289; 1859, £8,627,854; 1860, £6,719,857; and 1861, £6,331,828. Mexico, South America, and the West Indies were the next largest exporters; then the United States and France. The exports from the United Kingdom during the same period were—1858, £19,628,876; 1859, £35,688,803; 1860, £25,534,768; 1861, £20,811,648. The declared real value of gold and silver bullion and specie imported into the United Kingdom during the year 1871 was—gold, £21,613,005; silver, £16,527,322; total, £38,140,327; exported—gold, £20,698,275; silver, £13,062,396; total, £33,760,671. The declared real value of such bullion and specie imported during the ten months from January to October 1872 was—gold, £14,875,744; silver, £9,880,463; total, £24,756,207; exported—gold, £17,093,478; silver, £8,961,918; total, £26,055,396.

Shipping.—G. B. had, in 1861 (exclusive of river-steamers), 19,288 registered sailing-vessels, with an aggregate burden of 3,918,511 tons, and 997 steamers, carrying 441,184 tons, making together 20,285 vessels, of 4,359,695 tons burden, and employing, exclusive of masters, 171,957 seamen. During the same year, there were built and registered in the United Kingdom 1186 vessels, 215 of them steam, of an aggregate burden of 310,900 tons. The total tonnage of vessels entering and clearing British ports in 1861 was 26,595,641 tons, 21,924,983 tons representing cargoes, the rest being in ballast. The coast trade of G. B. during the same year amounted to 17,355,235 tons, all but 93,000 tons being carried by British ships. In 1871, the number of registered sailing-vessels engaged in the home trade was 11,838, employing 41,828 men, and their tonnage was 777,185. The number of steam-vessels, exclusive of river steamers, in the same trade was 1191; men, 12,613; tons, 195,125. The number of sailing-vessels engaged in foreign trade was, in the same year, 300, with 5767 men, and an aggregate of 157,964 tons; and of steam-vessels, 1066, with 40,323 men, and an aggregate of 936,914 tons. It will be seen that the merchant navy is availing itself, to a large degree, of steam-power. A parliamentary return issued in 1870, shews that during the year preceding, the total number of seamen employed on board British ships, registered in the United Kingdom, was 202,477; of these, 20,263 were foreigners.

Railways.—The total length of lines open for traffic in the United Kingdom in 1860 was 10,433 miles. During the year, 163,435,678 passengers travelled, of whom 20,625,851 were first class, 49,041,814 second class, and 93,768,013 third class. The amount of money derived from these travellers was—first class, £3,170,935; second class, £3,944,713; third class, £4,162,487. Luggage, mails, &c., brought up the receipts from passenger-traffic to £13,085,756. The goods-traffic in the same year amounted to £14,680,866, making a total income of £27,766,622. The total amount invested in railways by shares and loans in 1858 was £325,375,507, on which was paid interest to the total amount of £6,653,166. The average rate of dividend on the ordinary share capital over the whole kingdom in 1858 was 3·06 per cent.; the proportion per cent. of expenditure to total receipts in 1860 was 47. In 1860, the rolling-stock of the various companies consisted of 5801 locomotives, 15,076 carriages of all kinds, and 180,574 wagons. At the end of 1871 there were 15,756 miles of railway open for traffic—shewing an addition since 1860 of 5323 miles. Of this entire length 11,043 miles belonged to England and Wales; to Scotland, 2538; and to

Ireland, 1938. To the total capital paid up, England and Wales contributed £461,368,616; Scotland, £64,282,911; and Ireland, £27,028,580. In the division of total traffic receipts, the sums, read in the same order, were £41,383,065; £5,237,329; and £2,272,386.

Revenue and Expenditure.—The following table shews the total amounts of the actual revenue and expenditure for the sixteen years from 1857 to 1872, along with the proportion of receipts and of expenditure for each person in the United Kingdom:

	REVENUE.				EXPENDITURE.			
	Receipts at the Exchequer.	Proportion per head of Population.			Payments out of the Exchequer.	Proportion per head of Population.		
		£	s.	d.		£	s.	d.
1857,	£72,334,062	2	12	1	£75,588,667	2	14	4
1858,	67,881,513	2	8	3	68,128,859	2	8	5
1859,	65,477,284	2	6	3	64,663,882	2	5	8
1860,	71,089,669	2	9	10	69,502,289	2	8	8
1861,	70,283,674	2	8	11	72,792,059	2	10	8
1862,	69,674,479	2	8	3	71,116,485	2	9	11
1863,	70,603,561	2	8	4	69,302,006	2	8	2
1864,	70,208,964	2	7	9	67,056,286	2	6	2
1865,	70,313,436	2	7	7	66,462,206	2	5	4
1866,	67,812,292	2	5	7	65,914,357	2	4	8
1867,	64,434,568	2	6	5	66,780,396	2	4	0
1868,	60,600,218	2	6	2	71,236,242	2	6	7
1869,	72,591,991	2	7	9	74,971,816	2	8	8
1870,	75,434,252	2	9	3	68,864,752	2	4	0
1871,	69,945,220	2	5	4	69,548,539	2	4	3
1872,	74,708,314	2	7	3	71,490,020	2	5	0

The income of the United Kingdom is derived from the various sources of customs, excise, stamps, taxes, property and income tax, post-office, &c. The following are the sums received by the Exchequer from these sources during the financial year 1872—1873: Customs, £20,300,000; excise, £23,320,000; stamps, £9,700,000; assessed taxes, £2,350,000; income-tax, £9,950,000; post-office, £4,770,000; telegraphs, £850,000; crown lands, £375,000; miscellaneous, £3,300,000. The following are the items of expenditure in the same year: Interest and management of debt, £26,830,000; Consolidated Fund charges, £1,780,000; army (including abolition of purchase), £15,677,000; navy, £9,508,000; civil service, £10,652,000; revenue and post-office, £5,231,000; packet service, £1,135,000; telegraph service, £500,000.

National Debt.—At the end of the financial year 1872, the national debt of Great Britain and Ireland amounted to £736,141,900, of which £730,986,800 was funded, and £5,155,100 was unfunded. See DEBT, NATIONAL.

Army and Navy.—See BRITISH ARMY; and NAVY, BRITISH.

Form of Government.—The government of G. B. is of the kind known as a 'Constitutional Monarchy,' in which the sovereign accepts of his dignity under an express agreement to abide by certain prescribed conditions. See CORONATION OATH. The sovereignty is hereditary in the family of Brunswick, now on the throne, and in the person of either a male or a female. The sovereign (king or queen) is the directing power in the executive of government; while the legislative function is exercised by parliament. Further information regarding the British Constitution and Laws will be found under the heads PARLIAMENT; MINISTRY; COMMON LAW, COURTS OF; JUDGES, &c.

Money, Weights, and Measures. See POUND; MINT; WEIGHTS AND MEASURES.

Religion.—The United Kingdom is a Protestant state, but all religions—not offensive to public or private morals—may be professed, and their different forms of worship practised, without interference from any quarter whatever. There are two churches 'established' by special acts of the legislature. In England, the established church is Episcopal in its government. In Scotland, on the other hand, the established church is Presbyterian. See SCOTLAND, CHURCH OF. According to the census returns of 1851 (in the returns of 1861 and 1871, religious statistics were not included, as the government shrank from reopening a subject which had formerly given rise to much controversy), the number of places of worship, together with the sittings provided, in England and Wales, and the estimated number of attendants on a particular day, were as in the tables below.

Education.—In England, the chief institutions for education are the ancient national universities of Oxford and Cambridge; the more recent institutions of London, Durham, and Lampeter in Wales; the classical schools of Eton, Westminster, Winchester, Harrow, Charter-house, and Rugby; Owens College, Manchester, and other colleges and schools chiefly for physical science; the various military schools; the colleges of the dissenting denominations; the middle-class schools, either started by individual teachers, and hence called 'adventure' schools, or by associated bodies acting as directors, to whom the teachers are responsible; and the schools of design.

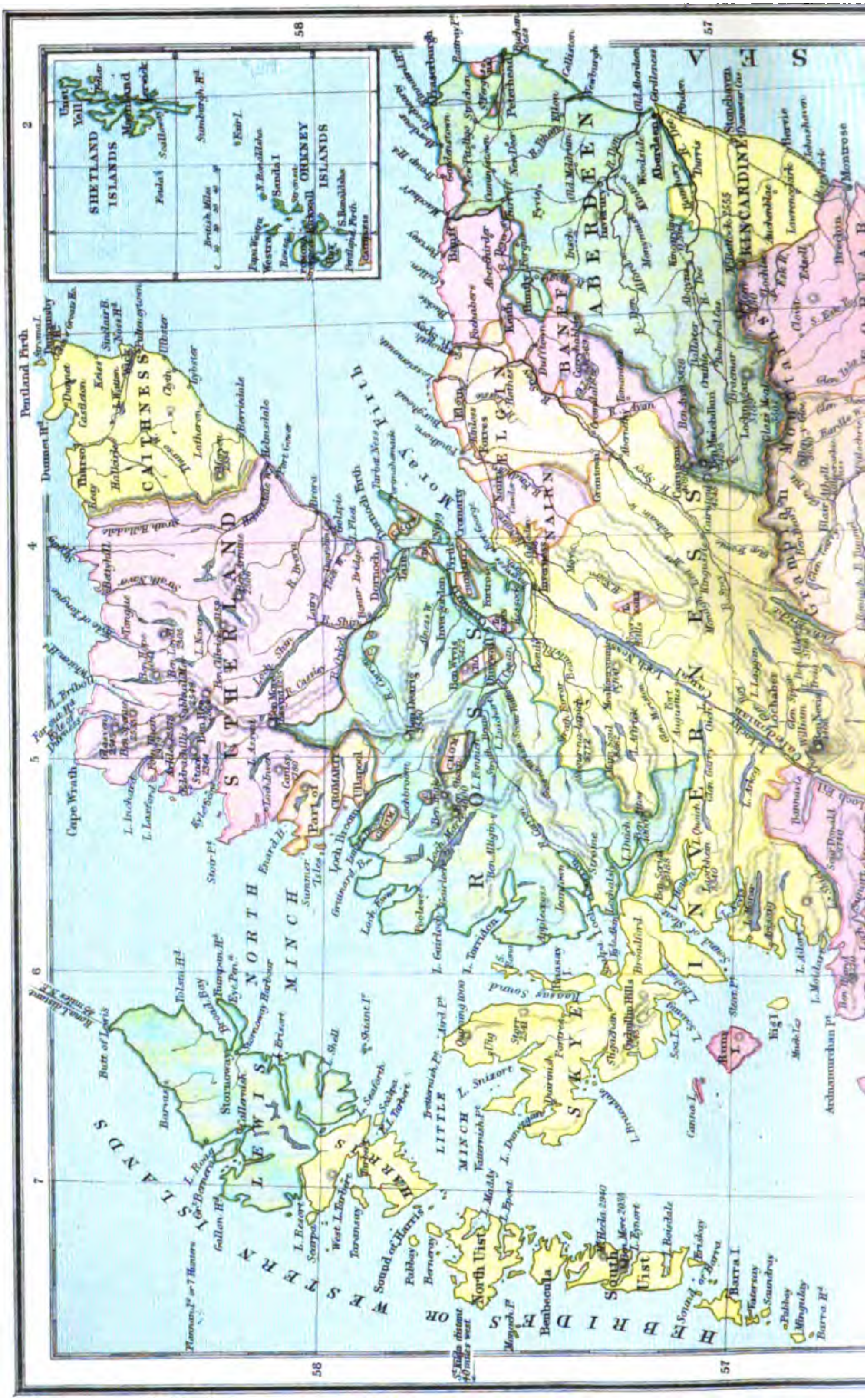
ENGLAND AND WALES.	Places of Worship.	Sittings Provided.	Estimated Number of Attendants.
Established Church,	14,077	5,317,915	3,773,474
Wesleyan Methodists (comprising seven distinct Sects),	11,207	2,194,298	1,385,382
Independents or Congregationalists,	3,244	1,067,760	793,142
Baptists (comprising six distinct Sects),	2,789	751,343	587,978
Calvinistic Methodists,	937	250,678	180,725
Scottish and Irish Presbyterians,	161	86,812	60,131
Isolated Congregations,	539	104,481	63,572
Roman Catholics,	570	186,111	305,393
Society of Friends,	371	91,599	18,172
Unitarians,	229	68,554	37,156
Latter-day Saints, or Mormons,	222	30,783	18,800
Sandemanians,	6	956	587
Jews,	53	8,438	4,150
Brethren,	132	18,529	10,414
Moravians,	32	9,305	7,364
New Church,	50	12,107	7,082
Apostolic Church,	32	7,437	4,908
Foreign Protestant, Catholic, and Greek Churches,	16	4,457	2,612
Established Church,	14,077	5,317,915	3,773,474
Other Denominations,	20,390	4,894,720	3,487,558
Total,	34,467	10,212,635	7,261,032

SCOTLAND.	Places of Worship.	Sittings Provided.	Estimated Number of Attendants.
Established Church,	1,183	767,088	713,567
Free Church,	889	495,335	438,363
United Presbyterians,	465	288,100	273,654
Reformed Presbyterians,	39	16,969	15,055
Original Seceders,	36	16,494	15,781
Scotch Episcopalians,	134	40,092	35,769
Independents or Congregationalists,	192	76,342	70,851
Evangelical Union,	28	10,819	10,589
Baptists,	119	26,086	24,330
Wesleyan Methodists,	82	22,441	21,768
Glassites or Sandemanians,	6	1,068	890
New Church,	5	710	630
Society of Friends,	7	2,152	2,153
Roman Catholics,	117	52,766	48,771
Unitarians,	5	2,437	2,438
Isolated Congregations,	61	11,402	9,401
Moravians,	1	200	200
Jews,	1	67	67
Mormons,	20	3,182	3,177
Apostolic Church,	3	675	675
Established Church,	1,183	767,088	713,567
Other Denominations,	2,212	1,067,717	975,482
Total,	3,395	1,834,805	1,689,049

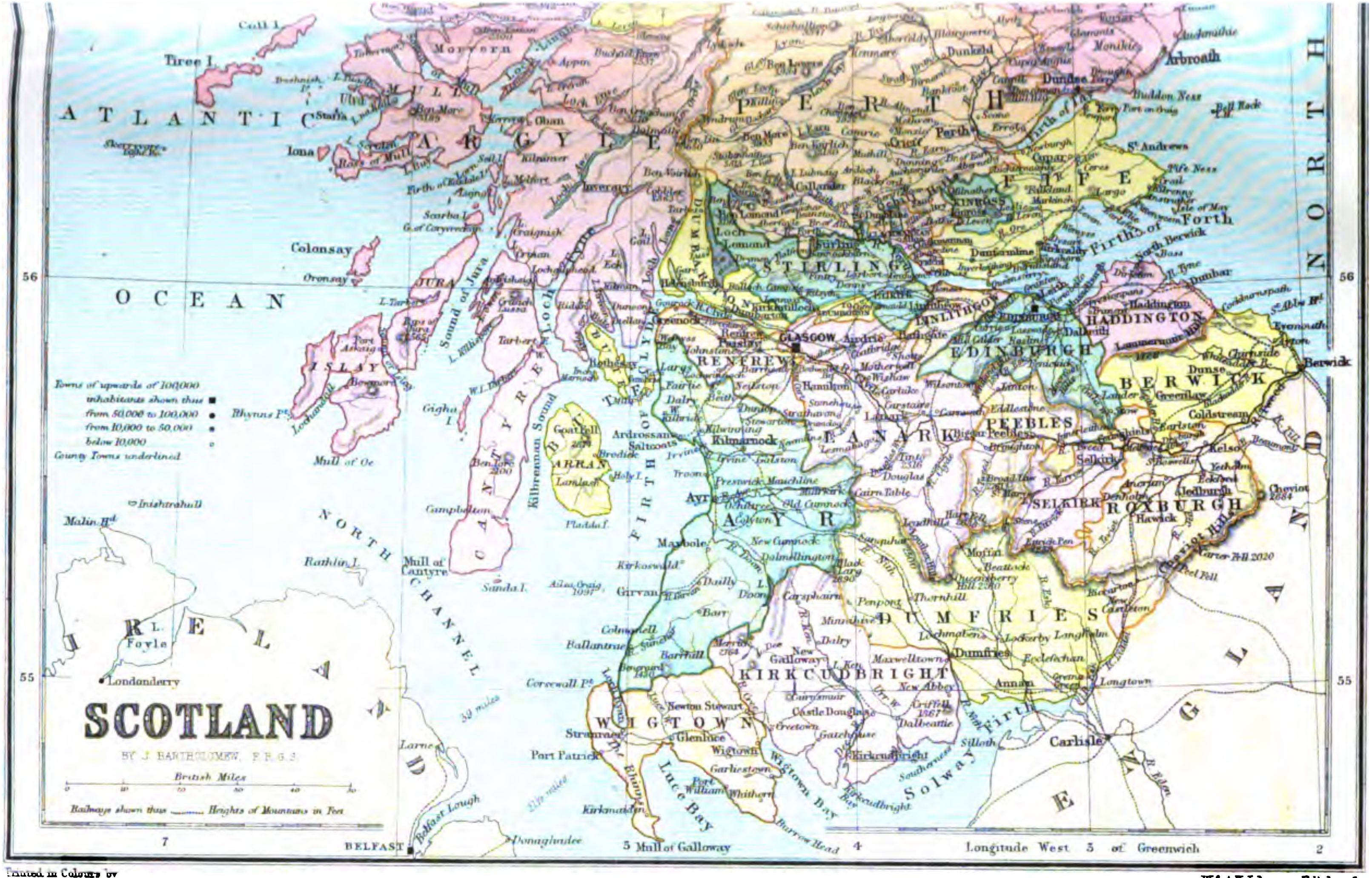
For primary education, a national system has now been established. Under the Elementary Education Act for England, 1870, a popularly elected school-board is established in any district where the existing schools are deficient. Schools under the act are supported by school-rates and fees, and by parliamentary grants, varying according to the number of pupils, and their proficiency as tested by different standards of examination. They are to be open at all times to government inspection. It is left to the discretion of school-boards to make education compulsory.

Scotland possesses four universities for the higher branches of education—viz., those of Edinburgh, Glasgow, St Andrews, and Aberdeen, besides a variety of minor colleges connected with the Episcopalian, Free Church, and other non-established churches. The Scotch Education Act, 1872, is modelled after the English Act, but differs from it, by enacting that a school-board is to be elected in *every* parish and burgh; by making it illegal for parents to omit educating their children, between 5 and 13, in reading, writing, and arithmetic; and by comprehending higher-class schools. The number of day-schools in Great Britain inspected in 1871 was 10,700: the daily average attendance throughout the year was 1,434,488; 1,724,689 scholars were present at inspection; 875,298 were examined; and 598,203 passed the prescribed tests. On the registers of the inspected day-schools were 2,055,312 children, of whom 517,344 were under six years of age, 1,332,229 were between six and twelve, and 205,739 were above twelve: 2709 night-schools were inspected, having an average attendance of 86,206 each night. In December 1871, there were in Great Britain 15,635 certificated teachers, 1196 assistant teachers, and 21,854 pupil-teachers.

History.—On the 1st of May 1707, during the reign of Queen Anne, the union of England and Scotland was formally accomplished. (For the previous history, see ENGLAND and SCOTLAND.) In the latter of these countries, the terms at first excited the utmost dissatisfaction, and even indignation; but the progress of time has shewn it to be one of the greatest blessings that either nation could have experienced. The last years of Queen Anne's reign were marked by the triumph of the Tory party, headed by Harley and St John (Oxford and Bolingbroke), who kept up a constant intrigue with the Pretender, for the purpose of procuring his restoration. This treachery was defeated by the sudden death of her majesty in 1713. According to the Act of Settlement, she was succeeded by the Elector of Hanover, who took the title of George I. The Whigs then regained their ascendency, and, under the guidance of Walpole (q.v.), now rising to eminence, at once proceeded to impeach the more important of the Tory leaders. Other severities drove the more impatient of that party to attempt bringing in the Pretender by force of arms. In 1715, the Earl of Mar in Scotland, and the Earl of Derwentwater in England, raised the standard of rebellion; both efforts, however, proved abortive, and were speedily crushed. Five years later, occurred the frightful catastrophe known as the South Sea Bubble, when the nation was saved from anarchy mainly by the exertions of Walpole. The latter now became premier and chancellor of the exchequer, and under him the commerce and manufactures of England continued steadily to advance, though little improvement was as yet perceptible either in Scotland or Ireland. George I. died in 1727, and was succeeded by his son, George II. An attempt was again made by the Tories to oust the Whigs from power, but was frustrated by Walpole, who still continued the prime mover of public affairs. In 1739, after a peace of extraordinary duration, he was forced by popular clamour into a war with Spain, on account of some efforts made by that country to check an illicit trade carried on by British merchants in its American colonies. This war was feebly carried on, and ingloriously terminated; but the attention of England was speedily drawn towards the Austrian War of Succession, in which it was involved through the anxiety of the king for his Hanoverian possessions, and the strong antipathy of the people to the French. Walpole, disapproving of the war, was driven from office in 1743. George II. appeared on the field of battle himself, and at Dettingen proved himself a man of courage and spirit. But the success of the French at Fontenoy in 1745 paralysed the efforts of England during the rest of the campaign; and in 1748, after nine years' fighting, a peace was concluded at Aix-la-Chapelle, by which it was agreed that both nations should mutually restore their conquests, and go back to exactly the same condition as they were in before the war! Meanwhile, a second attempt had been made (1745—1746) by Prince Charles Edward Stuart to win back the throne of his ancestors. This attempt, known as the second rebellion, was crushed at Culloden (April 16, 1746), and shortly



SHETLAND ISLANDS
ORKNEY ISLANDS
Pentland Firth
Cape Wrath
Dunnet Hd.
CAITHNESS
SUTHERLAND
ROSS
CROMARTY
INVERNESS
NAIRN
ELGIN
BANFF
ABERDEEN
KINCARDINE
Moray Firth
Aberdeen
Peterhead
Montrose
Brechin
NORTH MINCH
LITTLE MINCH
LEWIS
HARRIS
North Uist
South Uist
Benbecula
Barra I.
SKYE
Rum I.
Eig I.
Canna I.
WESTERN ISLANDS OR HEBRIDES
Butt of Lewis
Stornoway
Ardnamurchan Pt.
Caledonian Canal
Ben Nevis
Grampian Mountains
58
57
2
4
5
6
7



Printed in Colours by

W. & A.K. Johnston, Edinburgh

W & R. CHAMBERS. LONDON & EDINBURGH

after, a variety of important measures were passed by the imperial parliament relating to Scotland generally, and to the Highlands in particular, which had the effect, on the whole, both of conciliating the inhabitants, and of increasing their civilisation. Now, after a long period of indolence and poverty, Scotland began to make advances towards that equality with England, in respect of comfort and prosperity, which it has since attained.

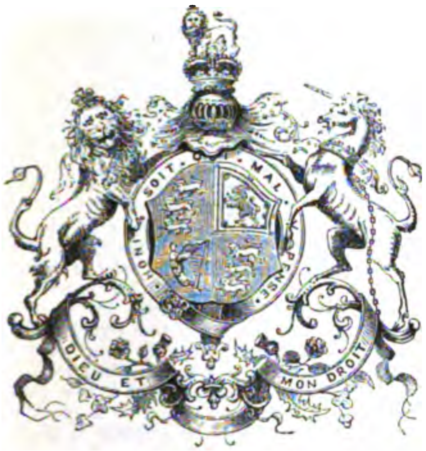
In 1756 broke out the 'Seven Years' War,' in which Britain took the side of Frederick the Great against France, Austria, Russia, and Poland. It achieved no triumphs in Europe; on the contrary, it suffered a signal disgrace in the surrender of the Duke of Cumberland, with 40,000 men, in Hanover; but in India, Clive deprived the French of most of their possessions, while Wolfe, in the New World, conquered their colony of Canada. In the midst of this war, George II. died (1760), and was succeeded by his grandson, George III., whose reign proved to be the longest and one of the most eventful in the annals of British history. At this time, the principal secretary of state was William Pitt, afterwards the great Earl of Chatham; but the favour which George III. shewed to the Earl of Bute, a feeble and narrow-minded Tory nobleman, rendered it necessary for the former to retire from office. Spain now joined France against Britain, as Pitt had foreseen and foretold; but fortune showered her brightest smiles upon the arms of the latter, and at the peace in 1763, she was allowed to retain many of the most valuable colonial possessions of both her antagonists. These wars, however, largely increased the national debt.

George III. now shewed himself anxious to destroy the influence of the great Whig families who had brought in the dynasty to which he belonged. The nation took the alarm, and for some time was strongly disaffected towards its sovereign, who was believed to be wholly under the influence of his Scotch premier, the Earl of Bute. Popular indignation at last forced the latter to resign in 1763. His successor, Grenville, inaugurated his advancement to office by the prosecution for libel of Wilkes, the member for Aylesbury, who had made himself conspicuous by his attacks both on Bute and his royal master. The proceedings in this case lasted some years, and were attended with tumults of a serious nature, and a vehemence if not rancour of public feeling that indicated the magnitude of the discontent which prevailed. During the administration of Grenville, too, the first attempt was made to tax the American colonies by the passing of the Stamp Act in 1765. Against this the colonies protested, and the succeeding Whig ministry of Rockingham repealed it. This ministry, however, was of short duration, and was replaced by one formed by Pitt, now created Earl of Chatham. The necessity for an increase of the finances led to another attempt at American taxation, and an act for imposing duties on the imports of tea, glass, and colours was passed. This measure excited the most determined opposition among the colonists; and finally, in 1774, war broke out between them and the mother-country, which lasted eight years, and in which the former were supported by France, Spain, and Holland. It resulted in the acknowledgment of their independence, and in the formation of the republic of the United States (1783). During almost the whole of this unhappy contest, the ministry of Lord North directed the policy of the country; and it was only the success of a vote for the conclusion of the war that forced them to resign early in 1782. It was followed by the second Rockingham ministry, and that soon after by the Shelburne ministry, only remarkable for the appearance in it of the younger Pitt. The lukewarm Whiggism of Lord Shelburne gave offence to Fox and other more advanced political thinkers; the result was a coalition of the Foxites with the followers of Lord North. This coalition, factious and unprincipled in the last degree, triumphed, and under the name of the Coalition ministry, held the seals of office during the year 1783. Fox's *India Bill*, the purpose of which was virtually to transfer the government and patronage of India from the East India Company to the House of Commons, was the cause of its ruin. This bill was considered by the king to aim at fixing the ministry in power beyond the control of both himself and the people, and having induced the House of Lords to reject it, he compelled the ministry to resign. Pitt was then appointed prime minister and chancellor of the exchequer. See PITT. In 1786 commenced the trial of Warren Hastings, who was impeached by the Whig leaders, Fox, Burke, and Sheridan, but was ultimately acquitted. Meanwhile, the progress both of England and Scotland was unquestionable; manufactures increased, agriculture improved, and—especially in Scotland—an interest in the discussion of political and other questions of importance spread through the community, as may be seen very clearly in the poetry of Robert Burns. The French Revolution (1789) at first strengthened this interest, but the excesses of the Reign of Terror produced a decided reaction; and for many years all classes, at least all the so-called 'respectable classes,' were fanatically averse to the slightest innovation. In 1793, the ministry of Pitt, without any real cause, declared war against the French republic, in spite of the opposition of Fox and Sheridan. This contest lasted till the peace of Amiens in 1801, and was, on the whole, very disastrous to G. B., except at sea, where the victories of Howe off Brest, Jervis off Cape St Vincent, Duncan off Camperdown, and Nelson in Aboukir Bay, served to sustain the spirit of the nation. Other features of the time were the *threatened* invasion of Britain by the French, which called forth volunteer corps in every part of the island; the Irish rebellion, which, though assisted by a French force, proved a failure; and the trial and condemnation at Edinburgh of the popular reformers, Mure, Palmer, &c. Pitt, who had left office just before the peace of Amiens, was succeeded by Addington, who was compelled to renew the war with Bonaparte in 1803, on account of the way in which the latter evaded fulfilling the conditions of that peace. Again, Bonaparte threatened to invade the country, and collected an immense flotilla at Boulogne, professedly for that purpose, in 1803, but was completely kept in check by Nelson. The battle of Trafalgar in 1805 nearly annihilated the navy of France and Spain. But on land, the arms of France were victorious; and the battle of Austerlitz (1805) broke up most effectually that coalition of continental powers against France which G. B. had fostered and formed. The shock of this disaster gave a death-blow to Pitt, who expired in the beginning of 1806, and was followed to the grave in the autumn of the same year by his rival, Fox. The overthrow of Prussia at Jena and Auerstadt, and of Russia at Friedland, placed G. B. in a most perilous predicament. All the nations of Europe were compelled by Bonaparte to exclude British merchandise from their ports, and the island of G. B. itself was declared in a state of blockade. Secure, however, in the protection of her invincible navy, she bore up bravely against her terrible isolation, increased her intercourse with her own vast colonies, ruined the commerce of her enemies, and never ceased her efforts to undermine the influence of her great enemy on the continent. The first people that shewed a tendency to revolt against the arrogant tyranny of Bonaparte were the Spaniards. G. B. at once offered to assist them with arms and money; and in 1808 a force was landed in Portugal, under the command of Sir Arthur Wellesley, afterwards Duke of Wellington. The war which ensued (known as the 'Peninsular war') lasted till 1814, and ended in the French being driven back in disorder into their own country at Toulouse. Meanwhile, ruin had overtaken the French army in Russia; Austria, Prussia, and Russia had combined with G. B. against Bonaparte; and in 1814 the allies entered Paris, and the French emperor was forced to abdicate, and retire to Elba. His return in 1815 once more threw Europe into disorder and agitation; but his power was finally shattered at Waterloo by Wellington and Blucher, and peace restored to Europe. The contest had cost Britain (which had to subsidise most of her allies) an enormous expense. See Debt, National.

Now that the long conflict between France and Europe was over, the thoughts of the people were again turned to the question of political reform. Four years of extraordinary mercantile depression, which followed the victory at Waterloo, partly resulting from bad harvests, and partly from G. B.'s having ceased to enjoy that monopoly of commerce which she did during the war, had made the people discontented, and the shameful massacre of the Manchester operatives in St Peter's Fields by the yeomanry in 1819—commonly known as the Peterloo Massacre—excited strong indignation; but a horror of anything revolutionary still possessed the upper and a large section of the middle classes, and severe measures were passed with a view to the suppression of discontent among the working-classes. In 1820, George III. died, and was succeeded by his eldest son, George IV. The trial of his consort, Queen Caroline, which occurred in the same year, shattered his popularity, which was never very great. The commercial reforms of Huskisson, supported by Canning, which marked the next two years, added immensely to the prosperity of G. B., and capital grew so abundant, that a vast number of joint-stock companies were formed, as a means of giving it a wider range. Many of their projects for traffic in remote countries were quite visionary, and ended disastrously, involving in ruin (between October 1825 and February 1826) fifty-nine English provincial banks, and inflicting the greatest misery upon the working-classes. About the same time, the Irish Catholics began to clamour for emancipation from their civil disabilities. The older and more inflexible Tories, who were still dominant in parliament, opposed it; but the intense determination of the Irish people, and the powerful eloquence of their champion, Daniel O'Connell, at last prevailed, and in 1829 the ministry of Wellington, yielding to the storm, itself proposed and carried the measure. In 1830, George IV. died, and was succeeded by his brother, William IV. The outburst of the July revolution in France quickened the paces of British reformers; the demand of the nation for an improvement in the parliamentary representation became very strong; and in November 1830, after an exclusion from office of nearly half a century, the Whigs once more ascended into power 'on the breath of popular applause,' and the ministry of Earl Grey immortalised itself by passing the 'Reform Bill.' Another of its claims to the respect and gratitude of posterity was the abolition of slavery in the British colonies (1834). The reform of the English poor-law, and in the mode of electing municipal authorities in Scotland, also deserves mention; but in 1834 the Whig ministry was dismissed by the sovereign. Sir Robert Peel now became premier, but the Whigs were still in a majority in the House, and Peel was compelled to resign. The Melbourne administration which followed carried several small though beneficial measures of reform, but it failed to secure the attachment of the people. The lower classes were becoming Radical and Chartist, while the middle classes, contented with the political power which the Reform Bill had secured to them, were growing apathetic, and in many cases, from dread of the masses, were leaning towards Toryism. In the midst of these perplexities, William IV. died in 1837, and was succeeded by his niece, the Princess Victoria, the present ruler of the united empire. In 1841, the Whig ministry succumbed to a vote of 'no confidence,' and Sir Robert Peel once more assumed the helm of state. The principles of free trade now began to be actively advocated; public opinion was leavened by the platform addresses of Mr Cobden and Mr Bright, until the prime minister himself was finally converted, and in 1846 carried, what he had long opposed, a measure for the abolition of the *Corn-laws*. Three years before the abolition of the corn-laws, a great religious schism took place in the Established Church of Scotland, and led to the formation of a body calling itself the 'Free Church of Scotland' (q. v.). Other important incidents of this period were the Chinese and Afghan wars; the Chartist agitation, which reached its climax in the monster petition of 1848, got up by Feargus O'Connor and his friends; the series of failures in the potato-crop of Ireland, involving that country in terrible misery, and inundating G. B. with paupers. Sir Robert Peel was succeeded in the government of the country by Lord John Russell, who did not prove as popular a minister as was anticipated, and in 1852 the old Tory party returned to power, headed by the Earl of Derby and Mr Disraeli. It was, however, beaten on its budget, and forced to resign in less than a year, when its place was taken by the coalition cabinet of Lord Aberdeen. During the ministry of this nobleman, the *Crimean war* began (1854); but as Lord Aberdeen was considered to be somewhat pro-Russian in his likings, he was obliged to make way for Lord Palmerston in 1855. Two years later (May 1857), the Indian Mutiny broke out, and the energies of the government were taxed to the utmost to suppress it, but were eventually crowned with complete success. Never did British soldiers exhibit equal heroism, both physical and moral. From 1855 to 1865 (excepting for a brief interval, when Lord Derby returned to office), the government was in the hands of Lord Palmerston. During this period, England carried on a successful war against China, and the volunteer movement was begun. The American War caused great distress among our operatives. In 1861, Prince Albert died. In 1866, Earl Derby was at the head of affairs: Britain was united to America in that year by the submarine telegraph, and the Fenian insurrection occurred. The year 1867 was marked by the passing of a Conservative Reform Bill, which added more than half-a-million electors to the constituency of G. B.; and by the expedition against Abyssinia, under Sir Robert Napier, which, in 1868, resulted in the destruction of Magdala, and death of King Theodore. During the government of Mr Disraeli, who succeeded Lord Derby, Scotch and Irish Reform Bills were passed, and an act discontinuing public executions. In 1869, Mr Disraeli having resigned, an act was passed by the Liberal government under Mr Gladstone, for disestablishing the Irish Church. The years 1870 and 1872 produced the Education Acts for England and Scotland. In 1873—1874, the Ashantee (q. v.)

War was carried on to a successful termination; and the latter year witnessed the establishment of a Conservative government under Mr Disraeli.

GREAT BRITAIN, Royal Arms of. The arms of the United Kingdom of Great Britain and Ireland are thus borne by her Majesty Queen Victoria.



Royal Arms of Great Britain:

Quarterly, first and fourth gu., three lions pass. gard. in pale, or, for England; second, or, a lion rampant within a double tressure flory counterflory gu., for Scotland; third, az. a harp or, stringed ar., for Ireland; all surrounded by the Garter.

Crest.—Upon the royal helmet, the imperial crown proper, thereon a lion statant gardant or, imperially crowned, also proper.

Supporters.—Dexter, a lion rampant gardant or, crowned as the crest. Sinister, a unicorn ar., armed, crined, and unguled or, gorged with a coronet composed of crosses pattée and fleurs-de-lis, a chain affixed thereto, passing between the fore-legs, and reflexed over the back, also or.

Motto.—Dieu et mon Droit in the compartment below the shield, with the Union rose, shamrock, and thistle ingrafted on the same stem.

Arms have been ascribed by heralds to the Saxon and Norman monarchs of England in the 10th and 11th centuries; but as heraldry was, in point of fact, unknown till the middle of the 12th c., they must be dealt with as fabulous. However, at a period almost before the earliest dawnings of hereditary coat-armour, the sovereigns of England, in common with various other monarchs of Christendom, adopted the lion as their device. Richard I., in his earliest seal, has two lions, which are borne counter-rampant; but in the latter part of his reign, after his return from the third crusade, the great seal of Cœur-de-Lion represents the three lions in pale and passant gardant, as they have been almost uniformly depicted since. The only subsequent instance of which we are aware of any variation in the number is on a seal of the Carmelites at Oxford, in which Edward III. is represented in a surcoat charged with four lions in pale passant gardant, a proof of the latitude which heralds occasionally allowed themselves as late as the beginning of the 14th century. In 1340, Edward III., in virtue of the supposed right of his mother, assumed the title of king of France, and quartered the arms of France with those of England, giving to the former the precedence. The fleurs-de-lis were then generally borne *sans nombre;* but in the latter part of the reign of Henry IV. they were reduced to three, borne or on a field azure. No further change took place in the royal escutcheon until the time of James I., except that Mary, on her second Great Seal, made after her marriage with Philip II., impaled the arms of Spain and England.

James VI. of Scotland, on succeeding to the throne of England, quartered the arms borne by preceding sovereigns with those of Scotland and Ireland, the first and fourth quarters being France and England quartered as before, the second quarter the lion rampant of Scotland within the double tressure (see Scotland, Arms of), and the third quarter the harp of Ireland (see Ireland, Arms of). The royal arms were similarly borne by all the sovereigns of the House of Stuart till the reign of Anne, except that William III. bore over all the coat of Nassau (az. semé of billets, a lion rampant or) on an escutcheon of pretence. In the reign of Anne, the legislative union with Scotland brought about a material change. England and Scotland impaled were placed in the first and fourth quarter, France in the second, and Ireland in the third. The accession of George I. displaced England and France from the fourth quarter, to make way for the arms of his majesty's German dominions. These were gu. two lions passant gardant in pale for Brunswick, impaled with or, semé of hearts gu. a lion rampant az., for Lüneburg, having the arms of *ancient* Saxony—viz., gu. a horse courant ar. enté en base, and in a shield surtout gu. the crown of Charlemagne proper, being the badge of the arch-treasurer of the Holy Roman Empire. A further alteration took place on the union with Ireland, when George III. laid aside the titular assumption of king of France, and abandoned the French ensigns. The arms of England were now made to occupy the first and fourth quarter, Scotland the second, and Ireland the third, while the German ensigns were relegated to an escutcheon of pretence. These last were finally abandoned on the severance of Hanover from the crown of Great Britain, which took place on the accession of Queen Victoria, and the royal escutcheon thus assumed its present arrangement.

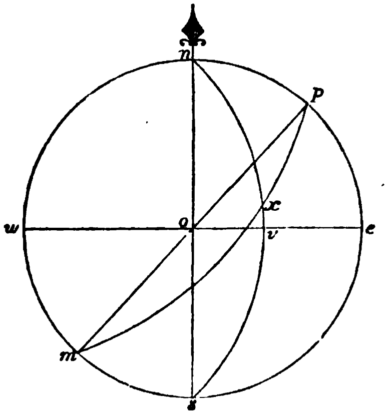
From the union of the crowns of England and Scotland under James I., up to the union of the kingdoms in 1707, the royal arms were somewhat differently marshalled in Scotland, Scotland being allowed in all Scottish seals, ensigns, and arms to occupy the first and fourth quarter, and England the second, while the whole were ensigned with the crown of Scotland; but the Act of Union of 1707 recognises no royal ensigns but those of the United Kingdom, which are to be 'such as her majesty shall think fit;' and by 39, 40 Geo. III. c. 67, on the union with Ireland, it was enacted that the armorial bearings of the United Kingdom 'shall be such as his majesty by his royal proclamation under the Great Seal of the United Kingdom shall be pleased to appoint.' The practice, which prevails to a certain extent in Scotland, of giving the precedence to the Scottish lion in the royal shield, is incorrect, though the error has been committed in several of the official seals of the kingdom.

The lion passant as the *crest* of England first appears on the Great Seal of Edward III.

The *supporters* borne in former times by the kings of England varied much, particularly during the early period when these appendages of the shield were invested with more of a decorative than a heraldic character, and perhaps often left to the fancy of the engraver. When the arms of any of the English sovereigns from Richard II. to Edward IV. are represented with supporters, the animals selected are almost indifferently lions, antelopes, or white harts, and occasionally their place is supplied by angels. Edward IV.'s shield is sometimes supported on one side by a black bull, and Richard

III.'s in one instance—in a MS. in the British Museum—on both sides by white boars. During the reigns of Henries VII. and VIII., Edward VI., Mary, and Elizabeth, the lion, red dragon, and greyhound were the supporters most in vogue, and as the herald or engraver had it not in his power to represent all three at once, he seems to have been allowed to select any two at pleasure. James I. for the first time clearly defined the royal supporters, adopting the lion of England and unicorn of Scotland as they have ever since been borne, the unicorn having been, up to 1707, allowed the precedence in Scotland.

GREAT CIRCLE or TANGENT SAILING. In order to have a clear idea of the advantages of great circle sailing, it is necessary to remember that the shortest distance between two places on the earth's surface is along an arc of a great circle (see SPHERE); for instance, the shortest distance between two places in the same latitude is not along the parallel of latitude, but along an arc of a circle whose plane would pass through the two places and the centre of the earth. The object, then, of great circle sailing is to determine what the course of a ship must be in order that it may coincide with a great circle of the earth, and thus render the distance sailed over the least possible. This problem may be solved in two ways, either by means of an instrument called the 'spherograph,' or by the computation of a spherical triangle. The first of these methods will be explained under the head of SPHEROGRAPH (q. v.). The method by computation will be understood from the accompanying diagram:



$nwse$ represents a meridian which passes through the place p, $nxvs$ another meridian through the place x, and pxm a portion of a great circle; let p be the place sailed *from*, and x the place sailed *to*, then px is the great circle track, and it is required to determine the length of px (called the distance), and the angle xpe which it makes with the meridian (called the course). To determine these two, we have three things given: nx, the co-latitude of x; np, the co-latitude of p; and the angle xnp, which, measured along ve, gives the difference of longitude. The problem thus becomes a simple case of spherical trigonometry, the way of solving which will be found in any of the ordinary treatises on the subject of Spherical Trigonometry.

From the theory of great circle sailing, the following most prominent features are at once deduced: *A ship sailing on a great circle makes straight for the port, and crosses the meridians at an angle which is always varying*, whereas, by other sailings, *the ship crosses all meridians at the same angle*, or, in nautical phrase, *her head is kept on the same point of the compass*, and *she never steers for the port direct till it is in sight.* As Mercator's Chart (q. v.) is the one used by navigators, and on it the course by the ordinary sailings is laid down as a straight line, it follows, from the previous observations, that the great circle track must be represented by a curve, and a little consideration will shew that the latter must always lie in a higher latitude than the former. If the track is in the northern hemisphere, it lies nearer the north pole; if in the southern hemisphere, it is nearer the south pole. This explains how a curve-line on the chart represents a shorter track between two places than a straight line does; for the difference of latitude is the same for both tracks, and the great circle has the advantage of the shorter degrees measured on the higher circles of latitude. Consequently, the higher the latitude is, the more do the tracks differ, especially if the two places are nearly on the same parallel. The *point of maximum separation*, as it is called, is that point in the great circle which is furthest from the rhumb-line on Mercator's chart. Since the errors of Dead-Reckoning (q. v.) prevent a ship from being kept for any length of time on a prescribed track, and thus necessitate the calculation of a new path, in practice, the accurate projection of a great circle track on the chart would be a waste of time. In general, it is sufficient to lay down three points—the place sailed from, the place sailed to, and the point of maximum separation, and through these points to draw an arc of a circle. As the rhumb-line and great circle track between two places, one in north latitude and the other in south latitude, cross each other at the equator, in this case there will be two *points of maximum separation*, and the course and distance must be calculated for each side of the equator separately. Many ignorantly object to great circle sailing on the ground that, on account of constant change of bearings, a ship cannot be navigated on the correct course; but, in fact, all that is required of a navigator is to sail as near to his great circle track as convenient; and each separate course will be a tangent to his track, and the shorter these tangents are made, the more will the length of a voyage be diminished. We may here mention that a chart constructed on the *Gnomonic Projection* (q. v.) represents all great circle tracks as straight lines. See NAVIGATION.

GREAT FISH RIVER is the name of two streams in opposite extremities of the British empire.—1. G. F. R. in Cape Colony rises in the Snowy Mountains; and, after a generally south-eastern course of 230 miles, it enters the Indian Ocean, in lat. 33° 25′ S. and long. 27° E., having at its mouth a bar, which renders it inaccessible to any decked vessel.—2. G. F. R. of British North America, known chiefly as the route of Back and King, in search of Ross, enters an inlet of the Arctic Ocean, in lat. 67° 8′ N. and long. 94° 40′ W., after a north-east course, the length of which, however, has not yet been ascertained. Its character is as unfavourable as its position to navigation and commerce.

GREAT KANAW'HA, a considerable river of North America, and an affluent of the Ohio, is called New River in the upper part of its course, and rises in the north-west of the state of North Carolina, between Blue Ridge and Iron Mountain. It flows first north-east for upwards of 100 miles between parallel mountain-ranges, then turning north and north-west, it breaks through several ridges of the Alleghanies, and continues to flow in a north-west direction to its junction with the Ohio at Point Pleasant, after a course of about 400 miles. About 100 miles from its mouth, on being joined by the Gauley river, it takes the name of the G. K.; and two miles lower, its course is marked by a remarkably picturesque fall of about 50 feet. Up to this fall, the river is navigable.

GREAT MARLOW, a municipal and parliamentary borough in Buckinghamshire, finely situated on the north bank of the Thames, in lat. 51° 34′ N., and long. 0° 46′ W., 31 miles north-west of London. The Thames is here crossed by a suspension-bridge (constructed in 1835), which has a span of 225 feet. The principal manufactures are silk, lace, and paper. G. M. returns one member to parliament. Pop. in 1871, 6627.

GREAT SALT LAKE, a remarkable and extensive sheet of water in the north of Utah Territory, North America, has given name to the Salt Lake City (q. v.), the Mormon metropolis, which is situated at its south-eastern extremity. It lies in one of the great valleys or basins of the Rocky Mountains, and is about 70 miles long and 30 miles broad, yet its average depth is only seven or eight feet, and it nowhere exceeds a depth of 33 feet. Its surface is 4200 feet above the level of the sea. In the middle of the lake, several islands rise as high as 3250 feet above the level of the water; the principal island is in lat. 41° 10′ N., and long. 112° 21′ W. The islands are 9 in number, one of them is 12 miles, and another 16 miles in length. The water of the lake is so salt as to form one of the purest and most concentrated brines known in the world. It contains 22 per cent. of chloride of sodium, slightly mixed with other salts. This lake, in whose waters no living creature is found, receives from the south, by the Jordan, the waters of the Utah lake, which are fresh, and those of the Wear river from the north; but it has no outlet. It has been called the 'still innocent Dead Sea;' and certainly in the quality of the water, and the wild, weird aspect of the surrounding scenery, the lakes greatly resemble each other. The first mention of the G. S. L. was by Baron La Hontan, in 1689, who did not himself visit it, but who gathered some notions of it from the Indians west of the Mississippi. It was first explored and described in 1843, by Colonel Fremont. A thorough survey was made in 1849—1850 by Captain Howard Stansbury of the United States army, whose report was printed in 1852. See SALT LAKE CITY, and UTAH.

GREAT SEAL. By Act of Union between England and Scotland (5 Anne, c. 8), one Great Seal for the United Kingdom of Great Britain is used for sealing writs to summon the parliament, for treaties with foreign states, and all public acts of state affecting Great Britain. The holder of the Great Seal is now generally called the Lord Chancellor. A seal is also kept in Scotland for sealing grants and writs affecting private rights there. By the law of England, the Lord Chancellor has the custody of lunatics, which is a *quasi* judicial power; but he has no authority to act in this capacity in Scotland, where a similar authority is vested in the Court of Session. As regards Ireland, the Act of Union, 39 and 40 Geo. III. c. 67, provided that various acts as to summoning parliament, &c., should be done under the Great Seal of the United Kingdom; but in other respects, the Great Seal of Ireland is used in the same manner as before the union.

GREAT SLAVE LAKE, an extensive and irregular sheet of water in British North America, is situated in lat. between 60° 40′ and 63° N., and in long. between 109° 30′ and 117° 30′ W. Its greatest length is about 300 miles, and its greatest breadth 50 miles. It is surrounded, especially on the north, by rugged and precipitous shores; it contains many islands, some of them wooded, and is wholly frozen over for six months of every year. On the north, it receives the surplus waters of Lake Aylmer and Lake Artillery, and on the south, those of Lake Athabaska. Its own surplusage of water is carried off by the Mackenzie River to the Arctic Ocean.

GREAT SLAVE RIVER, a river of British North America, forms the outlet of Lake Athabaska into Great Slave Lake, and flows in a north-west direction from the former to the latter. It is about 300 miles in length; its banks in many parts are well wooded; and its course, which in the upper part is interrupted by falls and rapids, lies through an alluvial region in the lower part.

GREAT WALL OF CHINA. See CHINESE EMPIRE.

GREAVES (Fr. *Grève*), pieces of armour formerly used as a defence for the legs (in the patois of Burgundy, *grève* still signifies 'shin'). They were originally made of leather, quilted linen, &c., and afterwards of steel, hollowed to fit the front of the legs, and fastened with straps behind. The Greeks termed them *knēmides* (whence the frequent expression in the *Iliad*, *euknēmides Achaioi*, the 'well-greaved Greeks'), and the Romans *Ocreæ*.

GREBE (*Podiceps*), a genus of birds of the family *Colymbidæ*, having the feet webbed not in the usual manner, but by a separate membrane for each toe, united only at the base. The tarsi (shanks) are so much compressed as to be almost like blades. The claws are large and flat. The bill is about as long as the head, straight, and conical. The wings are short. There is no tail. The legs are attached so far back, that the birds when on land assume an erect position, like penguins. They walk with difficulty, and all their motions on land are awkward. They sometimes shuffle along on their bellies like seals. But in water they are extremely agile; they swim rapidly, dive with extreme quickness if alarmed, and pass to very considerable distances under water, moving there by means of their feet alone, and threading their way with wonderful expertness among the stalks and leaves of aquatic plants. They feed on fishes, batrachians, crustaceans, and other aquatic animals, partly also on vegetable food. They are said sometimes to carry their young under their wings, and even to take them under water with them in diving to escape from enemies. The geographical distribution of the genus is very wide, and some of its species are also very widely distributed. Four species are British, two of which are only winter birds of passage; but the GREAT-CRESTED G. (*P. cristatus*), and the LITTLE G. (*P. minor*), also called DABCHICK or DOBCHICK, are resident all the year. The Little G. is by far the most common British species. It does not exceed ten inches in length. The Great-crested G. is rare, even in winter, when the number is increased by visitants from the north. It is sometimes called the SATIN G., from

Head and Foot of Sclavonian Grebe (*P. Cornutus*).

the beautiful shining silvery feathers of the lower parts of its body, on account of which it is in great request, the skin being used to make muffs for ladies, or cut into narrow strips for trimming their dresses. G.-shooting is a favourite amusement on the Lake of Geneva; the G. is pursued by a boat, whilst it seeks to escape by diving and swimming under water. The males of some of the grebes have the head finely ornamented with tufts. The plumage of most of them varies much at different ages and seasons.

GRECIAN ARCHITECTURE. The origin of the architecture of Greece is, like the origin of every art and science in that country, mixed up with mythical and fabulous history. It is divided into three styles, and each of these has its mythical origin. Thus, the Doric is said to have been copied from the early wooden huts of the aborigines; the Ionic, which sprang up among the Greek colonists in Asia Minor, to have been modelled on the graceful proportions of the female figure, as the Doric had been on the more robust form of a man—the volutes representing the curls of the hair, the fluting the folds of the drapery, &c. The story of the origin of the Corinthian style is very pretty: a nurse had deposited in a basket on the grave of a departed child the toys she had amused herself with when alive. The basket was placed accidentally on the root of an acanthus, and in spring, when the leaves grew, they curled gracefully round the basket, and under a flat stone which was laid on the top of it. Callimachus, the sculptor, seeing it, caught the idea, and worked out at Corinth the beautiful capital since called after that city.

Modern discoveries have, however, shewn that Greece owed much to the earlier civilisation of the countries which preceded it in history. To the architecture of one or other of these, almost every feature of Greek architecture can be traced. But it is for the first idea only that the Greeks are indebted to Egypt and Assyria; whatever forms they adopted, they so modified and improved as to make them part of their own architecture.

Grecian architecture is divided into three styles—the Doric, Ionic, and Corinthian (see COLUMN, figs. 4, 5, 6). Of these the Doric is the oldest. The earliest example which remains is the temple at Corinth, which was built about 650 B.C. The remains of this temple shew the various members of the style fully developed, but they are all of a massive and heavy description, strongly resembling in this respect their prototype the architecture of Egypt. There is now no doubt, although the intermediate steps are lost, that the Doric style took its origin from the rock-cut tombs of Beni-Hassan (q. v.) in Egypt, of which fig. 1 is an existing example. The pillars of one of these tombs appear at first sight to be Doric; it is only on close inspection that we find that the Echinus (q. v.) is wanting under the capital. The echinus was, however, used by the Egyptians. We here find ourselves in the cradle of Greek art. This is the spot where we must seek for the first origin of the style, not in Greece, where the earliest example is already complete in all its parts. The earlier the example, the more massive the form. This completely disproves the theory, that the pillars were copies of stems of trees used as posts. It seems more likely that the first pillars were square piers of rubble or brickwork, with a flat stone or tile laid on the top, to form a good bed for the beams to rest on. These formed the architrave, stretching from pier to pier, on which rested the cross-beams supporting the rafters of the roof, the ends of the latter suggesting the dentils and modillions (mutules) of the cornice, the former, the triglyphs (see ENTABLATURE). The square form of the pier was afterwards modified by cutting off the corners, and again cutting off the remaining corners, until the polygon suggested the fluted shaft. The same process was afterwards gone through by the medieval architects in developing the Piers (q. v.) of Gothic architecture.

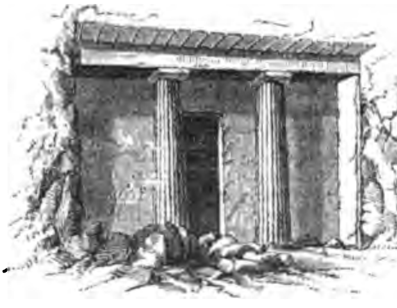


Fig. 1.

After the temple at Corinth, the next remaining example is the temple at Ægina (q. v.), built about a century later, or 550 B.C. There may have been many temples of the same date, but none now exist; they were probably destroyed during the Persian war, or removed to make way for finer buildings during the great building epoch of Greece which succeeded that war, and when she was at the summit of her power. Of this epoch, we have many remains. The temple of Theseus and the Parthenon at Athens (438 B.C.), that of Jupiter at Olympia (440 B.C.), Apollo Epicurius at Bassæ, Minerva at Sunium, and all the best examples of the Doric style of Greece, are of the age of Pericles. Besides the Peloponnesus, there are the countries colonised by the Greeks to which we can look for remains of Greek architecture. The Dorian colonists of Sicily and Magna Græcia carried with them the architecture of their native country, and furnish us with many fine examples. In Selinus there are six temples, the oldest being about the same age as that at Corinth. At Agrigentum there are three Doric temples, one of them founded by Theron (480 B.C.); this is the largest Grecian temple of the period, being 360 feet long by 173 feet broad. At Syracuse, Ægesta, and Pæstum there still remain many valuable examples.

As the Doric art progressed, the early massive forms gave place to more elegant and slender proportions. In the temple at Corinth the column is only 4·47 diameters in height; in the Parthenon (fig. 2), which is universally recognised as the finest example of the style, the column is 6·025 in height; and in later examples it becomes still taller and thinner, until it runs into the opposite extreme from which it started, and becomes so meagre and

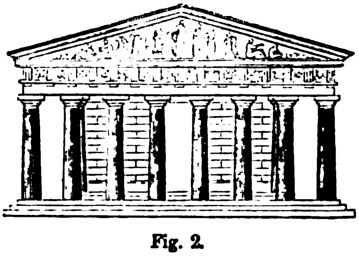


Fig. 2.

attenuated as to lose entirely the boldness and vigour of design which are the chief characteristics of the style.

One thing to be particularly admired in the Doric style is the beauty of the sculpture with which it is adorned, and the appropriate manner in which the sculpture is placed in the building, and the building suited for the sculpture. It has been shewn by Mr Penrose that every line was the subject of the deepest study on the part of the architect, for the purpose of correcting and allowing for all optical aberrations. The result is, that there is hardly a single straight line in the building; all the lines, which appear to be perfectly straight, are drawn with accurate curves, so as to produce the smoothest and most pleasing effect to the eye. Every harsh angle is softened, and every disagreeable combination of lines avoided. For example, the columns have an Entasis (q. v.) or slight swelling formed by a hyperbolic curve; the architrave of the front is curved upwards, so as to correct the optical illusion caused by the sloping lines of the pediment, and the columns are sloped slightly inwards, so as to give greater appearance of solidity.

The Parthenon is built entirely of white marble, and the whole of the masonry in this, as in other Doric works of importance, is put together with the most perfect workmanship.

There seems to be no doubt that this and other Greek temples were adorned externally with colour. To what extent this decoration was carried, is not clearly ascertained; but it is probable that the exterior walls were covered with historical pictures, which were sheltered from the effects of the weather by the portico surrounding the temple. The sculpture was probably also relieved by a flat colour on the background, and the mouldings decorated with painted or gilded ornaments.

Ionic.—This style took its rise about 500 B.C., and as we have seen that the earlier Doric was imported from Egypt, so the Ionic seems to have originated from the influence of Assyrian art. The recent discoveries of Layard and others have shewn that many of the characteristic ornaments of the style were in common use in Assyrian architecture. The volutes of the capitals are particularly indicative of an Eastern origin, the scroll being an ornament of very common use in all Eastern art.

The finest examples of the Ionic style remaining in Greece are the temples of the Wingless Victory (*nikè apteros*) and the Erechtheum at Athens, built about 450—420 B.C. In the Ionian and other colonies of Asia Minor, also, many fine examples of this style were erected. The celebrated temple of Diana at Ephesus was of the Ionic order. It was the largest temple we know of up to its time, being 425 feet long by 220 feet wide. No trace of it now remains.

The Ionic is a graceful and elegant style, but not so pure and severe as the Doric. The latter is distinguished by simple and beautiful outline, enriched with the most perfect sculpture; the former trusts rather to ornamental carving for its effect. This love of elaborate ornament is an indication of the Eastern influence under which the style originated, and the mouldings and many of the ornaments are found to be identical with those of Assyrian architecture, only refined and simplified by the Greeks. The honeysuckle ornament (fig. 3), so commonly used both in Assyrian and Ionic architecture, is a good example of the improvement effected by the Greeks on the original type. In the Ionic as well as in the Doric, we find the most perfect execution and workmanship, the spirals, entasis, &c., being all drawn and cut with the greatest possible exactness.

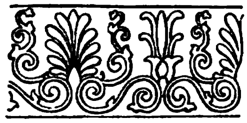


Fig. 3.

Corinthian.—This style was the latest introduced, and combines, to some extent, the characteristics of both the preceding. It unites and blends together the Egyptian and Assyrian elements, the cap being probably derived from the bell-shaped capitals of the former country, ornamented with the carved leaves and spirals of the East. This order was first used about the time of Alexander the Great, the earliest example extant being the Choragic Monument (q. v.) of Lysicrates (335 B.C.). There are also the Temple of the Winds and that of Jupiter Olympius at Athens, the latter being one of the largest and finest examples of the style.

The Corinthian is the most florid of the Greek styles, and although invented by the Greeks, it was not brought into use till after the power of the republics, to which we owe the finest works of Greek art, had begun to wane. This style, from its richness and splendour, became afterwards the greatest favourite with the Romans, in whose hands Greek art became spread over the whole empire.

Caryatides.—Besides the above styles, which constitute *the Greek orders* of classic writers, the Greeks also used *Caryatides* (q. v.), or female figures, in place of columns, as in the Erechtheum and *Telamones* (q. v.), or giants, as at Agrigentum. These were probably derived from the figures used by the Egyptians in their architecture, but the latter never used them as columns; they always placed them as statues in front of the columns.

Greek temples are technically classed and designated by the mode in which the columns of the porticos are arranged. The *cell*, or temple proper, is a square chamber contained within four walls; the simplest form of portico is called *distyle in antis* (fig. 4), the two side-walls being continued past the end-wall, and terminated with antæ, or pilasters, with two columns between.

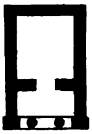


Fig. 4.

When the portico has four columns between the antæ, it is called tetrastyle.

The temples have generally the same arrangement at both ends.

In front of both ends of the plan *distyle in antis* (fig. 5), there is frequently placed a range of six columns, and from the flank columns a row is continued along both sides. Such an arrangement is called *peripteral*, and the temple is designated hexastyle and peripteral. This was a common arrangement.

The Parthenon is an exception to the general rule: it has a hexastyle portico at each end of the cell, in front of which is placed an octastyle portico, and seventeen columns at each side.

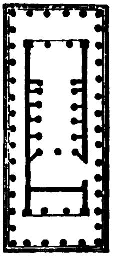


Fig. 5.

The great temple at Agrigentum had seven columns at each end, and fourteen at each side, and was peculiar in having the space between the columns all round filled up with a wall. The reason probably was, that the space between the columns was too great to be spanned by architraves in single stones. The wall was pierced with windows.

Considerable doubt has existed as to the mode adopted by the Greeks for lighting the interior of their temples; that suggested by Mr Fergusson seems the most probable, as being similar to the plan used by the Egyptians and Assyrians. The interior had generally a double row of columns, one over the other, dividing the width into three spans. This arrangement still exists in the temple of Neptune at Pæstum. Mr Fergusson supposes that the light was introduced by counter-sinking a part of the roof, so as to admit the light between the pillars of the upper range, thus forming a kind of clerestory, as shewn on the annexed section of the Parthenon (fig. 6). Windows, however, were also used, as in the temple at Agrigentum and in the Erechtheum.

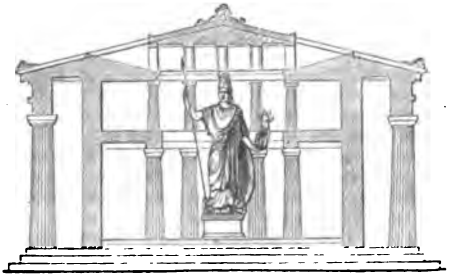


Fig. 6.

The theatres of the Greeks formed another very important class of works; they consisted of semicircular rows of seats cut in the rock, or partly built. Remains of these structures are found in all the countries inhabited by the Greeks, and were frequently of great size—that at Dramyssus being 443 feet across. The proscenia were the parts on which architectural design was chiefly displayed; but these have unfortunately all perished.

None of the palaces or domestic edifices of the Greeks remain to us; we are thus totally deprived of a very interesting chapter in the history of domestic architecture, for it is highly probable that the streets and houses of Greece, although not so splendid and enduring as the temples, were more varied in style, and exhibited many picturesque and beautiful forms, which are now entirely lost.

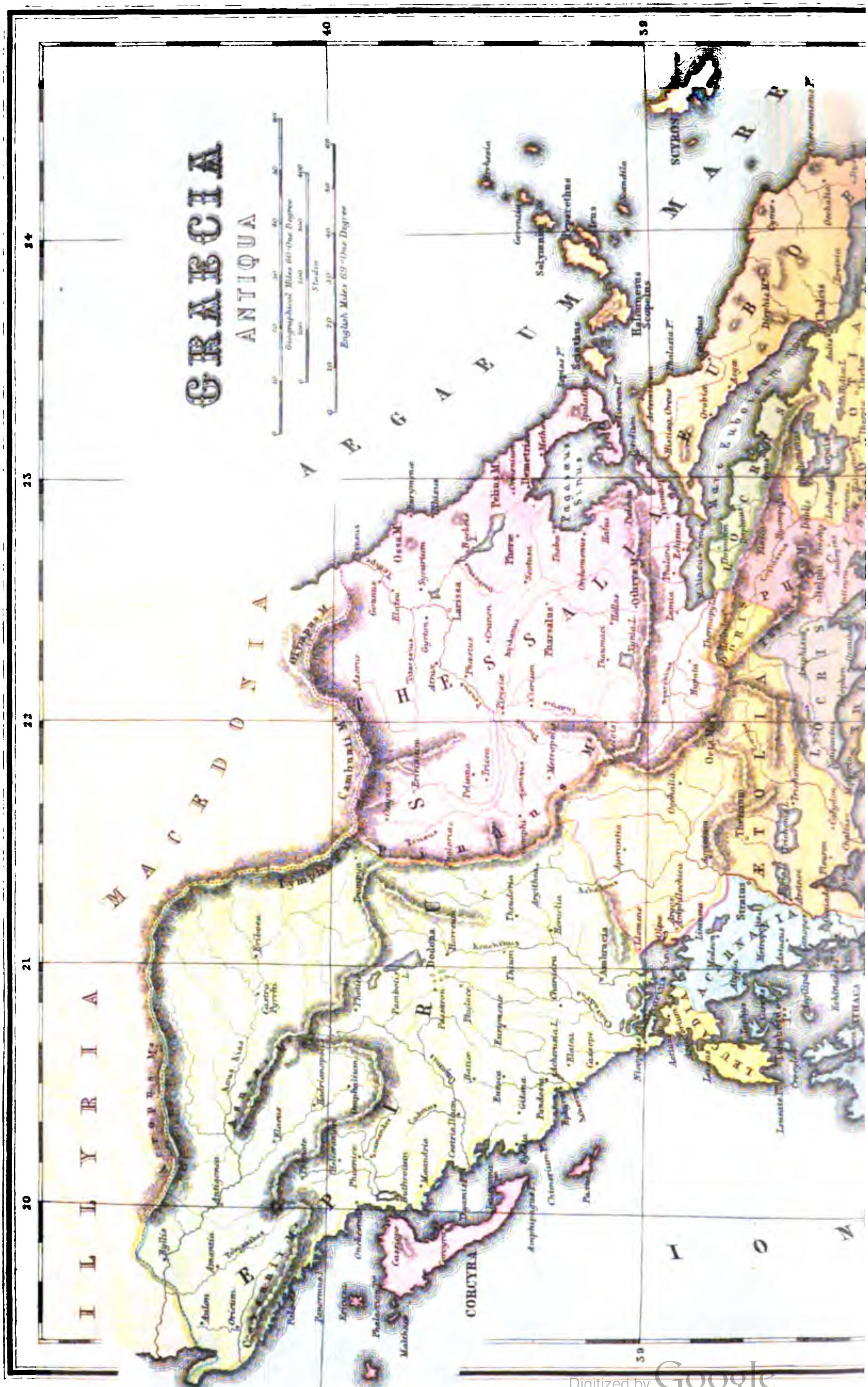
The attempt has been made in modern times to revive Greek architecture, and some ingenious modifications and adaptations of it have been carried out. But it was found that this style, so beautiful and appropriate in the warm and genial climate of Greece, was quite unsuited for our northern latitudes. The porticos are useless in a climate where external painting cannot last, and where the sunshine is courted rather than excluded; the pitch of the roof is not high enough to throw off our snows; and windows of sufficient size for our dark skies are not admissible. Grecian architecture has therefore been abandoned; and its place is now taken by a style more appropriate to our climate, and more suited to the feelings of the people.

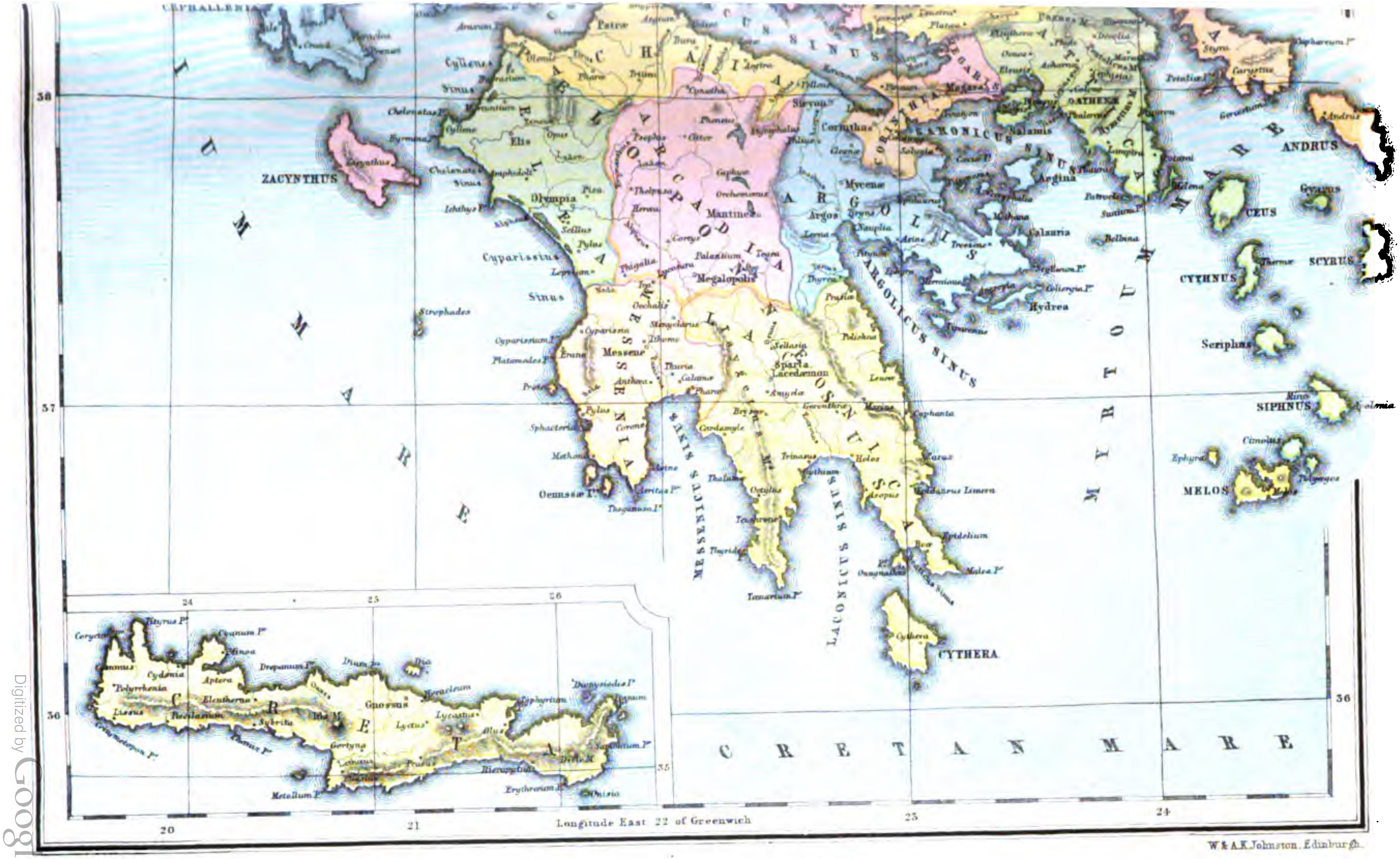
GREECE. The name by which the ancient Greeks delighted to call their native country was Hellas (q. v.). The terms Græcia and Græci were first used by the Romans, being derived probably from a small tribe in Epirus, near Dodona, called *Graikoi*, with whom the Romans may be supposed to have been, from proximity, best acquainted.

Extent, &c.—This country, so celebrated in the history of freedom, of literature, of art, of philosophy, and of civilisation generally, varied much in size at different periods of its history. Hellas at first was applied only to a small district in Thessaly; at a later period, it denoted not only the Morea, and what is commonly called G. Proper, but also Macedonia, Epirus, and the islands of the Ægean.

Boundaries—(1) *Ancient.*—The northern limit of ancient G. may be fixed about the 40th parallel of N. lat., the south extremity being in 36° 23′. The barrier separating G. from Illyricum and Macedonia on the north, was that range of mountains which, starting from the Adriatic as the Ceraunian range, merges into the Cambunian ridge in the centre, and runs out into the sea on the east as the far-famed Olympus. The Ægean Sea washes the country on the east, the Mediterranean on the south, and the Ionian and Adriatic on the west. The greatest length is about 250 English miles, and the greatest breadth 180; the area (not including Epirus, but including Eubœa) is about 21,000 square miles—i. e., about two-thirds the size of Scotland. The Cyclades are reckoned by themselves, and amount to rather more than 1000 square miles. See *Islands* at end of article. (2) *Modern.* The extent of modern G. is much more limited. Its north boundary was fixed in 1834 by a line drawn (in lat. 39° 8′ N.) from the Gulf of Arta (Ambracia) in the west to the Gulf of Volo (Pagasæ) in the east, thus excluding the greater part of Thessaly and much of Acarnania, with all Epirus. The greatest length of this territory is not more than 200 English miles, and its superficial area, including Eubœa, but not the Cyclades, about 15,000 square miles, or half the size of Scotland.

Physical Conformation.—G. is essentially a country of mountains, hills, and valleys. From the ridge which forms its northern frontier, there starts in a southerly direction the Pindus chain, the backbone of G., dividing Thessaly from Epirus, and giving origin to those numerous streams which water the mainland. About lat. 39°, it sends off two spurs to the east: Othrys (Gura), which terminates at the Gulf of Volo—and a little further south, Œta (Katavothra), at the extremity of which is the famous pass of Thermopylæ. Some ridges of less note run westward. From this point, the great central chain extends in a south-east direction (though with many windings), as far as Mount Cithæron, and even through Attica as far as Cape Sunium, under the names of Parnassus, Helicon, Cithæron, and Hymettus; while in a south-west course we find many ranges crossing the country towards the Ionian Sea and the Gulf of Corinth (Lepanto), in a direction parallel with, or slightly inclined to, that of the central chain. The somewhat lateral range of Cithæron and Parnes, on the borders of Attica, is extended through Megaris into the Morea or Peloponnesus by a lower ridge, which, passing across the isthmus of Corinth, stretches even to the west coast. Of this range, the two most conspicuous points are Mounts Cyllene and Erymanthus, from which two chains run south on the east and west of Arcadia respectively, and under the names Taygetus (Pentedactylon) and Parnon (Malevó), terminate in the promontories of Tænarus and Malea. Besides these, there are many shorter chains and individual peaks, which it would be tedious and out of place to detail. It may be sufficient to state, that there is no country of Europe, except Switzerland and the west parts of Scotland, which can be compared to G. in the extent, variety, and irregularity of its mountain system, and the number and character of its valleys. Of all the divisions of G., Arcadia is most like Switzerland in its rugged nature and generally elevated surface. Some of the mountain peaks of G. rise to a great height; thus, Olympus is 9700


GRAECIA
ANTIQUA
Geographical Miles 60=One Degree
Stadia
English Miles 69=One Degree
ILLYRIA
MACEDONIA
EPIRUS
THESSALIA
AETOLIA
ACARNANIA
LOCRIS
DORIS
PHOCIS
BOEOTIA
EUBOEA
AEGAEUM MARE
CORCYRA
LEUCADIA
ITHACA
SCYROS
Olympus M.
Ossa M.
Pelion M.
Othrys M.
Cambunii M.
Pagasaeus Sinus
Larissa
Pharsalus
Dodona
Ambracia
Thermopylae
Chalcis
Sciathus
Scopelus
Halonnesus
20
21
22
23
24
40
39



W. & A.K. Johnston, Edinburgh.

Printed in Colours by

W. & R CHAMBERS LONDON & EDINBURGH.

English feet, and is covered with snow; Guiona, on the frontier, 8240 feet; Parnassus, 8001; with many others of 7000, 6000, and 5000. Helicon is 4963; Cithæron, 4630; Cyllene, 7745; while the Acrocorinthus, or citadel of Corinth, is 1869 above the level of the sea. The mountains of G. are more remarkable for the suddenness of their rise than for their great elevation. So, too, there are many smaller peaks and cones notable for the abruptness with which they spring from the plain, such as the Acrocorinthus, the rock of Ithome, and the Meteora cliffs of Thessaly near the Penēus. These last are huge masses of rock standing out from the plain to heights varying from 100 to 300 or 400 feet, with sides perpendicular as a wall. They assume the shapes of pillars, cones, and other figures more or less regular: they cover a space of nearly two square miles, the recesses between the pinnacles being filled with trees and dense brushwood. The summits are occupied by monasteries, the only access to which is by baskets, nets, or ladders swung in the air.

Minerals.—G. is not rich in minerals: gold, silver, copper, lead, and iron, are found, but the mines have never been worked with zeal. The most famous mines in ancient times were those of Laurium in Attica. Coal is found in Eubœa and in some parts of the Peloponnesus; salt is procured in many districts of G. and in the Ionian Islands; and marble of the purest kind, and of various colours, may be had in endless amount in almost all parts of Greece. The most famed quarries were in Paros, Carystus (in Eubœa), Pentelicus, and Hymettus. Marble and building-stone were quarried by the old Greeks to a very large extent. There are many mineral springs, both cold and warm, and many caverns still emit those mephitic exhalations which in bygone days quickened the imagination of the poet, and confirmed the superstition of the peasant.

Plains and Valleys.—The valleys of G. are very numerous, but owing to the great number and irregular courses of the mountain-ranges, are very small. The two great plains are those of Thessaly and Bœotia, the former being the largest and the most fertile in all G.: that of Messenia is both extensive and fertile.

Coast-line.—As Europe is pre-eminent among continents for the great extent of its sea-coast, so is G. for a similar feature remarkable among the kingdoms of Europe. The bays are very numerous, and many of them run far up into the land, so that no part of the country is far from the sea—a circumstance which gives the inhabitants great facilities for commerce, and which leads the modern Greeks, as it did the ancients, to occupy themselves in very large numbers with maritime affairs.

Water-system—(1) *Rivers.*—The rivers of G. necessarily follow its valleys in character. None of them are navigable. The most important stream is the Achelous (Aspropotamo), which rises in Mount Pindus, flows in a south direction through Epirus, and empties itself into the Ionian Sea, at the mouth of the Gulf of Corinth, after a course of about 130 miles. The Spercheus rises in the Pindus range, and disembogues into the Malic Gulf, after traversing for more than 60 miles the fertile vale which is bounded on the north by Mount Othrys, and on the south by Mount Œta. Besides these, there are in North G. the Cephissus, rising in Doris, near the base of Mount Parnassus, and flowing through the fertile Bœotian plain into Lake Copais (Lago di Topoglia, or Lake of Livadia); and in the south part of Bœotia, the Asopus (Vuriemi). In Peloponnesus, the principal streams are the Eurotas (Vasilipotamo) and the Alpheus (Roufia). By the banks of this latter, the great Olympic games were celebrated. The rivers of G. depend for their supplies mainly on the atmosphere; hence in summer the larger streams are greatly reduced in size, and the majority of the smaller ones are either almost or altogether dry channels. Many of them are nothing more than mountain torrents, or gulleys, which the heavy rains of autumn and winter fill for a short season.

(2) *Lakes.*—The many hill-encircled valleys of G., from which there is no outlet, afford the most favourable opportunity for the formation of lakes; hence the rains of autumn and winter stagnate in many cases in the valleys of the mountains, and for at least a part of the year, form tiny lakes or tarns. Some of these are permanent, though with great difference in depth of water, according to the season of the year, while others degenerate in summer into reed-grown marshes and pestilential fens. See BŒOTIA.

Climate.—The climate of G. varies very considerably in different parts of the country. In the highlands of the interior, the cold in winter is often very severe, snow lying for several months. On the plains, and in the lower districts near the coast, snow is seldom seen; but the north and north-west winds are frequently very trying, though there is no intense cold. The summer heat is often excessive; and the sirocco not unfrequently visits the south and lower parts. In moisture, too, there is much difference; thus, while Attica is remarkable for its pure air and beautifully bright sky, Bœotia has been famed from ancient times for the moisture of its climate and the fogginess of its atmosphere. The swampy valleys of Lake Copais and other marshy tracts, when acted on by the scorching heat of a summer's sun, produce those noxious vapours which are found in so many parts of G., breeding malaria and disease. This defect seems to have increased since classical times, either from the greater thinness of the population, and the consequent diminution of tillage, or other causes not easily reached. But drainage would be an easy matter in a country whose rock-formation is of so soft a character as that of Greece. Were its natural advantages aided by drainage and irrigation, G. might yet become one of the healthiest and one of the most fertile countries of Europe.

Productions.—The more common products of Greek soil in ancient times were wheat, barley, and other cereals; flax, wine, and oil, with fruits of various kinds. The figs of Attica were and still are famed for the excellence of their flavour. Forests once covered many of the hills, and supplied timber for domestic purposes and for ship-building: they are still extensive in some parts. The most important productions of modern G. are those mentioned above, with maize, rice, millet, currants, and silk. Honey is produced in great quantity on Hymettus and in some parts of the Peloponnesus. The mulberry-tree is largely grown for the silkworm; and on the north and south shores of the Gulf of Corinth, as well as in Arcadia, and the west coast of the Peloponnesus, the Corinthian grape or currant is most extensively cultivated. Vines flourish in almost all parts, but the island of Santorin possesses the most famous vineyards, with the greatest variety of grapes, and furnishes a wine highly prized by the Russians. The olive grows in a wild state over all parts of G.; when ingrafted, it yields an excellent fruit, which the inhabitants pickle in very large quantity, as a staple article of food. The oil of the olive serves to supply light, and is used in cooking and for food, as we employ butter. Cotton, madder, tobacco, and leguminous plants grow in considerable quantity. Fruit trees are specially fertile; figs and apricots are plentiful and of excellent quality; oranges, citrons, lemons, pomegranates, almonds, water-melons, gourds, and others of less note are widely spread, largely produced, and of excellent quality.

Flora and Fauna.—The flora of G. resembles that of other countries of South Europe. Among the tame animals of ancient G. were the horse, mule, ass, ox, sheep, goat, swine, dog. The swine supplied the favourite flesh meat. Of wild animals, we find the wolf, bear, boar, and even lions at an early period. Sheep and goats are still very plentiful, and in fact constitute one of the most important sources of wealth to the Greeks. Oxen are much used for ploughing, but milch cows are little prized, and scarce. At the present day, the wolf, bear, lynx, wild-cat, boar, stag, roebuck, fox, jackal, badger, marten, and many other wild animals are found in the forests. Hares, snipes, wild-ducks, and other game are very abundant; while eagles, vultures, hawks, owls, &c., are found in considerable numbers. The tortoise is very common, but the inhabitants have a great aversion to it.

Agriculture.—The agricultural implements are still as rude as in the days of the Peloponnesian war, or even of Hesiod; and this, added to the scarcity of ploughing oxen, ruggedness of the country, general thinness of soil, and difficulty of tillage and irrigation, is enough to damp the ardour of even a more energetic population. The houses of the country-people are in most parts little better than mere hovels, and a large proportion of the arable land is untilled. The modes of tillage are of the most primitive kind; and thus, though nearly half the male population of G. is employed in agricultural labours, they make but slight impression on the general aspect of the country, and influence little the amount of exports; in fact, they do not produce as much grain as supplies the wants of the population, and that, too, though a higher yield is given in many parts of G. than in this country. Much labour, however, is bestowed on the cultivation of the olive, vine, mulberry, and fruit trees. The greater part of the land belongs to the state; rent is paid in kind, and in a certain proportion (one-third) to the net produce. The proprietor is in very many cases obliged to furnish the *metayer*, or tenant, with seed to sow the ground, and with oxen to plough and prepare it; and as the metayer has an interest in the farm for only one year, there is little encouragement for either landlord or tenant to expend largely in improvements—such as drainage, fences, clearing of the soil, and comfortable farm-steadings. The country, however, is better suited for a pastoral than an agricultural people. Arcadia is still the land of shepherds, as it was of old. The flocks are driven to the valleys near the coast in winter, and in April to the hills.

Manufactures.—The manufactures are few and unimportant. Cotton and woollen stuffs, and some minor articles are made by the peasantry for domestic use. Ship-building is carried on at most of the seaports; and silks, gauze-stuffs, cutlery, hardware, earthenware, leather, saddlery, and such articles are made in small quantities in some of the principal towns, and more especially on the islands. The Greeks have great skill in embroidering in silk gold, and silver; also in sculpture, and in the cutting of marble. Carpets are made in the island of Andro, and straw-hats at Lifanto. The modern Greeks are not behind their great ancestors in the art of dyeing in bright colours.

Commerce.—Every circumstance tends to make the Greek a man of commerce. He is of a quick, active, versatile, and practical turn of mind, and possesses all those qualities which insure success in business. The bays and gulfs of the sea-indented shore allure him to the waters, while the strong currents and frequent squalls on his iron-bound coast soon render him an expert and fearless seaman. The islanders are thrown into a seafaring life even more than the people of the mainland. G. occupies a position in the Mediterranean, which, for commercial advantages, cannot be surpassed. The exports of ancient times were of course mainly the produce of the soil, the trees, and the mines; and the same do they remain at the present day. Raw produce, as cotton, corn, currants, figs, and other fruit, tobacco, olive-oil, honey, wax, gum, valonia bark, silk, and sponge are the most common. From Western Europe manufactured goods of all kinds and the produce of our colonies are largely imported; while Turkey, from her provinces in Europe and in Asia, supplies coffee, rice, timber, drugs, and other articles of eastern growth. The Greek merchants speculate largely in the grain trade. The principal seaports are Syra, Piræus, Patras, and Nauplia, and the ports with which they trade most are Constantinople, Leghorn, Trieste, Palermo, and Smyrna. The mercantile navy of G. is very large, amounting to nearly 5000 vessels, many of 500 or 600 tons, but the majority are small-craft, fitted for short voyages from island to island, or to ports near Greece. It is as agents and carriers that the Greek ship-owners are specially engaged. They are, in fact, the great commission-agents and carriers of the Mediterranean. Greek merchants have now established themselves in London, Liverpool, Manchester, Glasgow, and other towns of the British empire, as well as in those of France and of Germany; and as they have greater facilities for collecting articles of commerce from the inland parts of their own and contiguous countries, besides, as they despise no sort of commission or merchandise, however small or insignificant, they now usurp almost the entire traffic of the Ottoman empire, of Persia, and of other eastern countries.

Internal Commerce.—But one great drawback to the development of Grecian resources, and the increase of a home-commerce, is the miserable state of the internal communication. Without a navigable river, with not a single canal, and with less than 100 miles of road fit for a donkey-cart in the whole extent of its territory, it is little wonder that the inland inhabitants are devoid of energy and enterprise, and that they consume but little of the imports from abroad. Mules, asses, horses, and men carry on their backs over rugged paths, and through mountain-passes, the scanty supplies of foreign luxuries and necessaries for the Greek peasant of the interior. Even from Athens to Corinth there is no carriage-road!

Political Divisions.—In ancient times G. was divided into a great number of petty states, each consisting of at least a city and some portion of surrounding territory. There was no king ruling over the whole country, no federal union which embraced all the states, no common council or government. Amphictyonic leagues did exist at one period, and in later times the Achæan and Ætolian leagues were formed with patriotic and national objects in view, but these applied only to a limited area, and were of only local operation; hence quarrels were of constant occurrence, and G. wasted on internal struggles those energies and means, which, if properly husbanded, united, and directed, might have raised her to the very pinnacle of fame and of prosperity in every department of human industry and human exertion. It was only when some monster danger threatened universal destruction that all united for the common good, as in the Persian invasions, and even then jealousies and selfish interests caused many to join with those who sought to ruin the fatherland. The divisions of ancient G., as laid down on maps, afford a very imperfect idea of the political condition of the country, singly or relatively; but as they have been so long known to the world under certain names, it will be best to mention them as usually given. Starting at the south-east, we have the triangularly shaped Attica, separated from Bœotia on the north by the range of Cithæron and Parnes, Bœotia, Phocis, Doris, Locris, Ætolia, Acarnania, Epirus, Thessaly, and Eubœa; and in the Peloponnese, Argolis, Laconia, Messenia, Elis, Achaia, and Arcadia, with Megaris, partly on the isthmus of Corinth. By the arrangements of 1852, modern G. is divided into ten provinces or nomarchies, which are again subdivided into forty-nine eparchies, and these again into demarchies or cantons. Of these ten, there are in Hellas, or Northern G., Attica and Bœotia, Phocis and Phthiotis, Acarnania and Ætolia: in the Peloponnesus, Argolis and Corinthia, Achaia and Elis, Arcadia, Messenia, Laconia: in the islands, Eubœa and the Cyclades. See ATTICA, BŒOTIA, EUBŒA, &c.; and for Cyclades, see section 'Islands' at end of this article.

Government.—In ancient G. each state managed its own affairs, and governments were of different kinds. In Homeric times, monarchy seems to have prevailed to a considerable extent, but in later years republics, aristocracies, and oligarchies almost entirely usurped the ruling power; factions were rife, and in many cases their contests led to a total disruption of the body-politic. The present constitution of Greece was arranged by an assembly elected in December 1863, and adopted October 29, 1864. The whole legislative power is vested in the Boulé, or House of Representatives, the members of which are elected by manhood suffrage for four years. The elections take place by ballot, and the chamber must meet annually for not less than three, nor more than six months. There must be an attendance of at least one half of the members to give legality to the proceedings, and no bill can become law without the consent of an absolute majority of members. The assembly has no power to alter the constitution itself. The Chamber of Deputies meets, on ordinary occasions, on the 1st November (O.S.) of every year. The number of members varies with the population, but in 1872—1873 it was 188. The executive is vested in the king and the ministers at the head of the following departments, who are responsible for the acts of his majesty: Ministry of the Interior, Finance, Justice, Education and Ecclesiastical Affairs, War, Marine, and Foreign Affairs. There is also a deliberative council of state, whose members are named by the crown, and hold office for two years. There must not be less than 15, or more than 25. To this council must be sent all bills from the chamber of deputies, and returned with observations or amendments within ten days; but this term may be prolonged for 15 days more. If no report is then made, the deputies may pass the law and send it up to the king. The education of the people is undertaken at the public cost; offices of state and positions of distinction are open to all. (See articles on individual cities and states.)

Administration of Justice.—The supreme court of justice is called, as in Athens of old, the Areopagus. Besides this, there are two courts of appeal, 3 courts for commercial suits, 10 courts for civil and criminal counts, and 120 justice-of-peace courts, with all the orthodox accompaniments of lawyers, juries, notaries, &c. There is a complete code of laws to meet all the cases which may arise between man and man. Capital punishment is exigible for certain offences, the guillotine being the instrument of execution. The most numerous class of felons are brigands and assassins. The Greek judges enjoy a well-earned reputation for independence and strict uprightness.

Army and Navy.—The army of G. is very small, being estimated to consist of 12,000 men, of whom about 800 are officers. The period of service is four years, and the force is recruited by a levy of 2000 men each year. All Greeks (with certain exemptions) from 18 to 30 years of age must serve, if called on, or provide a substitute. There is a police force, or *gendarmerie*, which is dispersed over the kingdom, and a kind of *irregular* troops, or militia, to guard the frontiers, and keep down brigands. These latter two are the only effective forces. The navy is little better than a name. It consists almost entirely of small vessels, with 2 frigates, 2 corvettes, and half a dozen steamers. It is useless as a defence from foreign powers, and serves only to repress piracy, and that in an ineffective way. The naval station is Poros, on an island of the same name at the entrance of the Gulf of Ægina.

Money, Weights, and Measures.—The unit of the monetary system is the Drachma (q. v.) = 8¼*d.* English; the unit of weight is the oke = about 2 lbs. 11 oz. avoirdupois; the common measure of length is the pique = 27 inches. A strema of land is about ¼ of an English acre.

Finance.—The financial affairs of G. seem to be in a state of hopeless bankruptcy. The kingdom started on borrowed capital, the three great powers of England, France, and Russia having guaranteed a loan of 60 millions of francs (£240,000), partly to indemnify Turkey and other creditors of G., and partly to assist agriculture and manufactures in their early struggles. The expenses of the court and government, the carelessness of officials, and the non-receipt of the taxes, have added to the embarrassment of the exchequer, so that at the present time the Greek treasury owes upwards of 330,000,000 dr., a third of which is due to the three powers, and the remainder to capitalists, principally in England.

Inhabitants (*Ancient Greece*).—Of the earliest inhabitants of ancient Greece we have no definite knowledge. The term *autochthones* (sprung from the soil itself—earth-born), which the Greeks applied to themselves, means no more than this, that the people had been there from time immemorial, and that future generations had not the means or the inclination to trace their origin any further back. At a very early period the population of G. was largely, if not entirely, composed of Pelasgians (q. v.). It is most probable that the Hellenes were only a branch of this great Pelasgian stock, but possessing more energy of character, they gradually spread themselves over the greater part of G., and supplanted the language and institutions of the Pelasgi by their own. Thus they became the ruling race, and gave their name to the country.—*Modern Greece.*—The population of modern G. is of a very mixed kind. In Ætolia, Acarnania, Thessaly, the greater part of Peloponnesus, and most of the islands, the descendants of the old Greeks are still predominant; but a very large admixture of Albanians (see ALBANIA) prevails in Attica, Bœotia, Phocis, and Argolis, with the islands of Spezzia, Salamis, Hydra, and Andro. The true Greek is easily recognised by his tall stature, slim body, aquiline nose, oval face, and moustache. Whiskers are not considered staid and respectable; the beard is worn only in mourning. The Greeks are uncommonly temperate both in eating and drinking, and in the indulgence of the passions generally; flesh is seldom eaten; the diet is principally vegetable. The Greeks are devotedly attached to their fatherland, and their love of liberty and independence is not less strong than it was in the days of Miltiades and Themistocles. Aristocracy is, in consequence, at a discount; and though they love and are loyal to a good ruler, yet they are easily roused into resistance by the infringement of their rights. Commercial bargains are the delight of the Greeks, and they often manage, it is said, to part with their wares at twice their value. This deceit they practise against the Turks especially. The Greek women are very plain. Early marriages are common in Greece. Greek matrons take great pride, like Niobe of old, in a numerous and beautiful offspring. But many of the children are cut off in infancy by the fevers which prevail so commonly. Two peculiar branches of the Greek race are—the Mainotes (from a district called *Maina*) of the Peloponnesus, and the Palikars of the north highlands. The former, who boast to be the descendants of the ancient Spartans, inhabit principally the mountain fastnesses of Taygetus, where for centuries they defied the power of the Turks. They resemble in their sturdy independence, feudal relations, robbing propensities, and other characteristics, the Highlanders of Scotland 150 years ago; but in recent times, education, intermixture with other races, and commerce, have to a great extent removed their distinctive peculiarities. The Palikars, that is, *Braves*, originally belonged to the northern parts of G.; but when Thessaly and other portions were by treaty left in the hands of the Turks, these hardy mountaineers chose to leave their ancient homes and settle in the new kingdom, to establish which they had shed their blood. The red cap, the white shirt, and the golden jacket, mark them out even to the casual observer as a separate class. They go about armed, and attended by armed followers; their houses are fortresses, and their servants form a little army. The islanders are almost all seamen or traders; they wear the red cap, a short jacket, and wide Turkish trousers. The Albanians form about a fourth of the population; they are a strong, hardy race, and engage in agricultural or other severe labour. They are the hewers of wood and drawers of water to the more wealthy classes. They speak a language which is little allied to either Slavonic or Greek. The Wallachs are a nomad and pastoral race; they sleep on the hillsides with their flocks, which are guarded by ferocious dogs. There are large numbers of Maltese at Athens, and the Piræus especially. There are few settlers from Western Europe. The Bavarians who swarmed into G. on the accession of King Otho have almost all disappeared.

Religion.—See the articles GREEK RELIGION (Ancient), and GREEK CHURCH.

Education (*Ancient*).—The education of the ancient Greeks was more of a physical than of a mental kind. The *gymnasium* was that of the athlete, not that of the *didaskalos* or preceptor. Young children were, till about their sixth year, trained at home under females, but were then sent to the *didaskaleia*, or schools under the charge of private tutors or pædagogi. The duty of the pædagogus was rather to keep his wards from outward injury and bad companions, than to teach them the accomplishments of grammar (including reading, writing, and arithmetic), music, and gymnastics, the favourite subjects of study in those days. In later times, the more intelligent slaves were specially trained for the duties of the pædagogus.—*Modern*.—Education of all kinds, from the humblest school to the university, is free to all. Hence an unusual number of Greeks press into the learned professions, and a large educational machinery is necessary to supply the demand for knowledge. There are about 370 communal or elementary schools, and 180 Hellenic schools, in which, among other branches, ancient Greek is taught. Besides these, there are—a military school; a polytechnic, for trades and professions; a lyceum; a normal school; an agricultural school; with seminaries for female education; and finally, there is the university of Athens, with four faculties—theology, philosophy, law, and medicine. All these institutions are well attended, and the youth of all ages are most zealous in prosecuting their studies.

Language (*Ancient*).—The Greek language is a branch of that widespread family of tongues, usually called Indo-Germanic or Aryan. It prevailed not only in the different parts of G., but also in the numerous Greek colonies which fringed the shores of the Euxine and the Mediterranean. But it must not be supposed that it was of the same type at all periods of Greek history, or in all parts of G., even at the same time. The three great branches of the Greek tongue were: 1. The Æolic, the oldest form, and that which presents the greatest affinity to the Latin and other members of the Indo-Germanic stock. 2. The Doric, a highland dialect, delighting in broad and rough sounds; it was spoken in the mountains of Thessaly, whence it travelled southward, and on the migration of the Dorians, took possession of the Peloponnesus. 3. The Ionic, a soft and vocal language, delighting in vowel sounds, and avoiding the harsh combination of consonants; it was spoken principally by the people of Attica and the Ionian colonies in Asia Minor. From it was made, by a series of contractions and modifications, that most perfect form of the Greek language, the *Attic*, which was neither so harsh and broad as the Doric, nor so soft and vocal as the Ionic. It was brought to the height of perfection by the poets, the philosophers, and the historians of G., whose writings still teach the world, and command its admiration. By the conquests of Alexander the Great, the Greek language soon spread over a large part of the then known world, but corruption at once set in—words of other languages were adopted into the Greek, foreign idioms were introduced, and the rigid syntax of the great Athenian writers was neglected, so that, in process of time, there arose a depraved form of speech, called the Hellenistic, varying in many essential points from its great parent. In this last form, the books of the New Testament were written. The process of deterioration still went on till about the middle of last century; when at length the spirit of the Greek nation again arose, and amidst other endeavours to revive the ancient glory of their race, an attempt was made, and is still being made, and that too with great success, to restore the purity of the language. This leads us to the *Language of Modern Greece*.—In different parts of Greece, different languages are spoken according to the element which predominates in the population. Thus Turkish prevails in some districts, Albanian in others, Wallachian in others, and Bulgarian in others; but in the greater part of Greece proper, the language is *Romaic Greek*, or as it is now more usually and more properly called, Neo-Hellenic. This language bears a very close resemblance to the Hellenic, or classical Greek; and in fact does not differ more, if so much, from the Attic, as the Attic differed from the Doric. Information on this subject must be sought in a grammar of the language. Great efforts have been made in recent years to purge the Neo-Hellenic of barbarisms and foreign terms, and it is now written with such purity, that good scholars in ancient Greek will have little difficulty in understanding Tricoupi's history or an Athenian newspaper.

Literature (*Ancient*).—The literature of Greece is a subject so extensive, that we cannot hope to give any adequate view of it in our limited space. Those who wish to study the matter further, must have recourse to a full treatise. Poetry seems to have been the earliest form of composition among the Greeks, as indeed it must of necessity be in all nations, for facility of recollection; hence *Memory* is called the *Mother of the Muses.* The earliest species of poems seems to have been hymns in honour of the gods; to these succeeded songs praising the glorious deeds of heroes; but the greatest poem of ancient times which has come down to us is the *Iliad* of Homer, detailing the events connected with the siege of Troy, and the warriors who took part in that famous expedition. The *Iliad* and *Odyssey* have been too long and too generally known and admired to need a word said in their commendation. The remarkable popularity of the Homeric poems produced a host of imitators; and hence we find that a great many poets endeavoured to rival the fame of the 'blind old man,' by narrating in verse the after-fate and vicissitudes of the heroes who took part in the war of Troy, or by treating of subjects allied to that of the *Iliad*, and even of mythological fables. These were called the Cyclic poets; they were posterior to Homer and Hesiod; their writings were put together in chronological order by some Alexandrine grammarians about 200 B. C. The Homeric period is closed by the name of Hesiod. Homer is supposed to have flourished about 900 B. C., and Hesiod about 850 B. C. Hesiod's most celebrated writings are the *Theogony*, the *Shield of Hercules*, and the *Works and Days*, an agricultural poem. Of his others, only small fragments are preserved. Epic poetry culminated in Homer, and with him and his contemporaries it sets. Of lyric poetry, there were two schools—the Æolic in Asia Minor and adjacent islands, especially Lesbos, and the Doric in Peloponnesus and Sicily. Of the Æolic school, the earliest poet was Callinus (700 B. C.); after him came Archilochus, so famed for his cutting satires, written in iambic verse; Tyrtæus, and Simonides of Amorgos, who contests with Archilochus the honour of having invented iambic verse. Alcæus and Sappho (about 610 B. C.) represent the Æolic school in its perfection. Nor must we forget the school-boy's favourite, Anacreon (about 520 B. C.), to whom, however, are attributed many pieces which are not considered genuine. Of the Doric or choral school, it may suffice to mention Alcman, Stesichorus, Arion, Simonides, Bacchylides, and greatest of all in every known variety of choral poetry, Pindar (q. v.) the Theban (522 B. C.).

Greek literature reached its highest perfection in the tragedies of Æschylus (born 525, died 456 B.C.); Sophocles (born 495, died 405 B. C.); and Euripides (born 480, died 406 B. C.). The writers who endeavoured to follow in the track of these three great masters were of far inferior merit, and with them tragedy degenerated to the effeminacy of lyrical songs and mere rhetorical bombast.

Comedy, like tragedy, took its origin from the worship of Bacchus. The three great names of the old Attic comedy are Cratinus, Eupolis, and Aristophanes (born 452, died 380 B. C.). In middle comedy, we have the names of Antiphanes and Alexis; and in new comedy, Philemon and Menander.

History did not engage the attention of the Greeks till a comparatively late period. Passing over the names of Cadmus of Miletus, Pherecydes of Scyros, Hecatæus, and Charon of Lampsacus, we come to Herodotus, the Father of History, or, as he has been called, the Homer of History, who flourished about 440; Thucydides, about 430; and Xenophon, about 400. In later times, we find Polybius (204—122 B. C.); Dionysius of Halicarnassus, who flourished about 20 B. C.; Diodorus Siculus, a contemporary of Julius and Augustus Cæsar; Plutarch; Appian (in time of Hadrian and Antoninus Pius); Arrian (time of Hadrian); and Dion Cassius. In geography, we have Strabo and Pausanias. In satire, the palm is carried off by Lucian (q. v.). In oratory, it may be sufficient to mention the names of Antiphon (born 480 B. C.), Andocides (467 B. C.), Lysias (458 B. C.), Isocrates (436 B. C.), Æschines, the great rival of Demosthenes (389 B. C.), Hyperides; and last and greatest of all, Demosthenes (385 B. C.). On the philosophers, see PHILOSOPHY.

Literature (*Modern*).—The literature of modern G. is still in its infancy. No work of importance appeared previous to the revolution; but since the establishment of the kingdom in 1829, more life has been infused into the men of a literary bent. The names of the brothers Panagiotis and Alexander Soutsos are well known to many in England. They have written dramas, love-songs, novels, lyrics, and a poem (by Alexander) in the style of Byron's *Childe Harold*, detailing the wanderings, sights, and adventures of a Greek in France and Italy. In most of these there is much merit, though few readers can fully appreciate the style and handling. Among dramatic writers, Neroulos, Rangavis, and Charmouzis hold a foremost place. The *Memoirs of Different Battles fought between the Greeks and Turks from* 1820 *to* 1829, by Perrævos, is a well written book. In grammar and lexicography, Bamvas, Gennadios, Scarlatto Byzantino, and others have done good service to the cause of learning. But of all the Neo-Hellenic works yet published, the *History of the Greek Revolution* by Tricoupi is the most valuable—valuable not only for its statement and facts, but also for the purity and elegance of its style. Many newspapers and other periodicals, in Neo-Hellenic, are published at Athens, Constantinople, London, and elsewhere; but the expense of these literary efforts is in most cases borne by wealthy Greek merchants, now so frequently met with in the west of Europe. It will require many years of good government, of national industry and prosperity, before G. can expect to assume that position in the world of letters which the prestige of her name entitles her to anticipate.

History (*Ancient*).—The early history of G. is lost in the mist of ages. The legends of gods and heroes, which constitute her only approach to history, are of that marvellous kind in which a superstitious and ignorant age delights. But how much truth may underlie the stories of Cecrops, Cadmus, Danaus, Theseus, Heracles, and many others, it is difficult to say; or to what extent the events of the Argonautic expedition, Trojan war, hunt of the Calydonian boar, and other joint-stock exploits, may be real, historians can never hope to discover. The heroic age is roughly estimated as continuing from 1400 to 1200 B. C.; but all Greek chronology is mere guess until the first Olympiad, 776 B. C. Of the migrations which took place during these early days, and of the numerous colonies planted by the Greeks, it is unnecessary to speak in this brief sketch; nor can we do more than merely refer to the wars of the Spartans against the Messenians, which beginning in 743 B. C., did not ultimately terminate until Ithome was destroyed in the third Messenian war, 455 B. C. Meantime, wars of less magnitude are carried on in different parts of Greece; Solon legislates at

Athens (594 B.C.); Pisistratus and his sons enjoy the 'tyrannis' at Athens from 560 B.C. to 510 B.C.; Crœsus, king of Lydia, and Cyrus the Great, his conqueror, are brought into contact with the Asiatic Greeks (560—542 B.C.). And now, in 499 B.C., the burning of Sardis by the Athenians and Ionians leads to those three invasions of G. by the Persians which end so gloriously for G., and so disastrously for Persia, and with the particulars of which all are so well acquainted. The first, under Mardonius, in 492 B.C., is averted by the shipwreck of the invading fleet off Mount Athos; the second, under Datis and Artaphernes, in 490 B.C., is hurled back from Marathon; and the third, under Xerxes, 480 B.C., is utterly shattered at Thermopylæ, Salamis, and Platæa. G. is now a mighty name, but the Athenians become the ruling state, and their supremacy continues till 404 B.C. Meantime, disunion at home succeeds the contests with foreign enemies. The great Peloponnesian war begins in 431 B.C., and wastes the energies of G. for 27 years, until the subjugation and partial demolition of Athens, in 404 B.C., put an end for a time to the fratricidal struggle. It was in 415 B.C., the 17th of this war, that the famous and unfortunate expedition to Sicily took place. Under Pericles, who was the ruling spirit of Athens at the commencement of the war, but who died of the great plague in 429 B.C., the Athenians reached the highest pitch of excellence in sculpture and architecture; then were raised some of those wondrous buildings whose remains still excite the admiration of posterity at a distance of more than 2000 years. In 401 B.C., the expedition of Cyrus the Younger to dethrone his brother Artaxerxes, took place; the battle of Cunaxa, in which Cyrus was slain, was fought in the same year. Cyrus had employed Greek mercenaries, and this brief war is specially famed for the masterly retreat of the 10,000 Greeks under Xenophon the Athenian in 401—400 B.C. The next year (399 B.C.), Socrates the philosopher, the teacher of Plato and Xenophon, was put to death. After the defeat of the Athenians in the Peloponnesian war, the Spartan state became the leading power in G., and was engaged in four wars in succession—1st, the Elean (399—398 B.C.); 2d, the Corinthian (395—387 B.C.); 3d, the Olynthian (380—379 B.C.); 4th, the Theban (378—362 B.C.). The great Spartan hero of these troublous times was Agesilaus, whose panegyric has been written by Xenophon with a friendly pen. During these eventful years were fought the battles of Coronea and of Corinth (394 B.C.), Orchomenus (375 B.C.), Leuctra (371 B.C.), Mantinea, in which the Theban hero, Epaminondas, was slain, 362 B.C. In 359 B.C., Philip ascends the throne of Macedonia, and a few years afterwards finds occasion to intermeddle in the affairs of Greece. Some of the allies of Athens renounce his supremacy, and thus arises the Social war (357—355 B.C.), in which Athens loses many of her tributaries, and much of her revenue. The Sacred war (355—346 B.C.) immediately follows, in which Philip takes part. About this time (352 B.C.), Demosthenes delivered the first of those powerful orations against Philip, called Philippics. In the battle of Chæroneia (338 B.C.), the Athenians and Thebans are utterly defeated by Philip; and at the congress of Corinth, in the following year, he is appointed generalissimo of the Greek forces against Persia. But the hand of the assassin cut him off at a marriage-feast in Macedonia; and after an unsuccessful revolt against his son Alexander, the Greeks are compelled to bestow upon the youthful hero the same high military office with which they had intrusted his father. The events of Alexander's career are well known. From this time G. becomes an appanage of the Macedonian kingdom, until Macedon is in turn overcome by the Romans. During the wars which arose among the successors of Alexander, G. was always the bone of contention; she suffered in consequence many hardships, and enjoyed but few lulls of peace. The last struggle for Grecian liberty was made by the Achæan League (a confederacy of cities at one time embracing all Peloponnesus, which had a common object, a common council, and a common chief or *strategus*), but it too fell before the conquering arms of Rome; and after the capture of Corinth in 146 B.C. by the consul Mummius, the once mighty G. became a province of the Roman empire.

History (*Modern*).—The history of G. for some centuries after the capture of Corinth belongs to the history of her conqueror. The Roman wars with Antiochus, Mithridates, and others, involved G. in countless hardships; and the fierce struggles of Cæsar and Pompey, of Brutus and Cassius with Antony and Octavianus, of Antony and Octavianus, of which G. was often the theatre, entailed upon her many calamities. For nearly two centuries after the accession of Augustus, G. enjoyed comparative tranquillity, during which Christianity spread among her people, churches were founded, and many devoted Greeks went abroad to strange lands and perilled their lives in the propagation of the Gospel. But dark days again awaited her, and successive inroads of Slavonians, Albanians, and other barbarous hordes, overran the country from the wintry plains of the north. When Constantine divided his empire, G. was attached to the eastern portion; but when, in 1204 A.D., the Venetian fleet under Dandolo overpowered the rickety throne of the Cæsars, G. too changed masters. The Osman Turks, who migrated to Europe in 1355 A.D., and made themselves masters of Thrace, Macedonia, Thessaly, and other parts, captured Constantinople in 1453 A.D.; and from that time until recent years, G. was subject to Mohammedan dominion. All the annoyances that ignorance, brutality, tyranny, and greed could suggest, were practised by the Turks on the much enduring Greeks, but at length human nature could no longer endure, and in 1820 broke out that rebellion against Turkish rule, which, by the bravery and determination of the Greeks, and the friendly countenance of Christian Europe, ended in the establishment of G. as an independent kingdom in 1829. Two unsuccessful attempts at rebellion had been made in 1770 and 1790. Capo d'Istrias, the first president of liberated G., was assassinated in 1831; and after several candidates for the throne of the infant kingdom had been proposed and rejected, Otho, second son of the king of Bavaria, was at length (1832) chosen by the three powers (Britain, France, Russia) which had assisted G. in her noble struggle. The reign of Otho was not a peaceful one, and he had very serious difficulties to contend with after he had assumed the reins of government in 1835. But his rule has not been altogether devoid of fruit; and law and order, industry and commerce, literature and notions of self-government, have made considerable strides within the last thirty years. On the banishment of Otho in 1862, the crown was offered to Prince Alfred of England. The agreement between the protecting powers, however, stood in the way of his election, and the present king, Georgias I., son of Christian IX. of Denmark, became king of the Hellenes in 1863.

Population.—The population of ancient G. at any one time it is quite impossible to approach; conjectures of the most wild and opposite kind have been hazarded, but it is useless to repeat them.

Of modern G., the inhabitants numbered, in 1871, 1,457,894.

The Islands.—The islands of the Ægean Sea may be comprehended, as in ancient times, under two groups—the Cyclades and the Sporades. The former were so called from the legend of their *circling* round Delos, when that island was rendered stationary for the birth of Diana and Apollo. The latter receive their name from the circumstance of their being *scattered* or *sown* in an irregular manner round the coasts of the adjoining countries. The following list contains those belonging to G.; the first 20 are the Cyclades proper, the remainder lie off Eubœa. The Italian names are in parentheses. The Sporades will be given under TURKEY. The Ionian Islands, formerly a republican dependency of Great Britain, were annexed to Greece in 1864.

1. Delos with Rhenea (Dili); 2. Syros (Syra); 3. Myconos (Mycono); 4. Tenos (Tino); 5. Naxos (Naxia); 6. Andros (Andro); 7. Ceos (Zea); 8. Cythnos (Thermia); 9. Seriphos (Serpho); 10. Siphnos (Siphanto); 11. Cimolos (Argentiera); 12. Melos (Milo); 13. Pholegandros (Policandro); 14. Sicinos (Sicino); 15. Ios (Nio); 16. Thera (Santorin); 17. Anaphe (Nanfio); 18. Amorgos (Amorgo); 19. Paros (Paro); 20. Oliaros or Antiparos (Antiparo): 21. Scyros (Scyro); 22. Sciathos (Sciatho); 23. Scopelos (Scopelo); 24. Icos (Chiliodromia). Besides these, there are many smaller islands and barren rocks, which belong to G., but which from their unimportance scarce deserve mention. These islands possess many of the features which mark the mainland: the climate is varied; the soil is in one fruitful, in another barren; the productions are much the same as in G., except that in some of them, as Santorin, the vine grows in greater variety and luxuriance; the population is more primitive, and less mixed, and consequently retain more pertinaciously the customs of their forefathers. The islanders are generally more industrious and more happy than the continentals—the sea is their highway, and they can more easily get a market for the fruits of their industry. The islanders are excellent seamen, and a very large proportion of the males are employed in navigation. Delos is now little more than a barren rock; and scarce a vestige remains of the temple of the Sun-god, or other memorial of its former religious and commercial pre-eminence.

Syra (population 21,000) is the principal port of G., and a great centre of trade. The Mediterranean steamers call at it. Wine is almost the only production of the island.

The people of Tenos are famed for the manufacture of marble tables, chimney-pieces, &c., which are largely exported, and the finest Malvasian or Malmsey wine is produced in the island. Of the other islands, the most volcanic is Thera; it produces in large quantity the wine called *Vino Santo*, or Santorin, of which the Russians are specially fond. Naxos is the largest and most beautiful and most fertile of the Cyclades. These islands comprise an area of rather more than 1000 square miles, and a population of (1871) 123,299 souls. The Cyclades are generally high and rocky in their coasts, and all are of a very similar aspect in this and other regards.

GREEK CHURCH, THE, taken in its widest sense, comprehends all those Christians following the Greek or Greco-Slavonic rite, who receive the first seven general councils, but reject the authority of the Roman pontiff, and the later councils of the Western Church. The Greek Church calls itself 'the Holy Orthodox Catholic and Apostolic Church,' and it includes three distinct branches—the church within the Ottoman empire, subject directly to the patriarch of Constantinople; the church in the kingdom of Greece; and the Russo-Greek Church in the dominions of the czar. The last shall form the subject of a separate article, but it must also be alluded to in treating of the sister-churches. The proper history of the Greek Church as a separate body dates from the commencement of the Greek schism, or rather from the commencement of the efforts on the part of the church of Constantinople to establish for itself a distinct jurisdiction, and an independent headship in the eastern division of the empire. The ecclesiastical pre-eminence of Constantinople, it need hardly be said, followed upon the political distinction to which it rose as the seat of the imperial residence, and the centre of the imperial government. Originally, Byzantium was but a simple episcopal see, subject to the metropolitan of Heraclea; but the rank of the see rose with the fortunes of the city; and before the close of the 4th c., a canon of the first council of Constantinople, held in 381, assures to it, on the ground that 'Constantinople is the new Rome,' the 'precedence of honour' next after the ancient Rome. This privilege, however, was purely honorary, and did not imply any pre-eminence of jurisdiction in the see of Constantinople, and there are many early instances in which questions arising within the district which afterwards became the patriarchate of Constantinople, nay, questions affecting the bishop himself, and even in his relations to the other patriarchs, were referred to the bishops of Rome. But the transition was not difficult, and was aided by the eminent qualities of some of the bishops, and especially of St John Chrysostom, so that in the council of Chalcedon (451), a decree was passed, which confirmed the precedence already given, and not only assigned to Constantinople an extensive range of jurisdiction, but also grounded these ecclesiastical privileges, in the case of the new as well as in that of the old Rome, upon the political precedence to which both successively had risen. The Roman legates protested against this canon, and the claim led to a misunderstanding between the two churches, which was widened and confirmed by the doctrinal differences which prevailed on the Eutychian question, in which the patriarchs of Constantinople gave their support to the *Henoticon*, a heterodox or equivocal formula put forth by the Emperor Zeno, which was warmly resisted in the West. The pope, in consequence, in 484, excommunicated the emperor, together with the patriarchs of Constantinople and Alexandria; and thus the East and West were, *de facto*, separated for a period of nearly forty years. The terms upon which the excommunication was withdrawn by Pope Hormisdas in 519, involved a complete and explicit acknowledgment of the supremacy of the Roman pontiff; but the rivalry of Constantinople still subsisted. In the end of the 6th c., the Trullan Council (see TRULLAN COUNCIL) caused a renewal of the misunderstandings. Many circumstances combined to hasten a rupture: the title of 'Ecumenical patriarch' claimed by the patriarch John the Faster, and reprobated by Gregory the Great (see GREGORY I.); the contests about image-worship, in which the patriarchs, in more than one instance, took the part of the iconoclast emperors; the abandonment by the emperors of the defence of Italy against the Lombards; the gradual growth of an independent confederation of Italian states, and ultimately the foundation of a new empire of the West, the political antagonism of which with the eastern empire almost necessarily involved an antagonism of the churches themselves. Hence when, upon occasion of his own personal contest with the see of Rome, the deposed patriarch Photius (862), (see PHOTIUS) identified his cause with that of the Eastern Church, he found a ready sympathy among his countrymen. The Latin doctrine of the twofold procession of the Holy Ghost, and the addition of 'Filioque' to the Latin creed, the Latin practice of clerical celibacy, and of denying to priests the power of administering confirmation, supplied the grounds of quarrel; and although the Photian schism fell with its author, and the communion of the churches was restored, their reconciliation was imperfect and far from cordial. The same causes of controversy, with others of a disciplinary nature, were renewed in the 11th c.; and in 1054 the pope Leo IX. issued a formal sentence of excommunication against the patriarch Michael Cerularius, which was solemnly published in Constantinople by the papal legates. Beyond the points of difference alleged by Photius, the most important of the new grounds of division was the use of unleavened bread by the Latins in the eucharist. Since that time, the separation has been perseveringly maintained. More than one attempt was made by the authorities upon either side to restore the former relations of the two churches, but in vain. The old antipathies of East and West became more inveterate by the separation; and the occupation of Constantinople by the Latins (1201), the outrages and atrocities by which it was disgraced, the establishment of the Latin kingdom at Constantinople, and the arbitrary tyranny by which it was maintained, widened still more the ancient estrangement. Nor was the breach healed by the re-establishment of the Greek empire (1261). The emperors, from political motives, pressed on all sides by the fears of foreign invasion and the embarrassments of domestic discontent, proposed, as the price of the assistance of the West in their necessity, the restoration of the Eastern Church to the obedience of Rome. Michael Paleologus (see MICHAEL PALEOLOGUS) by his ambassadors abjured the schism at the council of Lyons in 1274; and endeavoured, by a synod held subsequently at Constantinople, to obtain a ratification of the union; but he failed to gain the assent of the body of bishops; and in the succeeding pontificate, the breach was even more seriously renewed, by two synods held at Constantinople in 1283 and 1285. The necessities of John Paleologus compelled him once again to resort to the same expedient; and the negotiations for union were on this occasion conducted with much more deliberation. Delegates of the Greek Church, with the patriarch of Constantinople at their head, attended at the great Western Council (1437) of Ferrara (better known, from the place of its close, as that of Florence), and a protracted discussion took place, the chief points of which were the procession of the Holy Ghost from the Father and the Son, the addition of 'Filioque' to the creed, the nature of the purgation of souls after death, the use of unleavened bread in the eucharist, and the supremacy, by divine right, of the Roman pontiff. On all these points, the Greek delegates, with the exception of Mark, Bishop of Ephesus, subscribed the decree of the council; but this union was equally short-lived. On the return of the delegates to Constantinople, their proceedings were repudiated by the large body of the Greeks; and the downfall of the Greek empire and capture of Constantinople by the Turks in 1453, obliterated every trace of the attempted reconciliation. Since that time, some isolated bodies of Christians of the Greek rite have joined the church of Rome (see UNITED GREEK CHURCH); but every attempt at a general union on the part of the Roman pontiffs has proved a failure. It has been the same with the attempts which have been made by the Protestant communions to establish an understanding with the Greek Church. Very early after the Reformation, a letter was addressed by Melancthon to the patriarch Joseph of Constantinople through a deacon, Demetrius Mysus, who visited Germany in the year 1558. Another Lutheran embassy of a more formal character, headed by the well-known Tübingen divines, Andreæ and Crusius, visited Constantinople during the patriarchate of Jeremias (1576—1581). But both missions were equally without result. In the following century, the celebrated Cyril Lucaris (see LUCARIS), who had been educated in the West, and had carried home with him a strong, though for a time carefully concealed bias towards Protestantism, opened the way for negotiations with the Calvinistic party. Soon after his elevation to the patriarchate, he issued a decidedly Calvinistical confession of faith (1629). But far from carrying his fellow-churchmen with him in the movement, the innovations which he attempted not only led to his own deposition and disgrace, but called forth a doctrinal declaration signed by the patriarchs of Constantinople, Alexandria, and Antioch, and many metropolitans and bishops, which, by the clearness and decision of its definitions, draws the line so markedly between the Greeks and reformers as to shut out all possibility of accommodation in matters of doctrine. This exposition was adopted by all the churches; and in a synod held in Jerusalem 1672, it was adopted as the creed of the Greek Church. This declaration having been originally drawn up by Magilas, metropolitan of Kiew, it was published in 1722, by order of Peter the Great, as an authorised formulary of the Russian Church, under the title of *The Russian Catechism*. With a few exceptions, to be specified hereafter, it coincides with the formularies of the Roman Catholic Church.

The Greek Church comprised within its ancient limits, anterior to the Mohammedan conquest, Greece properly so called, the Peloponnesus, Eastern Illyricum, the Islands, and Asia Minor, as also Syria and Palestine, Arabia, Egypt, and parts of Mesopotamia and Persia. But with the first triumph of the Koran, the church of Constantinople by degrees lost almost all her territory in Asia and Africa; and since the conquest of the Turks, it has sunk into the condition of a weak and oppressed dependant. By the separation of the Russian branch, partially in the 17th, and finally in the beginning of the 18th c., and by that of the new kingdom of Greece, on occasion of the revolution, its importance has been still more diminished. Each of the three divisions into which it has separated possesses a distinct organisation; but as the faith and practice of all are substantially identical, we shall first give a brief account of the doctrines of the Greek Church, especially in their relations to the Christian communions of the West, and to the controversies by which they are separated from each other.

In general, it may be inferred from the fact that the Greek Church receives the first seven councils, that on all the controversies regarding the Trinity and Incarnation the Greeks are agreed with the Western Catholics, with the sole exception of the double procession of the Holy Ghost, in which they are at issue not only with Catholics, but it may be said with the entire body of Western Trinitarians. While they reject the papal claim to supremacy and doctrinal authority, they agree with Catholics in accepting as the rule of faith not alone the Bible, including the Deuterocanonical books (see Synod of Jerusalem in Harduin's *Coll. Concil.*, xi. col. 258), but also the traditions of the church, that is, what are believed to be, the unwritten revelations of our Lord and of the apostles, preserved by the testimony of the Fathers, among whom they regard with special veneration

Basil, Gregory of Nazianzum, and Chrysostom. They admit the seven sacraments as received by the Roman Church—viz., Baptism, Confirmation, Eucharist, Penance, Extreme Unction, Holy Orders, and Matrimony; but in the rites used by them in the administration of these sacraments there are considerable discrepancies from the Latin rite. They administer baptism by a triple immersion; confirmation is administered in immediate connection with baptism, even in the case of infants, and it is administered by priests, and not, as among the Latins, by bishops exclusively. As to the eucharist, the Greeks admit the real presence of Christ, the transubstantiation of the elements, the propitiatory sacrifice, and (although this has been denied by Protestants) the adoration of the host (see Renaudot, *Liturg. Collectio*, i. pp. 22, 23). But they differ from Catholics in the use of leavened bread, in administering the communion in both kinds, and in administering it in this form even to children. In the sacrament of penance, they recognise, like the Western Catholics, auricular confession, priestly absolution, and penitential works; and although they differ from the Latins as to the use of indulgences, they admit the principle upon which their use is founded, and even their applicability to the dead. The peculiarities of their use of extreme unction have been already detailed. See EXTREME UNCTION. In the sacrament of holy orders, they have many peculiar observances. See ORDERS, HOLY. The most striking point of difference regards clerical celibacy. The Greek Church recognises the excellence of virginity, and the fitness of its observance by those engaged in the ministry, so far as to prohibit marriage altogether to bishops (who are always chosen, in consequence, from the monastic, and not the secular clergy); to forbid priests or deacons to contract marriage after ordination; to forbid to all, without exception, a second marriage, or marriage with a widow; and to require of married priests that they shall live separate from their wives during the time when they are actually engaged in church services. But they not only permit married candidates to be advanced to deaconship and priesthood, but even require, as a general rule, that they shall be actually married before they can be admitted to orders. While admitting marriage to be a sacrament, they hold it to be dissoluble in case of adultery, and they regard fourth marriages as utterly unlawful. On the condition of souls after death, they do not admit with Western Catholics a purgatorial fire, but they admit the principle of the intermediate state of purgation, and of the practice of prayer for the dead. They also admit the intercession of saints, and the lawfulness of invoking them, especially the Holy Virgin Mary, and of honouring their shrines and relics. They do not permit the use of graven images, with the exception of that of the cross; but they freely receive and pray before pictures, which they hold in high honour, and on which they lavish the most costly ornaments of gold, jewels, and other precious things. In their belief of the merit of good works, and especially of fasting, they go even further than Roman Catholics. Besides four yearly fasts—the forty days of Lent, from Pentecost to the Feast of Saints Peter and Paul, the fifteen days before Assumption day, and the six weeks before Christmas—they observe the Wednesdays and Fridays throughout the year as fasts. Their liturgy shall be described hereafter (see LITURGY); for the present, it will be enough to say that, in splendour of ceremonial, they are not inferior to the Westerns. Instrumental music, it is true, is forbidden in the churches, but singing is universally in use. In public prayer, the kneeling posture is used only at Pentecost; at ordinary times, they stand, the body being turned towards the east. The use of the sign of the cross is habitual among them. The monastic institute has subsisted in the Greek Church from the earliest times, and numerous convents of both sexes are dispersed over the east, which follow almost exclusively the rule of St Basil. The abbot is called Hegumenos, the abbess, Hegumené; if several convents be subject to a single abbot, he is called Archimandrite. Both monks and nuns are bound by vows of celibacy. With both, the duty of manual labour is a leading observance; the nuns, like their Western sisters, apply themselves to the care of the sick, and to the education of young females.

As regards the separate constitution of the three great sections of the Greek Church, it will be enough to say that the church in the Turkish empire has remained subject to the patriarch of Constantinople, who from the beginning enjoyed a continued but precarious protection from the sultan, and even held, as regarded his own flock, a civil pre-eminence, with the rank of a 'pasha of three tails.' But in return for this civil status, the Porte claimed the right of appointing and also of deposing the patriarch, a right which was habitually exercised as a matter of purchase and sale, and which led to the grossest simony, not only as to the patriarchate, but in the entire ecclesiastical system. Formerly, the metropolitan of Russia (afterwards patriarch) was subject to the patriarch of Constantinople, as also the bishops of the modern kingdom of Greece; but both churches are now independent of Constantinople. The patriarch of Constantinople, Jeremias II., in the year 1589, consented to the creation of a separate but dependent patriarch; and this dependence continued until the time of Peter the Great, by whom the patriarchate was first supended and afterwards abolished, the Russian church being now governed by what is called the Holy Synod, an ecclesiastical commission appointed by the czar. The independence of the church of the kingdom of Greece dates from the revolution. The 'organic law of Epidaurus,' of January 1822, proclaimed the Oriental Orthodox Church as the church of the state, and soon afterwards measures were taken to organise this church in the new kingdom. For a time, the patriarch of Constantinople hoped to preserve his ancient authority; but the president of the new state, Capo d'Istrias, firmly resisted, and, after many preliminaries, the new church was formally organised by a decree of July 15 (27), 1833, on a plan in great part borrowed from the constitution of the Russian Church, as settled by Peter the Great. The governing body in the church of the kingdom of Greece is, as in the Russian, the so-called 'Holy Synod,' which consists of five members, who are ordinarily archbishops or bishops, but may also admit into their number one or two priests or monks. This synod is the supreme ecclesiastical tribunal, and in name at least is independent in spirituals; but as its members are all named by the crown, and hold office but for a year, it is practically a state instrument; moreover, two officials of the crown have a right to assist, although without a vote, at all its deliberations. The synod elects bishops, but the crown has the right of confirming and granting investiture. To it also belongs the power of regulating the limits of dioceses, and all such general arrangements. The last remnant of subjection to Constantinople was removed by a formal recognition of independence in 1868, and the bishops no longer seek consecration from the patriarch of that see. In 1869, a correspondence took place between the archbishop of Canterbury and the patriarch, with a view to the union of the Anglican and Eastern churches. In the same year the government of Russia abolished the hereditary character of the Russo-Greek priesthood. The Russo-Greek church is believed to number about 55,000,000. The church of Greece comprehends a district of about 880 sq. m., and numbers about 800,000 members.

The United Greek Church comprehends those Christians who, while they follow the Greek rite, observe the general discipline of the Greek Church, and make use of the Greek liturgy, are yet united with the Church of Rome, admitting the double procession of the Spirit and the supremacy of the Roman pontiff, and accepting all the doctrinal decisions subsequent to the Greek schism which have force as articles of faith in the Roman Church. The United Greeks are found chiefly in Southern Italy, in the Austrian dominion, in Poland, and in the Russian empire. In Italy, they are computed at 80,000; in Austria, at about 4,000,000; and in Poland, about 250,000. In Russia, it is difficult to ascertain their number. It has fallen off considerably in late years. In Austria, they are divided into Romanians and Ruthenians—the former being settled in Wallachia, Transylvania, and Eastern Hungary; the latter, in Little Russia, Galicia, and North-eastern Hungary. The union of the Greek Christians of Wallachia and Transylvania dates from the end of the 12th c.; and although the Reformation made some progress among them, they still for the most part remain true to the union. The union of the Galician Greeks or Ruthenians is of much later date, about the close of the 17th century. It is only necessary to add that the usage of the United Greek Church as to the law of celibacy is, with the consent of the Roman pontiffs, the same as among the other Greeks. They are also permitted to administer communion under both kinds.

GREEK-FIRE, a composition supposed to have been of nitre, sulphur, and naphtha as a principal ingredient, with which the Greeks of the Byzantine empire were wont to defend themselves against their Saracen adversaries. The accounts of its effects are so mingled with obvious fable, that it is difficult to arrive at any just conclusion as to its power; but the mixture appears to have been highly inflammable, and to have possessed the power of burning under water. It was projected either on blazing tow, tied to arrows, or through a tube, the precursor of cannon. Wherever the combustible fell, it made great havoc, from the inextinguishable nature of the fire. The invention of this material has usually been ascribed to Callinicus of Heliopolis, and the year 668 A.D.; but there seems to be reason to believe that it was rather imported from India. At Constantinople, the process of making Greek-fire was kept a profound secret for several centuries. The knowledge, however, of its composition gradually spread; and at the time of the discovery of gunpowder, Greek-fire formed a recognised defensive element in most wars from Western Europe to Asia Minor. Subsisting for some time concurrently with gunpowder, it gradually died out before the advances of that still more effective competitor, till now little vestige remains of Greek-fire beyond a Norman corruption of its name in our firework 'cracker,' which, derived from 'Creyke' of the middle ages, is but a corruption of 'Grecque.' See also Firearms.

GREEK MUSIC. The existence of music as an art or science among the ancient Greeks has for hundreds of years been a subject of inquiry and discussion among the learned. With the restoration of the arts and sciences at the end of the middle ages, the veneration for all that belonged to that people was carried to such an extent, that because we had to thank them for much, many writers thought we must be obliged to them for all. Fortunately, we have handed down to us various dissertations and fragments on music by old writers, which, although they do not unfold to us anything like a satisfactory view of the ancient Greek music, yet suffice to shew us that among the ancient Greeks the art of music was in a very imperfect and incomplete state, and that, in its elements and groundwork, it was entirely a slave to poetry, and can have been little else than a kind of intoned declamation. We hear from ancient writers of the magic influence of music; but we must not forget that they used the word music in a collective sense for the gift of the muses generally; and when they spoke of the elevating and moral effects of music, it is to be understood that they meant a general harmonious cultivation of the arts and sciences. The system of music known to the ancient Greeks, and as practised in their temples and theatres, differed essentially from our modern music, as their scale, or succession of sounds, was not based on the octave and its repetition, but on a fourth and its repetition. Their scale consisted of five tetrachords, each containing four consecutive sounds; the last sound of one tetrachord being always the first of the next; while two of their tetrachords had more than one sound in common. In modern music, the ancient Greek scale would be as follows: B, C, D, E; E, F, G, A; A, B♭, C, D, &c. This they called the diatonic genus. They had also their chromatic genus, thus, B, C, D♯, E; E, F, G♯, A, &c.; and their enharmonic genus, the tetrachords of which consisted of two quarter-tones (which cannot be expressed in modern music) and a major third. It is beyond a doubt that the ancient Greeks neither possessed a system of notation by which their music, such as it was, might have been preserved, nor had they any idea of harmony in the modern sense of the word. Many believe it impossible that a people who have left us specimens of their poetry and sculpture, which, after 2000 years, are still admired as masterworks, could have been content with such an imperfect and clumsy system of music. Had it been otherwise, it is scarcely possible to imagine that the knowledge of it would not have been handed down to us. An ode by Pindar, and a hymn or two set in modern notation from an old Greek MS., is the whole we possess of ancient Greek music, and those are said by many to be spurious.

GREEK PHILOSOPHY. See Philosophy.

GREEK RELIGION (Ancient), the most poetical and most humane of polytheisms, presents itself in historical times as a plastic worship of nature, with its visible objects and its invisible powers; of abstract notions, sensations, propensities, and actions; of tutelary Numina, household or family gods; and of exalted men or heroes. Composed of such widely discordant elements, this great Hellenic Pantheon offers yet a unity so harmonious and consistent in its minutest parts, that its origin is even more difficult to trace than that of the people itself, which, from a conglomeration of heterogeneous races and tribes was fused in an incredibly short space of time into one great family of equal propensities and of equal gifts. This question of the origin of the Greek religion has indeed been a point at issue from the time of Herodotus to our own. While he, together with many others, pronounced it to be almost completely an importation from Egypt, a strong autochthonic school held it to be homesprung; and these two antagonistic views—the East and Hellas—have, in a more or less modified form, found their foremost representatives in modern days, in Creuzer on the one side, and Otfried Müller on the other. The new and all-important science of Comparative Mythology, however, may be said to have set this point at rest; for it proves almost to demonstration, that the fundamental ideas of the Greek religion are due to the regions north-west of India, the cradle of the main Hellenic stock (see ARYAN RACE); while subsequent colonists introduced additional gods from Phœnicia, Egypt, and other parts of the East. All these, with the host of personified fancies and ideals begotten by the poets at home, were soon amalgamated into one great system. Yet those foreign elements, so far from detracting from the originality of the Greeks, shew in a still stronger light what brilliancy of conception and power of imagination, what harmony and plasticity, had fallen to the share of the inhabitants of Hellas; a land which in itself, by the immense variety of glorious scenery of sea and sky, wood and mountain, river and bay, rock and island, contributed not a little to quicken that immortal youthfulness by which they were so aptly and strikingly called throughout the East the people of Yavan (Sanscr. *Yuvan* = *Juvenis* = *Young*). The gods, from the moment they touched these shores, from dead symbols became living realities, with all the qualities and sensations, aims and actions, of a living individuality, and that of the highest, most noble, and divine frame existing—man. Anthropomorphism, indeed, is the chief characteristic of Greek religion. The brute creation—which to the East was something to be exalted, and to be adopted as the type of divinity—furnished the Greeks only with a few attributes for their humanly shaped gods. But man, the ideal of creation, was deficient in one thing:—the duration of his life was limited—and in this the gods differed from him: they were immortal. In all other respects, they were like himself: they loved and hated, they 'transgressed' and suffered. No ideal moral code existed with the Greeks, the first essentially ethical people though they are; consequently, their gods, when they could not attain the objects of their many and strong desires in a straightforward manner, had unscrupulous recourse to stratagem and cunning, and through their questionable practices, not unfrequently brought themselves into very undignified positions. And yet the influence of such unworthy conceptions of the gods was not so detrimental to the believer as at first sight might be supposed; for the Greek deities were not to be patterns for humanity: they were, through their mighty origin, their almost unbounded powers, and their immortality, exempt from the ordinary laws which must rule the dealings in the commonwealth of low, weak, dying humanity. They were a kind of exalted aristocracy, who could not be judged by a human standard, much less be imitated by human beings; and, after all, even they had to submit to a supreme fate (*Moira*), which found out their guilt, and punished it. The mortal, however, was subject to them individually; and it was his special province to fulfil the duties of piety and modesty towards them, of righteousness and justice towards his equals. On this condition alone, the undisturbed enjoyment of life with all its most glorious gifts was his. Retribution for evil doings followed, with rare exceptions, speedily and irrevocably, on the earth he trod, not at some future period or in other realms. There was a hereafter, but it was a shadowy thing without life and blood, a miserable nether world of cheerless twilight. Only for very extraordinary crimes was there something like a real, fearful, and everlasting punishment in store in the Hades, or the still more terrible Tartarus; while, on the other hand, only the most exalted heroes are, after their death, endowed with a new body and enjoy the pleasures of Elysium. But these are very exceptional cases: 'When a man is dead,' says the shade of Anticlea, 'the flesh and the bones are left to be consumed by the flames, but the soul passes away like a dream.'

We cannot attempt here to enter minutely into this vast subject of Greek theology—to trace its historical development from the days when the early Pelasgians invoked, like their Persian and German kinsmen, the highest god without image or temple, and the minor deities as the 'Great Ones,' the 'Unknown Ones,' the 'Merciful Ones,' without distinct name and shape—to the time when every sound and every sight, every thought and every deed, had a sublime significance, caused and inspired as it was by a god; when the prodigious number of clearly defined, and individually and most sumptuously worshipped gods formed one of the mightiest impulses to the development of the arts: and from that period down to the days when the poets put prophecies of the speedy death of the gods into the mouths of their heroes; when philosophers openly declared 'these things to be fancies and dreams,' and religious persecutions hastened the downfall of a creed which had become adulterated by foreign elements no longer to be amalgamated—until Christianity stepped in, and not satisfied with deposing the gods of Greece, sent them, branded with the names of 'evil powers,' or 'demons,' in the sense of Eastern 'Satans,' to perdition. Much less can we attempt here a minute enumeration and description of all the deities, their genesis and history, with the myths and legends, traditional or invented in historical times by poets and philosophers, or dwell on the immense influence of Greek religion on other religions, the Christian among them. It is only desirable here to trace a faint outline of the divine commonwealth, and the outward forms of the religious worship of the Greeks, in the so-called classical period. Some account of the principal deities will be found in special articles.

Without entering into the principal division of the gods into heavenly, terrestrial, and maritime, we will briefly mention the supreme council of the twelve national gods, who, together with a vast male and female retinue, dwelt on the heights of Mount Olympus, around its highest peak. This, reaching into the sky (Ouranos), was inhabited by Zeus, the son of Chronos, the highest, mightiest, and wisest being, king and father of gods and men: who watches over all human doings, principally over hospitality and the sacredness of oaths. Second in power is his brother Poseidon, the shaker of the earth, the ruler of the sea and all the waters of the earth. Next stands Apollo, the son of Zeus and Selo (darkness); he is (as Phoibos) the sun, and darts his rays or arrows as god of the chase, as god of destruction, as well as of beneficence. But he is not god only of the physical, but also of the mental light; hence to him belongs the insight into future events. He is the god of oracles, but, as such, equivocal (*loxias*); further, god of poetical inspiration, song, and music—leader of the muses. He is one of the sublimest figures among the gods. In his love and in his hatred, he is always enshrouded in a sacred dignity and majesty, of which even the most ribald fiction stood in awe. The god of the terrestrial fire, which in his person had been thrown from heaven to earth, is Hephæstus. His workshops are volcanoes, where metals are forged and wrought by him into artful forms; and as volcanic soil best matures wine, to him was assigned the office of cupbearer of the gods. Ares presides over war. Battles, slaughter, rapine, and the doom of cities are his delight. Hermes—originally, perhaps, the symbol of animal generation—appears as patron of the herds. He is the guardian of the roads and the messenger of the gods; he is, morever, the inventor of the lyre and gymnastics. He is the presiding genius of commerce, and, as such, a knave, even a thief. With Zeus is coupled Hera, his sister and wife—beautiful, majestic, but exacting and quarrelsome. The foremost daughter of Zeus, and who sprang from his head in full armour, is Athene, who stands in a twofold relation to the light, physical as well as mental—whence she becomes the goddess of understanding and wisdom—and to the water (*Tritogenia*); hence also her rivalry with Poseidon. The two elements, the warm and the moist, giving rise to the fertility of the earth, she is the goddess of the grain and of the crops; she is likewise goddess of war, and presides over female handiwork. Artemis, the twin-sister of Apollo, shares with him the chase and the light: her attributes are a torch and the moon. The Phœnician goddess Astarte had risen from the foamy waves on the Greek shores as Aphrodite, the Greek goddess of beauty, of love, of voluptuousness. Her counterpart was the chaste maiden-goddess Hestia, in whom was personified the hearth as the centre of the house and family. From the everlasting fire on her altar, the colonists took the flame which was to accompany them to their new settlements. The list of the Olympians closes with Demeter or Gaia. She is the goddess of agriculture, and, consequently, of settled institutions and laws.

An indefinite number of other gods followed, some of them little inferior in power and dignity to the twelve, and who sometimes, like Dionysus, the god of goat-herds and wine-growers, and others, acted as the special deities of certain classes. We may mention here Hades, Helios, Hecate, Leto, Dione, Persephone, Themis, Eos; the Charites, the Muses, the Moeræ, Proteus, the Nymphs, and other *daimons*—partly primeval local deities, partly deified powers of nature; river, mountain, and forest gods; or personified abstract notions—such as Tyche, Psyche, Hebe, Thanatos, Phobos, Hypnos, Kratos, Bia, and the like conscious or unconscious allegories. Besides these, there is a mob of deities, or rather monsters, begotten by gods—the Harpies, the Gorgons, Pegasus, Chimæra, Cerberus, Scylla and Charybdis, the Centaurs, the Sphinx, &c.

A palpable link between gods and men is found in the heroes or demigods—i. e., men deified after death—a race sprung from the embraces of gods and the beautiful daughters of man. They became either, like Heracles (the Phœnician Melkarth), founders of races, who were thus considered the sons of gods, or patrons of special trades and professions, like Dædalus, the *heros* of artificers and others. The entire absence of that dark and terrible, essentially Eastern, notion of an evil principle, co-existent with the good, between which two rival powers the world is divided; the undaunted geniality of the Greek nature; the tendency towards humanising the whole universe and its gods, who, again, had not disdained to ally themselves with mankind; and above all, the emancipation from an all-ruling hierarchy such as swayed the East, made the Greek religion dogmatically, as well as practically, one of the brightest and most joyous, no less than the mildest and most tolerant, of ancient creeds. The outward as well as the inward worship of the gods was with them purely a personal affair. No mediator stood between the individual and the deity; every freeborn man, woman, and child had the undisputed right to pray and to sacrifice when and where the heart prompted. The only office of the priests consisted in the care of certain sacred property, in providing for the service of the temple, in the performance of certain traditional rites, the recitation of certain ancient formulas handed down in the priestly families, and the expounding of the Divine Will expressed by oracles. The Sacrifices (q. v.), which in earlier days had consisted in the votive offering of a lock, a garland, a tablet, or such simple fruits as were yielded by the soil, gradually, as hills and groves no longer sufficed, and temples, stately and sumptuous, adorned with gorgeous statues, had been erected, grew into splendid feasts, of which the gods were invited to partake, together with those who sacrificed. Of the periodical festivals held in honour of special deities, the games and sports, the scenic representations and musical contests connected with them, and of their peculiar influence in raising the literature, arts, and philosophy of the Greeks above that of all mankind, we have spoken under FESTIVALS, and we may further refer for particulars to such articles as DIONYSIA, PANATHENÆA, THESMOPHORIA, ELEUSINIAN MYSTERIES (where also the subject of the Mysteries is touched upon), as also to the headings OLYMPIAN, PYTHIAN, NEMEAN, and other GAMES.

One of the most characteristic provinces of the Greek cult was that belonging to the mantics or diviners. The Greek, looking upon the gods as his omnipresent friends, who were anxious to caution him against threatening dangers, or, in other words, firmly convinced by his own strong sympathy with nature, that a derangement of his own affairs, however unknown to himself, must produce a corresponding derangement in nature, could not but give some credence to the foreboding significance of natural or 'supernatural' prodigies or signs. The ether or space between heaven and earth, would be the principal scene of these revelations; the storms that swept through it, the thunder that rolled around it, and the birds that floated in the blue abyss, were all so many divine omens. No less would the gods speak in the offerings immediately addressed to them—in the innermost entrails of the sacrificial animal—in the flame that rose from their altar—in dreams of the night, and strange sounds and portents by day: thus, if in the midst of the assembled people, an ominous animal appeared, they speedily dispersed. Yet the free and clear Greek mind could hardly be suspected to have more than tolerated such practices, much less could it be supposed that it ever sank to the low level of grovelling imbecility, as was the case in this matter of augury with the Etruscans (q. v.); and Homer—though to the astonishment of Xenophon—puts into the mouth of Hector the momentous words: 'One omen only is significant—to fight for one's country!'

The growth of culture did indeed early free the Greeks from the vague awe of everyday phenomena, and the science of manticism fell accordingly into the hands of the lowest jugglers and soothsayers, believed in only by the herd. But in the same degree, there rose into highest importance another and exalted kind of prophecy—the Oracles (q. v.). In this, the god Jupiter—afterwards principally Apollo, his son, the partaker in his counsels—spoke himself: first, in the rustling of leaves, in the clangour of brass basins, later, in distinct human words. He chose the weakest vessels—women, girls, to whom the divine gift was a burden and a pain. The Sibyl herself does not understand what the god says through her mouth; she is unconscious—in a state of somnambulism—of mania. But here the priests step in; they act as interpreters, as prophets, as *Evangelides* (the progeny of some *Evangelos*), 'bringers of good tidings.' Their influence, socially and politically, increased with that of the oracles themselves, especially when these latter, by degrees, from being casual and unforeseen, became frequent and regular. The richest gifts poured in from all parts, as it grew matter of piety to have recourse to them as means of grace. They thus rose into an institution, the importance of which, principally for the unity and consequent rise of Greece as a political power, cannot well be overrated. Besides the oldest oracle—that of Jupiter at Dodona—we may mention, out of the 260 which were counted throughout Greece, those of Didyma, Delos, Abæ, Klaros, Larissa, Tegyra, of Trophonius—in a subterranean cavern—and of Amphiareus, near Oropus, in Attica, where the answers were revealed in dreams. But by far the most famous, and of highest import for the whole nation as such, was that of Delphi (q. v.), where the Amphictyonic council was held; where everything connected with the public worship throughout the country was settled; where the calendar itself was regulated; where, in fact, for a very long time was to be found the real central power of Greece.—Its voice ceased in the days of Julian, called the Apostate.

GREELEY, Horace, American journalist, was born at Amherst, New Hampshire, February 3, 1811. His father was a farmer of small means; and Horace, after acquiring the rudiments of education at a common school, entered a printing-office as an apprentice, 1825, at Putney, Vermont. On the completion of his apprenticeship, he worked for some time as a journeyman printer, and in 1834 commenced the *New Yorker*, a literary weekly paper, for which he wrote essays, poetry, and other articles. After one or two other essays at editorship, he began in 1841 the *New York Tribune*, of which he has ever since been the leading editor. As Mr G. had adopted, to some extent, the social theories of Fourier, he was joined by the most able writers of that school of Socialism, and the paper is published as a joint-stock concern, being held in shares by its writers and others engaged in its publication. The *Tribune* has also been an earnest advocate of temperance, woman's rights, the abolition of slavery and capital punishment, and other reforms, and is recognised as the organ of the extreme or radical Republican party. In 1848, Mr G. was elected to congress from one of the districts of New York, for the short term, but failed in his congressional career by agitating an unwelcome reform in the mileage payments to members. In 1851 he visited Europe, and was chairman of one of the committees of the Great Exhibition. His aspirations to political position were defeated by the more conservative party leaders, and he, in turn, is supposed to have secured the election of Mr Lincoln, instead of Mr Seward, in 1860. On the secession of several of the southern states from the Union, Mr G. at first advocated their right to secede, in accordance with the principles of the Declaration of Independence; but when the war began, he became one of its most zealous advocates, and is supposed to have caused the premature advance that resulted in the defeat of Bull's Run, July 21, 1861. In 1872, he was an unsuccessful candidate for the presidentship, and died the same year.

GREEN CLOTH, Board of; a board connected with the royal household, consisting of the lord steward and inferior officers, which has power to correct offenders within the verge of the palace, and two hundred yards beyond the gates. A warrant must be obtained from this board to enable a servant of the palace to be arrested for debt.

GREEN COLOURS. Although every shade of green can be produced both in oil and water colours, and also in dyeing, most of them are made by mixing the various yellow and blue materials in different proportions. The following are the green paints in use:

Arsenical green, or Scheele's green, is an arsenite of copper, made by dissolving arsenious acid in a solution of potash, and adding it to a solution of sulphate of copper. A precipitate is formed, which is *Scheele's green*, or *Mitis green*.

Brunswick green.—The best is crude oxychloride of copper, but the kind commonly sold is a mixture of carbonate of copper and chalk, or pipe-clay. One shade of this mixture is sometimes called *Bremen green.*

Chrome green is a mixture of Prussian blue and chrome yellow.

Copper green is sometimes a natural product, but is more generally manufactured; it is the oxide or the carbonate of copper, and is sometimes called *green bice*, or *mountain green.*

Emerald green is an arsenite of copper, prepared by a slightly different process to *Scheele's green.*

Frise or *Friesland green* is made with sulphate of copper and sal ammoniac.

Gellart's or *Gellert's green* is a mixture of *cobalt blue*, flowers of zinc, and *chrome yellow.*

Sap green—the juice of buckthorn-berries fermented for seven or eight days, after which a little alum is added; and when evaporated to a thick consistency, it is pressed into bladders, and hung up until entirely dry. It is chiefly employed in water-colours.

Schweinfurth green is another form of the arsenite of copper produced by dissolving separately equal parts of acetate of copper and arsenious acid. The solutions are then added together quite hot, and the precipitate formed is the beautiful but highly dangerous pigment. Its great beauty has led to its frequent employment in colouring wall-papers, artificial flowers, and even in some cases, it is to be feared, in colouring sugar-confections.

All of these colours, with the exception of sap green, are dangerously poisonous.

Green, in dyeing, is always understood to be a mixture of the two colours blue and yellow. The materials are generally mixed first with blue, and afterwards with yellow, proportioning the intensity of each to the shade of colour required.

The Chinese have a vegetable green colour called *luh-kao*, or green indigo, but it is exceedingly costly, and is only obtainable in very small quantities.

GREEN EARTH, a mineral of a green colour and earthy character, often found filling the cavities of amygdaloid, or incrusting agates in that rock, sometimes also massive or disseminated, chiefly in trap rocks. It consists principally of silica, alumina, and protoxide of iron, the silica constituting about one half. It is used as a pigment by painters in water-colours, who know it by the name of *Mountain Green.* For their use, it is mostly brought from Monte Boldo, near Verona, and from Cyprus. In New Jersey, green earth is used as a manure, and is said to be very beneficial.

GREEN EBONY, a dyewood imported in considerable quantities into Britain from South America. It is the wood of the *Jacaranda ovalifolia*, a tree of the natural order *Bignoniaceæ*. It yields olive-green, brown, and yellow colours. It is generally imported in pieces about three feet in length; it is a hard wood of an olive-green colour, and is sometimes used for purposes of carpentry and by turners. The tree has showy, panicled flowers.

GREENE, Nathanael, an American revolutionary general, born May 27, 1742, at Potowhommet, Warwick county, Rhode Island. His father was a leading preacher among the Quakers, and educated his son very simply, training him from childhood to work on his farm, and at his anchor-forge and grist-mill. By his own perseverance, however, he acquired considerable knowledge of ancient and English history, geometry, law, and moral and political science; he was also fond of reading books upon war. In 1770, he was chosen a member of the Rhode Island Assembly, and, to the great scandal of his fellow Quakers, was among the first to engage in the military exercises preparatory to resisting the mother-country. In 1774, he enlisted as private, and in 1775 was appointed to the command of the Rhode Island contingent to the army at Boston, with the rank of brigadier-general. He was promoted to be major-general in 1775, and distinguished himself at the engagements of Trenton and Princeton. At the battle of Brandywine, he commanded a division, and by his skilful movements saved the American army from utter destruction; and at Germantown he commanded the left wing. In 1778, he accepted the office of quarter-master-general. In 1780, he succeeded Gates (q. v.) in the command of the army of the South. Gates had just been completely defeated by Cornwallis, and G. found the army in a wretched state, without discipline, clothing, arms, or spirit. By dint of great activity, he got his army into better condition, and remained on the defensive for the remainder of the year. In 1781, he had a successful skirmish with an English detachment, but drawing upon himself the whole army of Cornwallis, much his superior in numbers, he made a masterly and successful retreat. With 5000 new recruits, he entered upon more active operations, and finally defeated the English at Eutaw Springs, the hardest fought field of the revolution, which put an end to the war in South Carolina. Congress struck, and presented to him, a medal in honour of this battle, and the Carolinas and Georgia made him valuable grants of land. When peace was restored in 1783, G. returned to Rhode Island, where he received numerous testimonials of the public admiration. In 1785, he retired with his family to his estate in Georgia, where he died of sun-stroke in 1786.

G. was one of the very best generals of the war of independence, second, perhaps, only to Washington, whose intimate friend he was.

GREENE, Robert, an English poet and dramatist, was born at Norwich about 1560, or, as stated by some of his biographers, in 1550. He was placed at St John's College, Cambridge, and took out his degree of A.B. there in 1578. He afterwards travelled in Spain and Italy. On his return, he re-entered the university, and took his degree of A.M. at Clare Hall in 1583. He also appears to have studied at Oxford in 1588. On leaving Cambridge, he proceeded to London, where he supported himself by writing plays and romances. He poured out plays, poems, and novels, ruffled about in silks, wore long hair, and haunted taverns and places of questionable resort with such wild and profane geniuses as Marlowe and Peele. He died of the consequences of a debauch, 3d September 1592, and was buried next day in the New Churchyard, near Bedlam. After his death appeared the singular pamphlet entitled *The Repentance of Robert Greene, Master of Arts*, in which he lays bare the wickedness of his former life. It is perhaps the most valuable of his prose writings. G.'s poems possess considerable grace and tenderness, but his plays have almost perished from human memory. His *Groat's Worth of Wit bought with a Million of Repentance* contains one of the few authentic contemporary allusions to Shakspeare; and when his writings are forgotten, he will be remembered for it, and for being one of the knot of young men who came up to London when the English drama was creating itself, and who burned themselves out in fierce labour and fiercer dissipation.

GREENFINCH (*Coccothraustes chloris*), a bird of the family *Fringillidæ*, common in most parts of Britain, frequenting gardens, orchards, shrubberies, small plantations, tall hedges, and cultivated lands. It is found even in Scandinavia, but is more common in the south of Europe; its range extends throughout Asia to the Pacific Ocean, and westward as far as Madeira. It is sometimes called *Green Grosbeak* and *Green Linnet* (Scot. *Green Lintie*). The bill is much thicker than that of the true linnets, to which, however, it is nearly allied. A prevailing green tint, mingling with grey and brown, characterises the plumage, and gives the bird its name. The whole length is little more than six inches. The tail is a little forked. The proper song of the G. is not very sweet, but in confinement it readily imitates the song of other birds, and in consequence of this and of its very easy domestication, it is rather a favourite cage-bird.

GREENGAGE, a variety of plum, of a green colour and roundish shape, the *Reine Claude* of the French, generally esteemed as one of the finest varieties in cultivation, if not certainly superior to all others. It is not of the largest size, but in delicacy and richness of flavour it is unsurpassed.

GREENHEART, or **BEBEERU** (*Nectandra Rodiæi*), a tree of the natural order *Lauraceæ*, a native of Guiana, of great value as a timber-tree, and also yielding a valuable medicinal bark. The timber is commonly called *Greenheart;* the bark is better known as *Bebeeru* (otherwise *Beebeeru*, *Bïbiru*, *Bïbiri*, &c., and *Sipiri* or *Sipeira*), and the alkaloid to which it chiefly owes its properties is called *Bebeerine* (q. v.). The tree grows chiefly in British Guiana, and in the greatest perfection on the low hills immediately behind the alluvial lands; it rises with an erect, slightly tapering trunk to a height of 40 or 50 feet without a branch, attaining a height of 80 or 90 feet in all, and a diameter of 3 or even 4 feet. The wood is extremely strong and hard, and is imported into Britain, to be used chiefly by turners for the same purposes as lignum vitæ, which it much resembles. It takes a high polish. It is so heavy as to sink in water. It is remarkable for its durability, and for being almost exempt from the attacks of the white ants on land, and of the teredo in water. It is used in Guiana for ship-building, and for all the most important purposes for which timber is required.—The bark is hard, heavy, and brittle, with a fracture resembling that of sandstone, has a white epidermis, and is of a bright cinnamon colour within. It has a very bitter, somewhat astringent taste. Its tonic and febrifugal properties resemble those of cinchona bark. Instead of the bark itself, the sulphate of bebeerine is generally used in medicine.

South America produces a number of species of *Nectandra*. *N. Puchury* yields the seeds called *Pitchurim Beans*, which are astringent, are regarded as febrifugal, and are prescribed in dysentery, diarrhœa, &c., and the oil of which is used as a substitute for chocolate.

GREEN-HOUSE, a building appropriated to the cultivation of such exotic plants as do not require much artificial heat, but cannot endure the open air, at least in the colder part of the year. The name is derived from the original use of such buildings for the preservation of oranges, myrtles, and other evergreens; the cultivation of heaths, pelargoniums, fuchsias, and the many other flowers now familiar to everybody, not having been then introduced. The first green-house of which there is any record was erected about 1619, by Solomon De Caus at Heidelberg, to shelter orange-trees. The Chinese, however, are not unacquainted with green-houses, and it is not known how long this has been the case. The earlier green-houses were glazed only on the sides; glass roofs were introduced in the beginning of the 18th c., and the arched or curvilinear glass roof, still more favourable to the proper admission of the sun's rays, is an improvement which dates from the early part of the 19th. Heat was at first supplied, when necessary, by hot embers put in a hole in the floor, afterwards by furnaces in the green-house; flues, steam, and hot-water pipes, &c., are more recent inventions. See HOTHOUSE. As a green-house does not require artificial heat during summer, the roof is sometimes made capable of being then removed; more generally, many of the plants are carried out into the open garden. Air is freely admitted into the green-house in fine weather, even in winter, during the warmest part of the day, care being taken that the plants are not exposed to frost, nor to ungenial and chilling winds. Green-houses are sometimes appropriated chiefly to particular genera of plants, under such names as *Heathery*, *Camellia-house*, &c. According to the present use of the term, a green-house differs from a *conservatory* only in the plants being in pots, which are very generally placed on the shelves of *stages*, having a slope not very different from that of the roof.

GREE'NLAND, a region of unknown extent northwards, stretches from its southern extremity, Cape Farewell (q. v.), along the Atlantic and Arctic Oceans on the east, and Davis' Strait, Baffin's Bay, and Smith's Sound on the west. For all our recent knowledge of the western coast we are indebted chiefly to the late Dr Kane of the United States of America. According to that distinguished navigator, the western shore, properly so called, terminates at Cape Alexander, near lat. 78° 10′ N. About one degree more to the north, and about six degrees to the east, an immense glacier, described as the largest in the world, barred all further exploration; and it was only by means of a team of dogs that one of Dr Kane's subordinates reached Cape Independence in lat. 81° 22′ N. G., therefore, may fairly be presumed, but has not been positively ascertained, to be entirely distinct from the land on the west side of Smith's Sound. G. is said to have been first discovered about the close of the 9th c. by an Icelander named Gunbiörn, who named it Hvidsaerk (White Shirt), from its snowy headlands. It first obtained the name G. from another Icelander, Eric Rauði (the Red), who led hither an expedition in 985 or 986, and founded two settlements on the west coast, called the Oestre and Westre Bygd (the east and west colonies). About four centuries afterwards, the Westre Bygd was destroyed by the pestilence called the 'black death,' combined with the attacks of the aborigines; and a century after this, the Oestre Bygd suffered the same fate. G. was visited, and its west coast explored, successively by Frobisher, Davis, and Baffin, the latter having advanced as far as lat. 78° N. (the limit of the inhabited country). In our own times Dr Kane has extended his explorations as far as lat. 82° 30′, or within 520 miles of the north pole. The eastern and southern coasts appear to be so beset with ice as to be practically inaccessible. The former was explored by Dr Scoresby as far as lat. 74° 30′ N., and two inlets, Scoresby's Sound and Davy's Sound, were discovered running far into the interior. This coast-land is called by the inhabitants of the other districts Lost Greenland. Owing to the great extent of land towards the pole, the climate of G. is colder than that of corresponding latitudes further east—so much so, that in Lapland, lat. 72° N., the temperature is as high as in G., lat. 60° N. From observations made by Dr Kane between September 1853 and April 1855, in lat. 78° 37′ N., long. 70° 40′ W., the average temperature throughout the year is − 3·22°; from October to April inclusive, − 23·43°; from May to September inclusive, + 25·07°. The greatest degree of cold was − 68° in February, and the greatest heat was + 53·9° in July, the only month in which the average temperature was above the freezing-point. During the short summer, which in few places exceeds four months (during two of which, June and July, the sun is always above the horizon), vegetation is very rapid, the plants being for the most part the same as those indigenous to the north of Scotland, but of a more dwarfish character, the tallest trees not exceeding 18 feet. The inclemency of these regions does not affect the animal kingdom (man excepted). The walrus, seal, polar bear, arctic fox, dog, and reindeer abound, and supply the inhabitants with almost all the necessaries of life. Black cattle and sheep have been introduced by the missionaries. The sea swarms with different species of cetacea, such as the rorqual, mysticetus, narwhal, porpoise, &c., and of fish, as the cod, salmon, and herring. Sea-fowl are also very abundant during the summer season, while guillemots, sandpipers, plovers, and grouse are also found. The only mineral which has been found in sufficient quantity for exportation is Cryolite (q. v.), which is found at Arksut, and is largely exported. Near the same locality are found veins of tin associated with ores of lead, copper, zinc, iron, molybdenum, and with cryolite, fluor-spar, zircon, and other minerals. Copper-ore is said to be abundant in various parts, and gadolinite, sodalite, tourmaline, along with garnets, iolite, rock-crystal, &c., are often found. G. is supplied with coal from Omenek, one of the colonies of North Greenland.

There are now 13 different Danish colonies along the west coast of Greenland—7 in North G. (north of lat. 67° N.), and 6 in South G., with a population of about 10,000, inclusive of from 200 to 300 Danes. The first settlement was made in 1721 by Hans Egede (q. v.), a Norwegian clergyman at Godthaab, who, with 43 colonists, planted a missionary station in this bleak region. This mission is supported by the Danish government. It now possesses 8 missionary stations, and the Moravians 5; from Julianshaab the most southern, to Upernavik, at the very verge of human existence. In May 1874, the first native pastor was ordained. The population depends chiefly on the fisheries—the same which have so long attracted so many vessels from Great Britain. The exports are whale and seal oil, and cryolite; the skins of the seal, reindeer, and fox; and eider-down. The imports are wheat, brandy, coffee, sugar, tobacco, and firewood. In 1869, 9147 tons of cryolite, valued at £21,660, were exported from G. to Philadelphia. The trade to G. has always been a monopoly in the hands of the Danish government. Each settlement is managed by a trader and his assistant, who are paid by government. The whale-fisheries, which are carried on by the settlers, are also for the behoof of the Danish crown.

GREEN MOUNTAINS, a portion of the Appalachian range. See APPALACHIANS.

GREEN RIVER, a river of North America, and tributary of the Ohio, rises near the centre of the state of Kentucky, and flows through it; first in a westward direction for about 150 miles, passing the Mammoth cave, then north-westward for the remainder of its course. It joins the Ohio 9 miles above Evansville, in Indiana, and at its mouth is about 600 feet in breadth. It is upwards of 300 miles in length, and is navigable for small steamers for 200 miles. The lower course of the G. R. abounds in coal.

GREEN VITRIOL, a popular name for sulphate of iron. It sometimes occurs as an efflorescence resulting from a chemical change in *iron pyrites* or sulphuret of iron, but its quantity is generally small. It crystallises in acute oblique rhombic prisms.

GREE'NOCK, a parliamentary burgh, market-town, and important seaport of Scotland, in the county of Renfrew, is situated on the southern bank of the Firth of Clyde, on a narrow strip of shore, and on the slopes of the hills which form its background, 22 miles west-north-west of Glasgow. It extends upwards of two miles along the shore, and at one place it climbs to a considerable elevation up the face of the hills, which here rapidly attain an elevation of 800 feet; while toward the west, and all over the front of the hills, new and elegant villas are continually being erected. From the rising grounds behind the town, and from the western shore, the view of the opposite coasts of Argyle and Dumbartonshires, fringed with white gleaming villages, and of the Firth stretching away into narrow lochs, and dotted over, especially in summer, with every variety of craft, is exceedingly picturesque and beautiful. The most important buildings are the Custom-house, the Exchange, the Watt Monument containing a statue of Watt by Chantrey, a museum, a lecture-room, and a library, the Mechanics' Institute, &c. The harbours of G. have been constructed upon a large scale—the Albert in 1866; and from it extends westward the fine Princes Pier, opened in 1870. Its quays can be approached by steamers, and its harbours entered by vessels at any state of the tide. The commerce of the town is chiefly with North America, and the West and East Indies. The trade is mainly in sugar-refining, for which it has 15 establishments, turning out refined sugars to the value of upwards of £4,500,000 annually. In ship-building, about twenty iron vessels are turned off the stocks annually. There are, besides, manufactures of steam-engines, chain-cables, anchors; and rope and sail making. G. has almost constant intercourse with Glasgow by river or railway, and is the general starting-point for tourists *en route* for the Western Highlands and isles. It sends one member to parliament. The number and tonnage of vessels which entered and cleared at the port of Greenock for the following two years are returned as follows: In 1871, 3246 vessels, of 738,231 tons, entered and cleared the port; in 1872, 3348 vessels, of 810,075 tons. The sugar imported in 1830 was 18,357 tons; in 1840, 22,872 tons; in 1850, 45,815 tons; in 1860, 74,289 tons; in 1871, it was 213,090 tons; in 1872, 210,640 tons; and in 1873, 198,160 tons. The Globe Sugar-Refining Company turns out 720 tons a week, at a value of £22,000. Pop. (1871) 57,821.

Originally consisting of only a few thatched houses, G. was created a burgh of barony in 1635 (having then a population of less than 2000), and a parliamentary burgh after the passing of the Reform Act in 1832. The prosperity of the town dates from the Union in 1707, when free commerce to America and the West Indies was opened up.

GREENS, the common name of all those varieties of kale or cabbage (*Brassica oleracea*) which do not boll, and of which the leaves are used for the table as boiled vegetables; some of which are also called colewort, &c., whilst others, particularly those with curled leaves, as German greens, have no other name than greens or kale. Young unbolled cabbages, and shoots from the stocks of cabbages, are often also called greens, as well as turnip-tops, and other leaves of plants used in the same manner.—The leaves of GERMAN GREENS are very much waved or curled. It is one of the best kinds of *open* greens. It is either sown in spring, and planted out soon after; or it is sown in autumn, and planted out in spring.

GREE'NSAND, the name given to two divisions of the Cretaceous Measures (q. v.). They are so called from the occurrence in some of their beds of numerous small green specks of silicate of iron, sometimes so abundant as to give a green colour to them. The term is, however, far from being descriptive of the various included strata; it must be considered simply as a name. In some districts, especially on the continent, the green particles are entirely absent from the strata. On this account it has been proposed that the Lower Greensand should be called Neocomian, because strata of this period are well-developed at Neufchatel (Neocomum), in Switzerland. The mineral structure or lithological character of the Upper Greensand is so like that of the Lower, that it is scarcely possible to separate them when the intermediate gault is absent, except by their organic remains, which are very distinct; so much so, indeed, as to have caused the placing of the one series in the Lower Cretaceous group, and the other in the Upper. It should also be noticed that the relative importance of the two divisions is very different; the Lower Greensand includes a series of strata that are of a value nearly equal to the whole Upper Cretaceous group, of which the Upper Greensand is but a subordinate member.

The *Upper Greensand* consists of beds of sand, generally of a green colour, with beds and concretionary masses of calcareous grit, called firestone. The strata on the cliffs of the Isle of Wight are 100 feet in thickness. This formation is supposed to have been a littoral deposit on the shores of the Cretaceous seas. While the chalk was being deposited out at sea, these sands were being laid down along the shore, contemporaneous with the chalk, although they appear inferior to it. Their position would necessarily result from the cretaceous sea widening its area, and as the shore submerged, the greensand would be covered with the chalk, and would appear as an older and underlying deposit. The beds of this period are rich in fossils, abounding especially in the remains of sponges, mollusca, and echinodermata.

The *Lower Greensand* consists of a large series of more or less indurated sandstones and clays, with occasional calcareous beds. They attain a thickness of 850 feet. The sands preponderate in the upper, and the clays in the lower portion of the formation. Some beds of clay of considerable thickness, sometimes as much as 60 feet, are used as fuller's earth. The calcareous stone is a highly fossiliferous band of limestone, locally called Kentish rag, much used for building in Kent and Sussex. The formation was formerly known as the iron sand, because of the sands being cemented together by an abundance of oxide of iron; this gives them a reddish colour. The Lower Greensand contains numerous fossil mollusca and other marine remains. It is a sea deposit resting on the fresh-water Wealden strata, and shewing that at this period the sea made considerable encroachments on the dry land.

GREENSTONE, a variety of trap rock (q. v.), composed of felspar and hornblende, and having generally a greenish colour, hence its name. It has a more or less compact structure—the component crystals in one specimen being scarcely discernible with a pocket-lens, while in another they form a coarse aggregate, and specimens exhibiting all the intermediate stages may be found. In the finest they are not so small and compact as in basalt. Its crystalline structure separates greenstone equally from the earthy tuffs and the glassy pitchstones. It may become porphyritic from a portion of the felspar forming into larger distinct crystals. In weathering, the disintegrating greenstone assumes a dark-brown colour, and exfoliates round limited centres, giving the rock an appearance as if it were composed of a number of large boulders.

GREENWEED, a name given to certain half-shrubby species of *Genista*. See GENISTA and BROOM.—DYERS' G. (*G. tinctoria*), a species about one or two feet high, with lanceolate leaves, and terminal spiked racemes of pale-yellow flowers, is frequent in woods, meadows, and hilly pastures in most parts of Europe, and in the temperate parts of Asia; and is common in many parts of England, but rare in Scotland and Ireland. Its branches, leaves, and flowers—particularly the flowers—yield a fine yellow dye, chiefly used for wool; its flowers mixed with woad yield a fine green dye. It was formerly in great esteem as a dye-stuff, but others have now almost entirely supplanted it. The leaves and seeds were also formerly used in medicine; the former as a diuretic, the latter as a mild purgative.—HAIRY G. (*G. pilosa*), a rare native of Britain, but abundant in some parts of Europe, is cultivated in some places, especially in France, as food for sheep, which are very fond of it. It is particularly adapted for light and sandy soils. It is a slender, branched, tortuous, and procumbent plant, with small pale-yellow flowers.

GREENWICH, a parliamentary borough of England, in the county of Kent, is situated on the right bank of the Thames, at a distance of 5 miles south-east of London. It stands partly on an acclivity, but for the most part on low marshy ground, portions of which are said to be below the level of the Thames. The older streets are in general narrow and irregular, but those more recently built are spacious and handsome. By far the most interesting institution in G. is the hospital. See GREENWICH HOSPITAL. Among the other more important buildings are the Norfolk College, which supports 22 poor inmates and a warden, and of which the Mercers' Company are the trustees; and the Royal Observatory (see OBSERVATORIES), situated in the midst of Greenwich Park, a finely-kept extent of public grounds comprising nearly 200 acres. G. abounds in taverns, and is always a favourite resort of Londoners, but specially so in the 'whitebait' season—from April to August. The town contains extensive engineering establishments, iron steamboat-yards, rope-works, and several factories. G., which is also connected with London by railway, is touched at by all the river steamers. Pop. (1871) 169,361.

GREENWICH HOSPITAL, formerly a home for superannuated sailors, was a royal foundation, erected by the munificence of William and Mary, under their letters patent of 1694. For many generations a royal palace had occupied the site, and had always been a favourite resort of the sovereign. The buildings were sufficiently completed by 1705 (at a cost of £50,000) to admit 100 disabled seamen. By the 1st July 1708, 350 had been admitted; and the income derived from bequests, the original royal grant, and from contributions made under coercion by sailors, amounted to £12,000 a year, half of which was expended in maintaining the seamen, and the remainder in completion of the building. In the reign of George II., the forfeited estates of the Earl of Derwentwater, who had been attainted of high treason, were granted to the hospital, and were computed at £6000 a year. Up to 1834, a compulsory contribution of 6*d*. a month was exacted from all seamen, whether of the navy or merchant service, towards the funds of the hospital; but in that year an annual grant of £20,000 from the consolidated fund was substituted.

The income from all sources afterwards reached nearly £150,000 a year, out of which the following officers and pensioners are maintained: 1 governor, £1500 per annum; lieutenant-governor, £800; 4 captains, 4 commanders, 8 lieutenants, 2 masters, 2 chaplains, a considerable staff of naval medical officers and nurses, and 1600 pensioners. The pensioners were lodged, clothed, and fed at the expense of the hospital, and in addition had the following pecuniary allowance as tobacco and pocket-money: warrant-officers, 5*s*. a week; petty-officers, 4*s*.; seamen, 3*s*. The nurses were usually the widows of sailors who had lost their lives in the service.

The question had been frequently raised of late years, whether this superb charity was not, after all, a mistake, and whether the vast revenues would not be bestowed to better advantage in pensions to seamen, who might still find employment in aid of their subsistence, and who would have the happiness of passing the last days of their lives among their descendants and relatives. Under the old rules, the hospital was, so far as the pensioners were concerned, a monastery in which hundreds of men lived together, without any of the soul-sustaining inducements of monasticism. The old men were, on the whole, painful objects to contemplate, wrecks from whom no further good of any description was to be expected. Leading lives useless to themselves and to others, their best occupation was to recount, with the garrulity of age and the boastfulness of self-absorption, the exploits of long ago. Many would have preferred to see them in happy country-homes, kept by pensions from absolute want, teaching their grandchildren to delight in the country's glory, and spreading throughout the land, instead of concentrating in one parish, a knowledge of how England can provide in their old age for those among her sons who serve her faithfully in their prime.

The authorities were convinced at last that this semi-monastic enclosed life was not good for the old salts, who much preferred being with their children and friends in country villages or at seaports. Accordingly, in 1865, by the 28 and 29 Vict. c. 89, the institution ceased to exist as an asylum for aged sailors. The funds were converted into *out*-pensions, providing for a larger number than were maintained in the hospital; the old men were relegated to their friends; and the truly noble buildings, after lying vacant for some five years, became a Royal Naval College for officers to acquire naval science.

Attached to the hospital is a school for the gratuitous education of 800 sons of seamen. This establishment is under the superintendence of the same commissioners as the hospital, and with regard to funds, is consolidated with it. The education given is such as to fit the recipients for service in the royal or merchant navy; and the period during which boys are permitted to participate in its advantages extends to from three to four years.

In addition to the in-pensioners alluded to above, about 12,000 old or disabled seamen are assisted in their old age by what was formerly called the *Greenwich out-pension*, but is now styled a *Naval* *pension.* It varies from £3 to £57 a year. These men, distributed throughout the country, receive their pensions from the Staff-Officers of Military Pensioners, in their respective districts.

The buildings of G. H. and schools occupy the whole space, with the exception of a roadway, between the Thames and Greenwich Park; and taken together, they constitute a magnificent series of buildings, those composing the hospital being among the finest in the whole kingdom.

GREENWICH OBSERVATORY. See OBSERVATORY.

GREGARI'NIDÆ. This term was applied by Leon Dufour to designate a group of microscopic organisms belonging to the sub-kingdom *Protozoa*, which have been discovered as parasites in the intestinal canal in various invertebrate animals, especially insects, arachnidans and certain chætopodous worms. They seem to have been first observed by Cavolini in the last century, but the earliest systematic notice of them is that of Dufour in 1828, who gave them their name from the groups in which they occurred.

The form of the body varies: it may be cylindrical, ovate, fusiform, or threadlike. It is often marked by indentations or strictures corresponding to the spot where an internal septum divides the organism into two or more segments. In some, a process projects from one end of the body, or there may be two lateral processes, and to these prolongations minute hooks are attached (see *d* in fig. 1), by which it is supposed that these animals attach themselves to the surfaces on which they are generally found. Anatomically, the G. consist of an extensible transparent membrane enclosing a granular mass, in which we observe a nucleus surrounded by a clear space. See CELLS. These organisms are colourless; their locomotive powers seem very limited; and they have neither mouth nor feet.

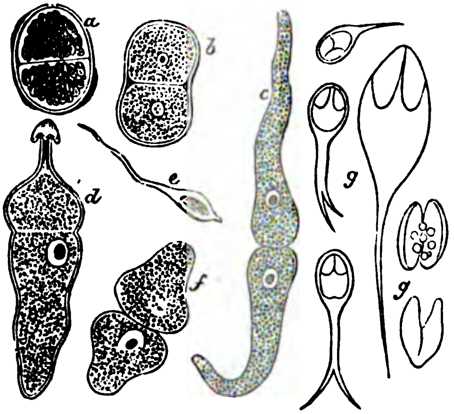


Fig. 1 (copied from Greene's *Manual of Protozoa*).
a, b, c, d, various species of gregarina; *e,* pseudo-naviculæ; *f,* younger stage of *a*; *g,* various psorospermiæ.

On carefully watching them under the microscope, we observe two of them to come in contact. The surfaces in contact become flattened, and a cyst or capsule soon forms around them and encloses them (see *f* and *a* in fig. 1). Numerous globular vesicles are then produced in the interior, and these become ultimately metamorphosed into peculiar bodies, which are termed *pseudo-naviculæ* (*a*, *e*, in the fig.). The septum by which the two G. were at first divided, finally disappears; the cyst bursts, and the pseudo-naviculæ escape, and in due time burst also; and thus gives rise to bodies closely resembling amœbæ (fig. 2), minute animals belonging to the Rhizopoda (q. v.), which at length develop themselves into young gregarinidæ. The coalescence or conjugation of the G. is not positively essential to the formation of pseudo-naviculæ, since they are sometimes seen to occur within the bodies of single animals.

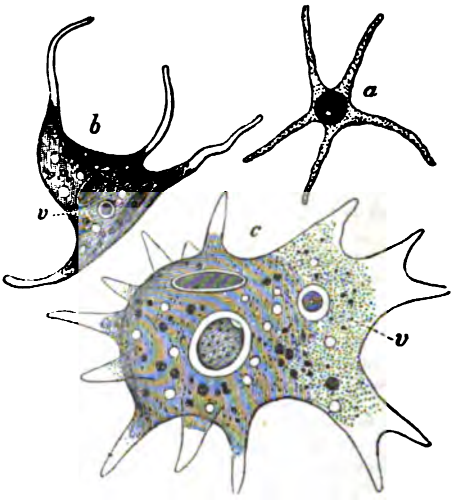


Fig. 2 (copied from Greene's *Manual of Protozoa*).
a, young amœbæ; *b,* older specimen; *c,* a peculiar variety; *v,* a body resembling a nucleus.

We have followed, as we believe, the best authorities in placing the G. as adult forms of the group of the Protozoa. There is, however, considerable difference of opinion regarding the position they ought to occupy. Stein places them among the infusoria, Leon Dufour, Leidig, Vogt, and others, place them under various divisions of the worms, while some have even held that they are vegetable forms.

It is exceedingly probable that certain minute parasitic organisms, occurring both on and within the bodies of fishes, and to which the term *psorospermiæ* has been applied, are identical with the pseudo-naviculæ, which we have already described. The forms of several of these psorospermiæ are shewn in *g* in the figure.

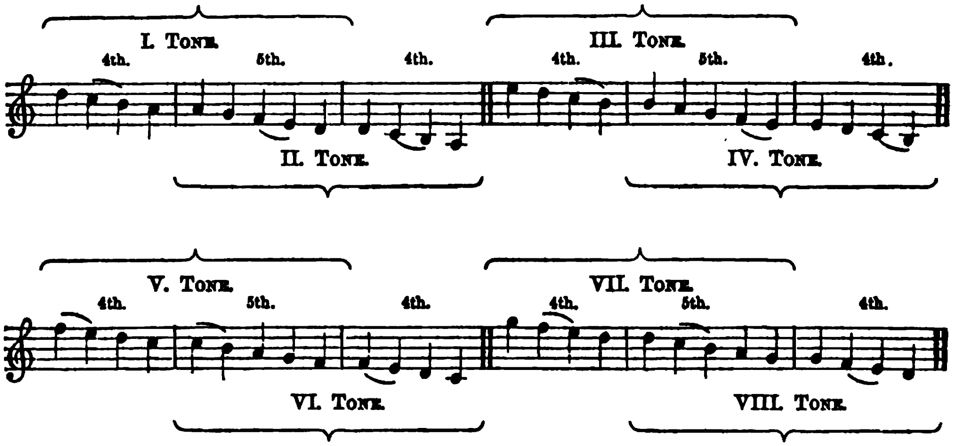
The G. have been divided into (1) the *Monocystidæ*, when the animals are solitary; and (2) the *Zygocystidæ*, when two animals are conjoined.

Numerous memoirs have lately been written on the Gregarinidæ. We may especially refer to Kölliker's memoir in the *Zeitsch. f. wissen. Zoologie* (1848), and the Lieberkühn's memoir on their development in the *Memoires Couronnés des Savants Etrang.*, published by the Brussels Royal Academy in 1855.

GREGOIRE, HENRI, the most remarkable among the so-called 'constitutional' bishops of France, was born of poor parents at Vebo, near Luneville, December 4, 1750. Having received his education from the Jesuits at Nancy, he entered into orders, and for some time held a professorship at the Jesuit College of Pont-à-Mousson. A work of his, published in 1778, on the *Amelioration of the Condition of the Jews*, attracted considerable notice. It was translated into English, and crowned by the Royal Society of Metz. G., soon after his ordination, was appointed curé of Embermesnil, in Lorraine; and at the election for the States-general in 1789, he was chosen one of the deputies of the clergy. An ardent democrat in all his views, he attached himself from the first to the Tiers-état party, and acted a prominent part in the subsequent drama; he was one of the chief advisers of the secession, took the oath of the Tennis Court with the rest, and supported the Abbé Sieyes in the proposal for constituting the seceders into the National Assembly, of which he became one of the secretaries. From that time forward, G. pursued his course without hesitation. He was one of the most enthusiastic on occasion of the famous session of the night of August 4, in the abolition and renunciation of the privileges of the nobles and clergy. G. carried into every department the stern democracy to which he was devoted, and which he identified with the Christian brotherhood of the gospel. Upon the fundamental doctrine of the Revolution—the 'rights of man'—he sought to ingraft his own early advocacy of the Jews and of the negroes. Carrying the same views into questions of church-polity, he was a zealous supporter of the civil constitution of the clergy, was the first of his order to take the oaths, and was elected the first 'constitutional bishop' of the department of Loir-et-Cher. He was chosen for two places, but accepted this, although the old and legitimate bishop, Monseigneur de Themines, was still alive. When at the blasphemous Feast of Reason, the miserable Gobel, constitutional Bishop of Paris, having publicly renounced Christianity, a similar renunciation was demanded from G. by the infuriated rabble, he firmly confronted the danger, and refused. Through the later phases of the Revolution, under the Directory, G. continued to take a part in public affairs; and to his interference are due many of the measures connected with the public organisation of literature and science, which still bear their fruits in the French system of administration. After the 18th Brumaire, he became a member of the Corps Legislatif. His extreme republicanism was highly distasteful to Bonaparte, and it was only after a third attempt that he was appointed member of the senate. On the conclusion of the concordat between Pius VII. and Bonaparte, he ceased to exercise ecclesiastical functions, as he could not be induced to give the retractations which the church authorities required. True to his old principles, he resisted every step towards the establishment of the absolute authority of Napoleon; and, in 1814, he was one of the first to pronounce against the Empire. On the Restoration, he was one of the most earnest in demanding from the king the acceptance of the constitution. During 'the Hundred Days,' he attracted no notice; but after the return of the king, he was excluded from the senate, and ceased thenceforth to hold any public place. During this enforced retirement, and in the intervals of leisure in his earlier political life, he published several works, literary, religious, political, historical, and polemical, the most voluminous of which are a *Cronique Religieuse*, in 6 volumes, and a *Histoire des Sectes Religieuses*, also in 6 volumes, but incomplete. When upon his death-bed, an effort was made by the Archbishop of Paris to induce him to express his regret for the uncanonical and schismatical proceedings of his early career; but he persistently declined to make any retractation. In consequence of his refusal, the archbishop directed that the last rites of the church should be withheld. Notwithstanding this prohibition, the last sacraments were administered to G. by the Abbé Guillon, and he died May 23, 1831.

GREGO'RIAN CALENDAR AND YEAR. See CALENDAR.

GREGORIAN CHANT or TONES, the name given to certain choral melodies introduced into the service of the early Christian church by Pope Gregory the Great, who flourished towards the end of the 6th century. The music of the church in earlier times was founded on the Greek system, as far as it could be used, which was improved from time to time, until St Ambrose, Bishop of Milan, in the 4th c. invented the Ambrosian chant. See AMBROSIAN CHANT. In 599, Pope Gregory began to reform and improve the music of the church at Rome, by discarding the Greek tetrachord, or scale, on the basis of a fourth, and in its place substituting the scale of the octave, which some writers say he named by the letters of the alphabet, while others say he had a peculiar set of signs called *nota Romana*, consisting partly of words with points, strokes, and other marks, which sufficiently served his purpose. To the authentic modes of Ambrosius, Gregory added the plagal, which began with the fourth below, and thus he completed the octave. He retained the four most useful modes of the Ambrosian chant, termed the *Dorian*, *Phrygian*, *Lydian*, and *Mixolydian*, which are supposed to have been obtained from the ancient Greeks. At first Gregory's improvement was called the *Roman chant*, but later it got the name of *cantum planum* or *firmum*, as it was originally sung in unison, and in notes all of the same length. At a later period, the letters of the Roman, as well as of the Greek alphabet, were used to express the notes of the Gregorian chant, but without any general fixed order or rule. In the course of time, the system of notation on lines and spaces came into use; but at first only four lines were used, on which we find all the old examples of the Gregorian chant written. By the Gregorian tones, or modes (*toni*, *modi*) of Gregory, must be understood a certain melodious formula, made out of the union of a perfect fifth and a perfect fourth, or their inversion, to give the church-song greater variety. All the old writers agree as to the diatonic genus of the Gregorian tones, but they do not all agree as to the number of the tones; some counting fourteen, others twelve, while in some old Roman choral-books we find only eleven. The foundation of the system of the Gregorian tones may be explained thus: As there are seven notes from *a* to *g*, there should be at least seven different modes, or tone-systems, varying from each other according to the position of the semitones; but as the final or key-note of each mode might be the first note, or might be in the middle, the same scale could therefore, as it were, be viewed from two sides, which gave rise to the fourteen system of tones. It was, however, found that two of those were at variance with a fundamental rule of church-song—viz., that every mode or scale must possess a perfect fifth or perfect fourth; and that the modes containing a false fifth from *b* natural to *f* natural, or a false fourth from *f* to *b*, could not be used, and on account of the dissonant character of these intervals, must be rejected. This reduced the number of the tones to twelve. It was further found, that as four of the twelve were merely transpositions of some of the others, there were really only eight, and that they were in every respect sufficient for all the purposes of church-song. The eight Gregorian tones, as they are handed down to us, were in time fixed by a royal mandate of Charles the Great—*octo toni sufficere videntur*. The following example in modern notation in the G clef will shew the position of the eight Gregorian tones:



There cannot be a doubt that Pope Gregory greatly improved the church-music at the time, and that the eight tones have always been ascribed to him. That they are of great antiquity is certain, for we find them mentioned in a treatise on choral singing by one Aurelian in the 9th century. The different character of the Gregorian tones depends entirely on the places of the semitones, which in the above example are marked with a ⌒. Several of the tones have various endings, some as many as four, while the second, fifth, and sixth tones have each only one ending. For a full and interesting account of the Gregorian church-music, see N. A. Janssen's *Grundregeln des Gregorianschen Kirchengesanges*, published by Schott in Mainz, 1846.

GREGORY, the name of a Scotch family remarkably distinguished, like that of the Bernouillis, in the history of science. Its history goes back to the union in marriage of the Rev. John Gregory, minister of Drumoak, Aberdeenshire, to a daughter of a David Anderson, who is described by Dr Hutton in his *Philosophical and Mathematical Dictionary*, as 'of Finzaugh, a gentleman who possessed a singular turn for mathematical and mechanical knowledge.' The most distinguished offspring of this marriage was—

JAMES GREGORY, born at Aberdeen in November 1638 or 1639. He studied at Marischal College, after leaving which, he betook himself to optical science, in which he made his first discoveries. At the age of 24, he invented the reflecting-telescope known by his name, and which he described in a work, entitled *Optica Promota*. In 1664 or 1665, he went to London with a view to the construction of his telescope; but finding the artists he employed wanting in the skill necessary for grinding the metal for the object-speculum, he passed on to the university of Padua, where he devoted himself to study; and in the year 1667, produced his *Vera circuli et Hyperbolæ Quadratura*, followed, in 1668, by two other works, *Geometriæ Pars Universalis*, and *Exercitationes Geometricæ*. These works led him into correspondence with the greatest mathematicians of the age—Newton, Huyghens, Wallis, &c. He was immediately on his return to London, elected a Fellow of the Royal Society, and in 1669 he obtained the professorship of mathematics at St Andrews, a chair which he filled for about six years. Here, in 1672, he produced *The Great and New Art of Weighing Vanity*, &c., which bore to be the work of M. Patrick Mathers, Archbedal to the University of St Andrews, the object of which was to expose the ignorance of a Professor Sinclair of Glasgow, who had put a slight on one of the St Andrews professors. In 1674, G., who had in the meanwhile married Mary, daughter of Mr George Jamieson, a distinguished painter, was called to Edinburgh to fill the mathematical chair, which he did for little more than a year. In October 1675, when shewing the satellites of Jupiter to some of his pupils, he was struck with total blindness, and a few days after died at the age of 36. For a particular list and account of his works and discoveries, see Hutton's *Philosophical and Mathematical Dictionary*. Dr Hutton describes him as a man of very acute and penetrating genius, possessing an inventive mathematical genius of the first order; somewhat irritable in temper; but exhibiting one of the most amiable characters of a true philosopher—that of being content with his fortune.

By his marriage with Mary Jamieson, James G. had a son of the same name, JAMES G., M.D., born in 1674, who became professor of medicine in King's College, Aberdeen, where he founded the School of Medicine. This James G. had two sons, JAMES G., M.D. (the second), who succeeded his father in the Aberdeen professorship; and JOHN G., M.D., who merits particular notice. He was born at Aberdeen in 1724, where he received his early education; afterwards he studied medicine at Edinburgh, Leyden, and Paris. After filling in succession the chairs of philosophy and medicine at Aberdeen, he was appointed, in 1766, professor of the practice of medicine in Edinburgh, where he long enjoyed high reputation as a teacher and practising physician, along with the greatest personal popularity. He was the intimate friend of the most eminent men of Edinburgh in its most brilliant period. He died 9th February 1773. Among his works are—*Elements of the Practice of Physic*, 1772; *A Comparative View of the State and Faculties of Man with those of the Animal World*, 1765; and *A Father's Legacy to his Daughters* (published after his death), 1793. In 1788 his works were collected in 4 vols. 12mo, by Mr Tytler (Lord Woodhouselee), who prefaced them by a life of the author. A Life of him was also written by Mr Smellie. His son, Dr JAMES G. (the third), became distinguished as professor of the practice of medicine at Edinburgh, and a leading man in his profession. He was the author of *Philosophical and Literary Essays*, 2 vols. 8vo, Edin. 1792. The son of this Dr James was the late WILLIAM G., professor, at one time, of chemistry in King's College, Aberdeen, and who died April 1858, as professor of chemistry in the university of Edinburgh. William G. was well known by his works on chemistry, and his edition of the inorganic part of Turner's *Elements of Chemistry;* the organic part of which was edited by Liebig. He also translated, 1855, Liebig's *Principles of Agricultural Chemistry.* Amongst his contributions to chemistry may be noticed his improved processes for the preparation of hydrochloric acid, muriate of morphia, and oxide of silver, and his memoirs on the preparation of sulphuric acid, on the preparation of creatine, on the decomposition products of uric acid, on the spontaneous decomposition of alloxan, on the purification of chloroform, &c.

We have now to revert to the original stock—the family of the Rev. John G. and Jane Anderson. James G., inventor of the telescope, and founder of the line of distinguished men which we have just followed, had an elder brother of the name of DAVID—a remarkable man, skilled in medicine, philosophy, and mathematics, and known as David G. of Kinardie—the first man in Scotland who kept a barometer, a circumstance which, according to Dr Hutton, nearly led to his being tried by presbytery as a wizard. This David had three sons, named respectively, DAVID, JAMES, and CHARLES. The first of these became Savilian professor of astronomy, Oxford. He was born at Aberdeen in 1661, and there received the early part of his education, which was completed at Edinburgh. He is supposed to have been disposed to mathematical studies, by having been appointed literary executor of his uncle James—of the telescope—more likely it is that he was so appointed because he had already manifested an aptitude for such studies. With the executry, at any rate, his uncle's 'mantle' descended upon him. In his 23d year he was appointed professor of mathematics in the university of Edinburgh, and by his lectures in this chair, he had the honour of being the first to introduce the Newtonian philosophy into the schools. In 1691, through the friendship of Newton and Flamsteed, he obtained the vacant Savilian professorship of astronomy at Oxford, for which the illustrious Halley was a competitor. Halley, however, soon after obtained the professorship of geometry in the same university, and became a great friend and fellow-worker of Gregory's. Dr David died at Maidenhead in 1710, in his 49th year.

Among the works of Dr David G. may be mentioned, *Exercitatio Geometrica de Dimensione Figurarum* (Edin. 1684); *Catoptricæ et Dioptricæ Sphaericæ Elementa* (Oxford, 1695), which contained the substance of his Edinburgh lectures, and in which, among other ingenious matters, Dr Hutton thinks there is an anticipation of Dolland's Achromatic Telescope. *Astronomiæ Physicæ et Geometricæ Elementa,* Oxford, 1702. An edition of Euclid in Greek and Latin, which is highly valued, 1703. Towards the end of his life he worked with Dr Halley on an edition of the *Conics of Apollonius,* but did not live to see it finished. He was the first who considered the Catenary, on which he left a paper in MS., besides a short treatise of the *Nature and Arithmetic of Logarithms;* a treatise on *Practical Geometry,* published in 1745 by Maclaurin; and many memoirs which were published in the *Phil. Trans.,* vols. xviii.—xxv. Of his four sons, the eldest, David G., became regius professor of modern history at Oxford, and Dean of Christ's Church. On Dr David G. removing to Oxford, he was succeeded, in 1691, in the Edinburgh chair, by his brother James, who filled it for 33 years, when he retired, and gave place, in 1725, to Maclaurin. His brother Charles, in 1707, became professor of mathematics at St Andrews, an office which he held for 32 years, when he resigned it, and was succeeded by his son, another DAVID, who died 1763.—The three sons of David of Kinardie were thus, at the same time, professors of mathematics in three universities, while two of them left sons who obtained professorships. Dr Thomas Reid of Glasgow, it may be mentioned, was a nephew, through his mother, of these illustrious brothers. Altogether, it is said (Chalmers's *Biographical Dictionary,* p. 289) that no less than 16 members of this family have held British professorships.—Mention must be made, in conclusion, of R. F. GREGORY, late Fellow of Trinity College, Cambridge, author of *Examples in Differential and Integral Calculus,* and other valuable works, who died before bearing the full fruits of his genius, and who is understood to have belonged to the family of the Scottish Gregories.

GREGORY, the name of sixteen popes, of whom the most important, historically, are treated in separate articles.

GREGORY I., THE GREAT, a father and saint of the Roman Catholic Church, was born in Rome about the middle of the 6th c. of an illustrious Roman family. His father, Gordianus, was a senator, and one of the earlier pontiffs; Felix III. had belonged to the same family. At a comparatively early age G. was named by the Emperor Justin II. to the important charge of prætor of Rome; but he voluntarily relinquished this office, and withdrew altogether from the world into the monastery which he had founded in Rome, under the title of St Andrew's. This was but one of many such acts of religious munificence. 'He founded and endowed,' says Dean Milman, 'six monasteries in Sicily.' Before entering the Roman convent, equally founded by himself, which he chose for his own retreat, 'he lavished on the poor all his costly robes, his silk, his gold, his jewels, his furniture, and not even assuming to himself the abbacy of his convent, but beginning with the lowest monastic duties, he devoted himself altogether to God.' This was probably about 575. He was elected abbot of his monastery, and it was while he was still in this office that the well-known incident befell of his meeting the Anglo-Saxon youths in the slave-market, and on being struck by their beauty, and learning that they came from a pagan land, resolving to devote himself to the conversion of that land to Christianity. He set forth on his journey, but the clamour of the Romans at his loss led the pope Benedict to compel his return, and eventually to enrol him in the secular ministry by ordaining him one of the seven Regionary Deacons of Rome. Benedict's successor, Pelagius II., sent G. as nuncio to Constantinople, to implore the emperor's aid against the Lombards. He resided three years in Constantinople, during which time he commenced, and perhaps completed, his great work, the *Exposition of Job.* On his return to Rome he resumed his place as abbot, and on the death of Pelagius, in a plague which laid waste the city, G. was unanimously called by the clergy, the senate, and the people to succeed him. He used every means, even to a petition to the Emperor Maurice to withhold his consent, to evade the dignity; but he was forced to yield, and was consecrated September 3, 590. Few pontiffs have equalled, hardly one has surpassed, G. as the administrator of the multiplied concerns of the vast charge thus assigned to him. 'Nothing,' says Dean Milman, 'seems too great, nothing too insignificant for his earnest personal solicitude; from the most minute point in the ritual, or regulations about the papal farms in Sicily, he passes to the conversion of Britain, the extirpation of simony among the clergy of Gaul, negotiations with the armed conquerors of Italy, the revolutions of the Eastern Empire, the title of Universal Bishop usurped by John of Constantinople' (*Latin Christianity*, i. 439). There is no department of ecclesiastical administration in which he has not left marks of his energy and his greatness. To him the Roman Church is indebted for the complete and consistent organisation of her public services and the details of her ritual, for the regulation and systematisation of her sacred chants. The mission to England, which he was not permitted to undertake in person, was intrusted by him, with all the zeal of a personal obligation, to Augustine; and, under his auspices, Britain was brought within the pale of Christian Europe. Under him the Gothic kingdom of Spain, long Arian, was united to the church. Nor was his zeal for the reformation of the clergy, and in purifying of the morality of the church, inferior to his ardour for its diffusion. His letters, which are numerous and most interesting, are full of evidences of the universality of his vigilance. On occasion of the threatened invasion of Rome by the Lombards, G. is declared by Milman to have 'exercised the real power by performing the protecting part of a sovereign;' and in his general administration, to have been 'in act and in influence, if not as yet in avowed authority, a temporal sovereign.' Against the memory of his administration of Rome a charge was formerly made, that in his zeal against paganism he destroyed the ancient temples and other buildings of the pagan city; but Gibbon confesses that the evidence 'is recent and uncertain;' and, indeed, the only authority to which Gibbon himself refers, Platina, simply mentions the charge in order to repudiate it. The same, according to Milman, may be said of 'the fable of his having burned the Palatine Library in his hatred of pagan literature, which is now rejected.' As regards the general government of the church, G. reprobates very strongly the assumption by John, patriarch of Constantinople, of the title of Ecumenical or Universal Bishop; the more especially, as the object of John in assuming this title was to justify an exercise of jurisdiction outside of the limits of his own patriarchate. In his writings, too, the details of the whole dogmatical system of the modern church are very fully developed. His works fill four folio volumes. His *Letters*, and, still more, his *Dialogues*, abound with miraculous and legendary narratives, which, however uncritical in their character, are most interesting as illustrating the manners and habits of thought of that age. G., with all his zeal for the diffusion of Christianity, was most gentle in his treatment of heathens and Jews, and he used all his efforts to repress slave-dealing, and to mitigate the severity of slavery. He died March 12, 604.

GREGORY II., by birth a Roman, was elected bishop of that see in 715. His pontificate is specially noticeable as forming an epoch in the progress of the territorial pre-eminence of the Roman see in Italy. The Eastern emperors having almost utterly abandoned the government, and, still more, the defence of Italy, and the aggressions of the Lombards becoming every year more formidable, the imperial authority in the West sunk into little more than a name; and the tyrannical and barbarous measures by which the Emperor Leo, the Isaurian, attempted to enforce his decrees against image-worship, weakened still more the tie which bound Italy to the Eastern emperors. The natural result of the diminution of the imperial authority in Italy was the growth of that of the pope, to whom the deserted Italian provinces looked, partly as their spiritual counsellor and head, partly as their mediator with the barbarous enemy, partly as the centre of the political federation for self-defence which their very isolation necessitated. G. convened a council in Rome on the subject of the honour due to images, and addressed a very energetic letter to the emperor, protesting against the sacrilegious outrages of which he had been guilty, explaining and defending the Catholic doctrine on image-worship, and warning the emperor that the feelings of his subjects were so completely alienated by his conduct, that it was only the pope's influence which prevented them from throwing off all allegiance. G. has been accused of himself fomenting this disaffection. The contrary, however, is attested, not only by G.'s own letters, but also by Paul the Deacon, in his *History of the Lombards* (book vi. c. 39); and it is quite certain that the circumstances themselves, and the well-known character of the emperor, would sufficiently explain any degree of discontent in Italy. At all events, the result of the contest was a most notable aggrandisement of the political authority and influence of the popes in Italy. G. II. died in 731.

GREGORY III., a native of Syria, succeeded Gregory II. in 731. The encroachments of the Lombards in Italy during his pontificate became so formidable, that as the Eastern emperors still remained powerless or indifferent to the protection of the Italian provinces, the Romans charged G. to send a deputation to Charles Martel, soliciting his succour against the enemy, and proposing, upon that condition, to recognise him as their protector, and to confer on him the title of consul and patrician of Rome. This offer was made by the pope 'in virtue of a decree of the Roman primus,' and is of great historical importance in the consideration of the nature and origin of the papal power in Italy. The embassy failed, owing to the pressure of his war with the Saracens, to enlist the aid of Charles; but it was a step towards the consummation of the independence of the West. G. III. died in 741.

GREGORY VII., pre-eminently the historical representative of the temporal claims of the mediæval papacy, was born, about 1020, at Saona, a village in the southern border of Tuscany. Whether his family belonged to the burgher or the noble class, is disputed by his biographers. His family name, Hildebrand, would imply a Teutonic descent; but by birth and education, at least, he was Italian. His youth was passed at Rome, in the monastery of St Mary on the Aventine, of which his uncle, Laurence (afterwards Bishop of Amalfi), was abbot. From Rome, he passed into France, where he entered the celebrated monastery of Cluny, in the schools of which he completed his education; and from the strict ascetic observances there practised by him, he acquired those habits of austerity which distinguished his entire life. He visited the court of Henry III., and obtained by his preaching the reputation of great eloquence. On his return to Rome, he became the chaplain of Gregory VI., but after the death of that pontiff, he again withdrew to his former retreat at Cluny, from which he was only recalled by the earnest appeal of the new and zealous pope, Leo IX., whom he accompanied to Rome in 1049. Under this active and devoted pontiff, Hildebrand exercised great influence. He now, for the first time, entered into holy orders, and was eventually created cardinal. Besides the important domestic employments which were assigned to him, he was sent as legate to the important council of Tours, in which the cause of Berengar was examined. Under all the short but important pontificates of the successors of Leo IX., who are known in history as the German popes—Victor II., Stephen IX., Benedict X., and

Alexander II.—Hildebrand continued to exercise the same influence, and by inspiring into their government of the church the great principles to which his life was vowed, he prepared the way for the full development of his own theory of the papacy. He was unanimously elected at Rome, without awaiting the imperial authorisation, three days after the death of Alexander II. The German bishops, who feared the strong arm of those reforms of which his name was a guarantee, endeavoured to prevent the Emperor Henry IV. from assenting to the election; but Henry gave his approval, and the new pope was crowned, July 10, 1073. From the date of his election, the pontificate of G. was one life-long struggle for the assertion of the principles with which he believed the welfare of the church and the regeneration of society itself to be inseparably bound up. Regarding as the great evil of his time the thoroughly secularised condition of the church in a great part of Europe, and especially in Germany and Northern Italy, he directed against this all his efforts. The position occupied by the higher clergy as feudal proprietors, the right of investiture with the temporalities of benefices claimed by the crown, the consequent dependence of the clergy upon the sovereign, and the temptation to simony (see Simony) which it involved, were, in the mind of G., the cause of all the evils under which Europe was groaning; and of all these he regarded investiture (see Investiture) as the fountain and the source. While, therefore, he laboured by every species of enactment, by visitations, by encyclical letters, and by personal exhortations, precepts, and censures, to enforce the observance of all the details of discipline—celibacy, the residence of the clergy, the instruction of the people—and to repress simony and pluralism, it was against the fundamental abuse of investiture that his main efforts were directed. In the year after his election, he prohibited this practice, under pain of excommunication both for the investor and the invested, and in the following year he actually issued that sentence against several bishops and councillors of the empire. The Emperor Henry IV. (see Henry IV.), disregarding these menaces, and taking the offending bishops under his protection, G. cited him to Rome, to answer for his conduct. Henry's sole reply was a haughty defiance; and in a diet at Worms in 1076, he formally declared G. deposed from the pontificate. G. was not slow to retaliate by a sentence of excommunication; and in this sentence, unless revoked or removed by absolution in twelve months, by the law of the empire at the time, was involved the forfeiture of all civil rights, and deposition from every civil and political office. Henry's Saxon subjects appealing to this law against him, he was compelled to yield, and, by a humiliating penance, to which he submitted at Canossa, in January 1077, he obtained absolution from the pope in person. This submission, however, was but feigned; and on his subsequent triumph over his rival, Rudolf of Swabia, Henry resumed hostilities with the pope, and in 1080 again declared him deposed, and caused to be appointed in his place the antipope Guibert, Archbishop of Ravenna, under the name of Clement III. After a protracted siege of three years, Henry, in the year 1084, took possession of Rome. G. shut himself up in the castle of St Angelo. Just, however, as G. was on the point of falling into his enemy's hands, Robert Guiscard, the Norman Duke of Apulia, entered the city, set G. free, and compelled Henry to return to Germany; but the wretched condition to which Rome was reduced obliged G. to withdraw first to Monte Cassino, and ultimately to Salerno, where he died, May 25, 1085. His dying words are a deeply affecting, but yet a stern and unbending profession of the faith of his whole life, and of the profound convictions under which even his enemies acknowledge him to have acted. 'I have loved justice and hated iniquity; therefore I die an exile.' The character of G. VII., and the theory of church-polity which he represents, are differently judged by the different religious schools; but his theory is confessed by all, even those who most strongly reprobate it as an excess, to have been grand in its conception, and unselfish in its object. 'The theory of Augustine's city of God,' says Milman, 'no doubt swam before his mind, on which a new Rome was to rise, and rule the world by religion.' In his conception of the constitution of Christian society, the spiritual power was the first and highest element. It was to direct, to command the temporal, and, in a certain sense, to compel its obedience; but as the theory is explained by Fenelon, by Gosselin, and other modern Catholics, the arms which it was authorised to use for the purpose of coercion were the arms of the spirit only. It could compel by penalties, but these penalties were only the censures of the church; and if, in certain circumstances, temporal forfeitures (as in the case of Henry IV.) were annexed to these censures, this, it is argued, was the result of the civil legislation of the particular country, not of any general ecclesiastical law. Thus, in the case of Henry, the imperial crown was forfeited, according to the Swabian code, by the mere fact of the emperor's remaining for twelve months under excommunication without obtaining absolution from the sentence. Moreover, whatever may be said of the power in itself, or of the lengths to which it has at times extended, the occasion and the object of its exercise in the hands of G. were always such as to command the sympathy of the philosophical student of the history of the middle age. By his firm and unbending efforts to suppress the unchristian vices which deformed society, and to restrain the tyranny which oppressed the subject as much as it enslaved the church, he taught his age 'that there was a being on earth whose special duty it was to defend the defenceless, to succour the succourless, to afford a refuge to the widow and orphan, and to be the guardian of the poor.' Dean Milman sums up his history of G. as of one who is to be contemplated not merely with awe, but in some respects, and with some great drawbacks, as a benefactor of mankind.—See Milman's *Latin Christianity*, vol. iii.; Bowden's *Life of Gregory VII.* (1840); Voigt's *Hildibrandt als Papst Gregor VII. und sein Zeitalter*.

GREGORY XIII., Hugh Buoncompagno, was born at Bologna, January 7, 1502. He was educated in his native city, where he held the professorship of law for several years. Having settled at Rome in 1539, he was distinguished by several important employments, and was one of the theologians of the council of Trent, on his return whence, he was created cardinal in 1564, and sent as legate to Spain. On the death of Pius V., G. was elected pope in 1572. Not one among the post-reformation pontiffs has surpassed G. in zeal for the promotion and improvement of education; a large proportion of the colleges in Rome were wholly or in part endowed by him; and his expenditure for educational purposes is said to have exceeded 2,000,000 Roman crowns. The most interesting event of his pontificate, in a scientific point of view, is the correction of the calendar (see Calendar), which was the result of long consideration, and was finally made public in 1582. A grievous imputation rests on the memory of G. from the fact of his having ordered a *Te Deum* in Rome on occasion of the massacre of St Bartholomew (see St Bartholomew); but in justice it must be said, that this was done on the report of the

French ambassador, which represented that bloody event, not as a deliberate aggression on the part of the Catholics, but simply as the suppression of a baffled Huguenot conspiracy. G. published a valuable edition of the *Decretum Gratiani* with learned notes. He died in 1585, in the 83d year of his age.

GREGORY NAZIANZEN—from his erudition in sacred literature also called the THEOLOGIAN—was born about 329 at Arianzum, a village near Nazianzus, in Cappadocia, not far from Cæsarea. His father, whose name also was Gregory, and who had originally belonged to the heathen sect of Hypsistatics, i. e., Worshippers of the Most High, but also of the fire, like the Persians, and keepers of the Jewish Sabbath and the law of the purity of meats, had, chiefly at the instigation of his pious wife Nonna, become a convert to Christianity about the time of the great Nicæan Council (325), and four years later was raised to the dignity of Bishop of Nazianzus. Formed to piety by domestic example, G. was at an early age sent, for the purpose of finishing his education, to Cæsarea, in Palestine, where the study of eloquence then flourished. He then visited the schools of Alexandria, and subsequently of Athens, where he met Basil the Great, then also a young student, and became his most intimate friend. At the same time, there studied at Athens, Julian, later emperor and apostate, and there is no doubt that the three often met and had friendly discussions on the subjects of their common studies; although G., even at that time, augured no good for Julian, who exhibited signs of 'an unsettled and arrogant mind.' G. having made brilliant progress in eloquence, philosophy, and sacred literature, returned to Nazianzus, and here first received baptism at the hands of his own father, consecrating to God, at the same time, all 'his goods, his glory, his health, his tongue, and his talents;' and, in order to be still more able to pursue a life of austere devotion, he retired into solitude, and took up his abode with Basil in the desert near the river Iris, in Pontus. Recalled by his father, G. was ordained priest, and afterwards fled; and being recalled a second time, he returned to Nazianzus, assisted his father in the ministry, and preached to the people. In 371 or 372, St Basil, who in the meantime had become Bishop of Cæsarea, prevailed upon him to accept the see of Sasime, a small town in Cappadocia. But he had scarcely taken possession of his new dignity, when, overcome again by his innate repugnance to public life, he retired, a bishop without a bishopric, to Nazianzus, where he stayed until the death of his father in 373. He then went into a monastery at Seleucia, which, however, after the death of the Emperor Valens (378), he was induced to leave, in order to undertake the charge of a small Nicæan congregation in Constantinople, where, until then, Arianism had held undisputed sway. G. was after a short time, when his erudition and eloquence became conspicuous, elected archbishop, upon which the Arians became so exasperated that his very life was in danger. G., although upheld by the Pope Damasus and the Emperor Theodosius, preferred resigning his see voluntarily, 'in order to lay the storm, like another Jonah, although he had not excited it.' He went back to Nazianzus, and took up his solitary abode near Arianzus, where, after some years of a most ascetic life, he died in 389. His ashes were conveyed to Constantinople, and thence, during the Crusades, to Rome. His day is, with the Latins, the 9th of May. His character and temper, ardent and enthusiastic, but at the same time dreamy and melancholy, hard, but also tender, ambitious and yet humble, all his instability and vacillation between a life of contemplation and of action, are vividly depicted in his writings, which mostly serve the great aim of his life—to uphold the integrity of the Nicæan orthodoxy against the heresies of the Arians and Apollinarists. The merits of his writings—which vividly portray the instability and vacillation of his life—are very unequal; sometimes not inferior to the sublimest flights of poetical genius, and withal of a classical elegance and refinement, they at other times become redundant, pedantic, and heavy with far-fetched similes. Notwithstanding all this, G. may fairly be pronounced one of the first orators, and most accomplished and thoughtful writers of all times. His surviving works consist chiefly of about 53 orations, 242 letters, and 156 poems—meditations, descriptions, acrostics, epigrams, &c.—to which Tollius (Utrecht, 1696) has added 20 more, which he called *Carmina Cygnea*. Muratori published (Padua, 1709) 228 other unedited epigrams. The first edition of his complete works appeared at Basel in 1550, folio. Another edition appeared in Paris 1609—1611 (2 vols. folio), by Morel, which was reprinted in Paris in 1630; Leipsic (or rather Cologne), 1690, and Venice, 1753; but none of these is sufficiently accurate. The last edition, but little improved, under the auspices of the Benedictines, appeared in 2 vols. (Paris, 1760—1840). His separate works have frequently been edited, and partly translated into different tongues.

GREGORY OF ARMENIA, commonly called THE ILLUMINATOR, was the apostle of Christianity among the Armenians. Like the majority of the bishops of the primitive church, little is known of his early history. He is said to have been educated at Cæsarea, in Cappadocia, where, at the same time, he was instructed in the Christian religion. He afterwards entered into the service of Tiridates, king of Armenia, by whom he was subjected to severe persecution on account of his refusal to worship idols. Some severe public calamity which succeeded, being looked upon as a proof of divine wrath, the king immediately put himself and his subjects under G.'s instructions. The people were converted in great numbers, and churches immediately erected throughout the country; and G., after receiving ordination at Cæsarea, returned as metropolitan of Armenia, and baptised his converts. This took place about the beginning of the 4th century. Many authors have given in their works discourses professedly by G., but now believed to be spurious. The memory of G. is held in great reverence in the Greek, Coptic, Abyssinian, and Armenian churches, and he is one of the saints of the Roman Calendar.

GREGORY OF NYSSA, SAINT, a Greek Church-father, and the younger brother of Basil the Great, born about 332 at Sebaste, devoted himself at an early age to the study of sciences and philosophy, and subsequently married a pious and honourable lady. In consequence of a dream, however, he separated from her, and abjuring the world, entered upon the duties of an ecclesiastic. After a short relapse into his old profane studies, he renounced this 'apostacy' for ever, and in 372 was made Bishop of Nyssa, a city in Cappadocia, in Lesser Armenia, much to the dismay of the Arians, who knew him to be a zealous defender of the Nicene creed. They at once commenced an opposition to him. G. was deposed by the emperor, and compelled to flee. He lived for some years in seclusion, until, at the death of Valens (378), Gratianus restored him to his see. In 379, he was charged by the council of Antioch, to visit the churches in Arabia and Palestine, in order to restore them to their pristine orthodoxy and peace, the many years of heresy and dissension that had preceded having created a sad confusion among the flock of the faithful. In 381 he was chosen by the council of Constantinople to be one of the 'Centres' of faith for the Catholic communion, i. e., an arbiter of orthodoxy for his and other congregations, principally in Pontus. He further assisted at the councils held in that city in 382 and 383, and played so prominent a part in both, that shortly afterwards the honourable title of Metropolitan was unanimously conferred upon him. The last time G. seems to have appeared publicly, was at the council at Constantinople in 394; and he seems to have died shortly afterwards. The second Nicæan council conferred upon him the pre-eminent title of 'Pater Patrum.'

His writings are extremely numerous. Although not fraught with the glowing eloquence and penetrating acumen of a Gregory Nazianzen, or a Basil, they exhibit a greater depth of poetical feeling and philosophical thought, while, at the same time, they abound in practical teachings and wise counsels for every stage of life. The fanciful, often puerile subtleties and conceits which occur no less frequently, are rather to be put to the account of the times in which G. lived, when symbolism and allegory reigned supreme. On the other hand, G. cannot be praised too highly for having been one of the first who manfully stood out for the ancient Greek—albeit heathen—philosophy. His writings are indeed fully imbued with Platonism and Aristotelianism, and he went as far as to borrow the technical terms of these masters for his theological investigations. 'As the Israelites borrowed from the Egyptians,' he said, 'so Christianity must carry along with it all that is costly out of the pagan camp;' a saying which, however, has been attributed to some other Fathers of the early church. His orthodoxy has been questioned in later times; chiefly on account of his strongly condemning as heathenish, the view that religion was mostly dependent on the dogma: according to him, religion was more a matter of the heart and of feeling. The council of Ephesus solemnly and most energetically declared for the soundness of his teaching, refuting the heretics out of his own writings. Of his Christology—in the main that of Origen—viz., that the Logos had penetrated all parts of the human nature, and thus elevated it to himself, we will treat under this latter. The Latins celebrate the day of G. on the 10th of January, the Greeks on the 9th of March. His most celebrated works are a catechetic treatise; a dialogue of the Soul and Resurrection, called *Macrinia*, after his sister (supposed to have been held at her death-bed); a treatise on *the Holy Trinity and the Deity of the Holy Ghost*, besides a number of homilies. The first complete Latin edition of his writings, comprising dissertations on the Old and New Testament, dogmatical and controversial treatises, discourses, sermons, panegyrics, biographies, letters, &c., appeared at Cologne in 1537 (folio), and was followed by others at Basel (1562 and 1571), and Paris (1573 and 1603). The first Greek and Latin editions by the Jesuit Gretier appeared in Paris (1615—1618), in 2 vols., fol., and was reprinted there in 1638. Separate works of G. have been edited repeatedly, but next to none have appeared in any modern translation.

GREGORY OF TOURS, originally called **Georgius Florentinus**, born 544 at Auvergne, in a family exalted by rank as well as by piety. On the paternal side, he traced his descent from Vellius Epagatus, the martyr of Lyon; on the maternal, from St Gregory, Bishop of Langres. St Gallus, Bishop of Clermont, G.'s uncle, undertook his early education, and, after his death, G. continued his studies under St Avitus, the successor of Gallus in the bishopric. Ordained deacon, G. left Auvergne, and went to the court of Siegbert, king of Austrasia. Still very young, he was elected to the see of Tours, and he was consecrated by Giles, Archbishop of Rheims. The first years of his episcopacy were a season of great perplexity, owing to the constant contentions of the first Merovingian kings. His courage and firmness, however, were equal to any of the severe tests to which they were exposed, and by openly resisting even royal authority on some occasions, he drew upon himself the hatred of Queen Fredegunda, and the ire of her husband, King Chilperich, who seems to have been a mere tool in her hands. G. was accused of seditious and other treasonable actions, and summoned before a council of bishops in 580. Here, however, he defended himself with such clearness and vigour, that Chilperich himself, strange to say, from that moment ceased to be his foe, and becoming even his warm admirer and friend, charged him afterwards with many important political missions. This royal partiality, however, does not seem to have prevented G. from occasionally calling the king a Herod and a Nero. No less favoured by the king's successors, Gontram and Childebert II., G. did not fail to use all his influence with the court for the amelioration of the position of the church, and the general condition of his flock. His travels had, apart from their political purposes, at the same time the object of everywhere restoring peace and piety, so much needed in those days in convents and churches, among the clergy and the laity. Of his journey to Rome in 590, the circumstances of which are related with a minuteness of itself surprising; of the pope's wonder at finding in G., instead of the imposing man he had expected to behold, a *homuncio*, or manikin, and of his answer, that 'we all are as God had made us,' we can only say, that according to the lucid investigations of Dr Kries (*De Greg. Tur. Vita et Scriptis*, p. 16), it never can have taken place. His last journey seems to have been to Orleans, whither he accompanied the king in 593. He died shortly after, in 594 or 595, at Tours, where he had been a bishop for twenty-three years. His works comprise, in the first place, his ten books of Frankish history, *Gesta*, *Chronicon Francorum*—the first attempt at French historiography—and have earned for G. the name of 'Father of Frankish History,' although its crudity of style, and indiscriminate mixing up of everything important and otherwise, make it partake much more of the nature of a chronicle than of a history properly so called. G.'s other works are: *A Book of the Glory of the Martyrs; Of the Miracles of St Julian* (304); *Of the Glory or Miracles of the Confessors; Of the Miracles of St Martin;* and a book of the lives of the Fathers, consisting of 23 biographies of Frankish ecclesiastics, and many other minor writings. Much more, however, is generally attributed to G. than is in reality his. The first critical edition of his works, by Ruinard, appeared in Paris, 1699, fol.; the latest, by Guadet and Taranne, Paris, 1836 and 1837, with a French translation. Of monographies on G., we may mention *De Greg. Tur. Episc. Vita et Scriptis*, by C. G. Kries and Löbell; *Gregor von Tours und seine Zeit* (Leip. 1835, 8vo).

GREGORY THAUMATURGOS (Wonder-worker), originally called **Theodorus, Saint**, born at Neocæsarea, in Pontus, between 210 and 215. Sprung from an illustrious and wealthy heathen family, he was educated for a rhetorician or advocate; but an acquaintance which he formed with Origen at Cæsarea, in Palestine, allured him to the field of sacred science. G. forgot Roman law, applying himself instead, under his new master, with zeal and fervour to the study of the Holy Scriptures and of profane philosophy. Several years had thus passed, when Maximin's persecutions forced Origen to leave Cæsarea. G. then went to Alexandria, and stayed there for three years (235—238). Gordian having succeeded Maximin, Origen returned to Cæsarea, and G. went to join him there, and to renew his former studies under him. Most probably it was at that period also that he was baptised, and changed his heathen name of Theodorus. Recalled to his family, G., instead of striving for those posts of honour for which he had been destined, retired into solitude; but was so often besought to return and labour for the church, that he allowed himself to be consecrated about 240. Installed as bishop at Neocæsarea, a wealthy and populous, but utterly unchristian city, G. applied himself to his holy work with the utmost zeal. He wrought, according to ancient testimony, many miracles, such as recalling devils, whom he had frightened out of a heathen temple, at his will, and thereby converting its chief functionary to Christianity; moving a stone, staying a river, killing a Jew by his mere wish, changing a lake—a matter of contest between two brothers—into solid earth, and thus contrived to change the unbelieving population of his see into devout Christians.

During the persecution of Decius, which broke out in 250, G. fled with a great part of his flock, whom he would not see exposed to the danger of having either to change their faith, or to die the death of martyrs, and during this flight, he, once when hard pressed by his pursuers, transformed himself and his deacon—the heathen priest whom he had converted by recalling the devils—into trees. In 251, the Emperor Decius died, and G. returned to Neocæsarea. He now instituted a general festival for those Christians who had fallen during the persecution, and permitted the faithful to celebrate it with banquets and sports like those which accompanied heathen festivals—a proceeding by which he intended to draw over the pagan multitude to christianity, but which has been severely blamed, and which, indeed, was fraught with great mischief for the church in later times.

In 264, we find him, together with his brother Anthenodorus, at the Council of Antioch, which had been convoked for the purpose of condemning the heresies of Paul, Bishop of Samosata, their signatures occurring first in the Acts of the Council. Whether or not G. also took part in the second council (269), necessitated by Paul's refusal to abdicate, is very uncertain. Of his own extraordinary piety, devotion, truthfulness, and modesty, of his 'prophetic and apostolic temper,' the best testimony lies in the fact that St Basil, St Maximus, and other great luminaries of the church, call him a second Moses or Paul.

The only genuine works of G. are a panegyrical discourse on Origen, which he delivered in public before his return to his native place; the abovementioned creed; a Metaphrasis on Ecclesiastes, often and wrongly attributed to Gregory of Nazianzus, in twelve chapters; and a Canonical Epistle, setting forth the punishments and penances to be undergone by such Christians as had bought booty from pagan soldiers, a practice very common in those times of constant invasions of Goths and Scythians in Asia, principally in Pontus. All other writings shewn under his name are spurious. The first collected edition of his works was published by Ger. Vossius at Mayence in 1604; a more complete edition appeared in Paris, 1622, in folio.

GREIFENBERG, a small manufacturing town of Prussia, in the province of Pomerania, is situated on the left bank of the Rega, 40 miles north-east of Stettin. It is surrounded by walls, has three gates, and is famous for its linen manufactures. Pop. (1871) 5619.

GREIFENHAGEN, a town of Prussia, in the province of Pomerania, is situated on the right bank of the Reglitz, 13 miles south-south-west of Stettin. It is partially walled, has two churches, and is the seat of considerable industry. Pop. (1871) 6611.

GREIFSWALD, a town of Prussia, in the province of Pomerania, is situated on the Rick, about 3 miles from its mouth, and 20 miles south-east of Stralsund. It is regularly built, and is surrounded by promenades, into which the former ramparts have been converted. Among its houses are several curious brick structures, dating from the 14th and 15th centuries. G. contains, besides other public institutions, a gymnasium and a university (founded in 1456), attended by about 350 students. The university library contains about 100,000 volumes. Weaving, machine-making, salt-works, and manufactures of paper, tobacco, soap, leather, and oil are carried on, as well as commerce. G. possessed, in 1872, 55 ships of 15,530 tons. Pop. (1871) 17,238.

G. was founded in the 13th c., before the close of which it made one in a union of Wendish Hanse-towns, comprising Stralsund, Rostock, Weimar, and Lubeck. At the peace of Westphalia (1648), the town came into the possession of Sweden; but, together with the whole of Swedish Pomerania, it was conceded to Prussia in 1815.

GREIZ, a town of Central Germany, capital of the principality of Reuss-ältere-Linie, and seat of the sovereign prince, is charmingly situated on the right bank of the White Elster, 49 miles south-south-west of Leipsic. It is well-built, is surrounded by walls, and contains three castles, one for winter, another for summer occupation, with beautiful gardens and park; the third, which is built on an isolated rock, is used for public offices. The town-house, a handsome specimen of Gothic, was built in 1841. Nearly 3000 hand-looms are here employed in the manufacture of woollen and half-woollen goods; one factory contains 500 looms. Pop. (1871) 11,582.

GRENA'DA, an island of volcanic origin in the British West Indies, is said to be the most beautiful of the Caribbees. With an area of 133 square miles, it contained, in 1871, 37,684 inhabitants, mostly of African descent. Of these only 400 or 500 are whites, the rest are people of colour. Very considerable importations of coolies have taken place. On the coast are several good harbours; while a central ridge of mountains here and there presenting an elevation of 3000 feet, possesses various extinct craters, some of them transformed into considerable lakes. The chief towns are St George, St Mark, St Patrick, St Andrew, and Charlotte-Town. The first of these, which is the seat of government, stands in lat. 12° 2′ N., and in long. 61° 48′ W. In 1866 there were 27 schools, consisting of the normal and grammar school, the central schools, and parish schools, with an attendance of 1418. The public revenue amounted in 1871 to £22,880. The imports and exports were respectively represented by £132,467 and £153,921; the corresponding results in 1833, virtually the last year of unmitigated slavery, having been £73,846 and £288,683. Among the exports are sugar, cotton, and cocoa; the last of which seems likely to become the staple.—The island was discovered by Columbus on his third voyage in 1498, at which time it was inhabited by Caribs, who were subsequently exterminated by the French, into whose hands G. came about the middle of the 17th century. It finally fell into the possession of the British in 1783.

GRENADE, a small shell, about three inches in diameter, of iron or annealed glass, filled with powder, and thrown from the hand. Hurled among dense masses of troops, as those assembled in the ditch of a fortress during an assault, grenades are particularly embarrassing, the splinters inflicting deep wounds and causing great confusion. The discharge is effected by means of a small time-fuze. Grenades are occasionally rolled over the parapet, through wooden troughs, into the trench below: there is also a species of hand-gun fired from a rest, called 'musketon,' from which grenades may be projected to a short distance. These missiles are said to have been first used in the year 1594.

Grenade.

GRENADIE'R, originally a soldier who was employed in throwing hand-grenades, but in modern parlance a member of the first company of every battalion of foot, in which the tallest and finest men of the regiment are placed. This company used to be distinguished from the rest by tall bearskin caps; it holds the place of honour, viz., the right, when in line, and the front when in column of attack.

GRENADIER GUARDS, the first regiment of Foot Guards in the British Household Brigade of Guards, and generally considered the finest corps in the army. It comprises 2540 officers and men, divided into three battalions. The officers of this fashionable corps are usually from the families of the nobility or more distinguished landed gentry. The First Foot Guards, under which name the regiment was originally known, was first raised in 1660; since then it has ever borne an honourable position in all the wars of the country, and especially in the Peninsula, at Waterloo, and in the Crimea.

GRENADI'NES, a chain of islets in the West Indies, extending between Grenada, on which they are chiefly dependent, and St Vincent, from lat. 12° 30′ to 13° N. They vary in size from about 7000 acres downwards. The largest is Carriacou. Much inconvenience is caused by their deficiency in streams and springs, an evil which, of late years, has been increasingly felt, from the injudicious destruction of the timber.

GRENELLE, a suburb of Paris (q. v.).

GRENO'BLE (a corruption of the Lat. *Gratianopolis*, or City of Gratian), an important town, and strong fortress of France, with double enclosures, capital of the department of Isère, is pleasantly situated on both banks of the river of that name, in a beautiful and fertile district, surrounded by high mountains, and about 58 miles south-east of Lyon. It is divided by the Isère, which is here confined within handsome quays, into two unequal portions: the one, narrow and contracted, and consisting of only two streets, situated on the right bank of the river at the foot of a hill, is called Saint Laurent; the other, a much more important quarter, containing all the public buildings, and consisting of spacious and well-lighted streets, on the left bank, is called Bonne. Among the public buildings are the Palais de Justice, with a Gothic oriel, originally the palace of the Dauphin, and the most interesting old building in the town; the Académie Universitaire; the town-hall; the public library, containing 80,000 volumes and 1200 MSS.; and the picture-gallery. G. has gained a reputation for its manufactures of gloves (in making which from 14,000 to 15,000 persons are employed), liqueurs, perfumes, and silk goods. Pop. (1872) 28,663. In the vicinity lies the village of Chartreuse, from which the Carthusian monks derive their name, and where they originated.—See Champollion Figeac, *Antiquités de G.* (Gren. 1807), and Pitot, *Histoire de G. et de ses Environs* (Gren. 1829).

GRENVILLE, George, an English statesman and reputed author of the Stamp Act, which first drove the American colonies into resistance, was born in October 1712. He was brother to Richard Grenville, Lord Temple, and brother-in-law of the Earl of Chatham. He entered parliament in 1741, and from 1744 to 1762 filled several minor government offices. In 1757 he introduced a bill for the regulation of the payment of the navy. In 1762 he became Secretary of State, and then First Lord of the Admiralty; and in the following year he succeeded Lord Bute as Prime Minister, uniting in himself the offices of Chancellor of the Exchequer and First Lord of the Treasury. He resigned the premiership in 1765, and died in 1770. G. was distinguished for eloquence, public spirit, business qualities, and extensive knowledge; but his imperious nature made him an unpopular minister, alike with the king, the parliament, and the people.

GRENVILLE, William Wyndham, Lord, third son of the preceding, was born in October 1759. After studying at Eton and Oxford with brilliant success, he became a member of the House of Commons in 1782, and attended his eldest brother, Lord Lieutenant of Ireland, in the character of secretary. Soon after he became Paymaster-general of the Army, and in 1789 was chosen Speaker of the House of Commons. In 1790 he was appointed Secretary of State for the Home Department, and was raised to the peerage with the title of Baron Grenville. He became Foreign Secretary in the ensuing year. He resigned office, along with Pitt, in 1801, on the refusal of George III. to give his assent to the Catholic Emancipation Bill. He was Premier in 1806—1807. In 1809 he was chosen chancellor of the university of Oxford. From 1809 to 1815 he acted along with Earl Grey, and he generally supported Mr Canning. Lord G. was an able speaker, with much influence among the Peers, and an excellent scholar. He died in 1834.

GRESHAM, Sir Thomas, founder of the London Royal Exchange, descended from an ancient Norfolk family, was the second son of Sir Richard Gresham, an opulent merchant, elected in 1537 Lord Mayor of London. Born in 1519, he was first apprenticed to his uncle, Sir John Gresham, a wealthy London mercer, and then sent to study at Gonville Hall, now Caius College, Cambridge. In 1543, he was admitted a member of the Mercers' Company. His father, who died in February 1548, had been one of Henry VIII.'s domestic financial agents; and in 1552, G. was sent to Antwerp, as king's factor there, in consequence of the mismanagement of the person previously in charge. In two years, he paid off a heavy loan, entirely restored the king's credit, and introduced a new system of finance. The principal duty of the royal agent was the negotiation of foreign loans; and during the long period he held the office, he was successfully employed in many most important and difficult money transactions. As he was a Protestant, Queen Mary, on her accession, sent him his dismissal; but on presenting a memorial of his past services, he was soon reinstated. By Queen Elizabeth, he was, in 1559, knighted, and appointed, for a short time, English ambassador at the court of the king of Spain's regent at Brussels. The troubles in the Netherlands compelled him, in 1568, to withdraw finally from Antwerp, to which city he had made more than forty journeys on the service of the state, in one of which, in 1560, he was thrown from his horse, and rendered lame for life. In 1569, by his advice, the plan of borrowing money from the London merchants, instead of from foreigners, was adopted, to the great advantage of the mercantile body. Having, in 1564, lost his only son, Richard, he resolved upon devoting a portion of his great wealth to the erection of a bourse or exchange, in imitation of the one at Antwerp, for the London merchants, who were wont to meet in the open air—a project which had originated with his father. It was formally opened, in 1570, by Queen Elizabeth in person, on which occasion she dined with the founder, and named it the Royal Exchange. Renowned for his hospitality and liberality, he frequently entertained foreign personages of distinction, and erected a magnificent mansion at Osterly Park, near Brentford, where he was visited by Queen Elizabeth. For the endowment of a college in London, he directed by his will that his town-mansion in Bishopsgate Street should be converted into a residence and lecture-rooms for seven professors, to be salaried out of the Royal Exchange revenues. Gresham College was taken down in 1768, and the ground on which it stood—now occupied by the Excise Office—was transferred to government. The lectures are now delivered in a lecture-hall built at the corner of Basinghall and Gresham Streets out of the accumulated fund. The subjects of lecture are divinity, physic, astronomy, geometry, law, rhetoric, and music. G. also provided for the erection and support of eight almshouses, and made many other charitable bequests. He died suddenly, November 21, 1579.

GRETNA GREEN, originally the name of a farmstead in the vicinity of the village of Springfield, in the parish of Graitney, in Dumfriesshire, Scotland, but frequently applied to the village of Springfield itself, which is situated about a mile and a half north of the north-eastern extremity of the Solway Firth. The village was long the centre of extensive smuggling operations, and more recently it became famous (or infamous) for its irregular marriages. See next article.

GRETNA GREEN MARRIAGES, the name given to marriages of English persons contracted at Gretna Green. This spot being the first convenient halting-place for runaway couples from England, gave the name to this kind of marriage, originally an easy mode of evading the English Marriage Act, which required the consent of parents and guardians, publication of banns, and the presence of a priest—all of which involved considerable publicity and an inconvenient delay, but which were got rid of by the parties passing the English border into Scottish ground. The rule being, that a marriage is valid if contracted according to the law of the place where the parties enter into the contract, it was easy for English couples to avail themselves of the mode of contracting marriage allowed by the law of Scotland, which required nothing but a mutual declaration of marriage to be exchanged in presence of witnesses—a ceremony which could be performed instantly—and it was immaterial whether the parties were minors or not. This declaration generally took place in presence of a blacksmith, who in reality was no more necessary than any other witness, but who gradually assumed an authority which imposed on the credulity of the English strangers, and thereby profited by the liberality usually dispensed on such auspicious occasions for his trifling services. The declaration of marriage being exchanged, the parties could return at once to England, and their marriage was held ever after to be valid there and all the world over.

These marriages have received much discouragement of late. Not only has the strictness of the English law of marriage been dispensed with, by allowing marriages to be contracted in England in comparative secrecy before the superintendent registrar, without going before a priest, but the Scotch law has also been altered, with a view of checking this evasion of English law. By 19 and 20 Vict. c. 96, no irregular marriage of that kind in Scotland is now valid unless one of the parties had at the date thereof his or her usual place of residence there, or had lived in Scotland for 21 days next preceding such marriage. The effect of this statute is, therefore, an obstacle to runaway marriages from England so far, that one of the parties must at least have resided in Scotland 21 days. In reality, therefore, the Gretna Green marriages may yet be resorted to by English parties, provided the intended husband comply with this requisite, which may easily be done; and it is needless to observe, that if either party has been living in Scotland, he or she will still have no difficulty in eloping with the other party, for the recent statute will be no obstacle in such cases.

GREY, Charles, Earl, K.G., head of the government which carried the Reform Bill, was born March 13, 1764, at Fallowden, near Alnwick. The Greys are a Northumberland family of great antiquity, celebrated for military achievements, and first ennobled in the time of Edward IV. The first earl was Sir C. Grey, K.B., a distinguished member of the military profession, who held commands in the first American war, and in the war against the French republic. He assisted in the reduction of the West India Islands, and was aide-de-camp to Prince Ferdinand at the battle of Minden, where he was wounded. Without the knowledge and against the wish of his more celebrated son, he accepted a peerage from Lord Addington's government. His son was sent to Eton, and thence to Cambridge. He then visited the continent; and in his 22d year entered the House of Commons as M.P. for his native county. He became a follower of Mr Fox, and his maiden speech was in opposition to the address of thanks to the king for negotiating the commercial treaty with France. He soon obtained a leading position in the House of Commons, and was one of the managers of the impeachment of Warren Hastings. He assisted Mr Fox in opening the charge respecting Cheyte Sing, and took an active part in all the subsequent proceedings. He was also one of the founders of the Society of Friends of the People, the object of which was to obtain a reform of the representation. In 1793, he was selected to present a petition from this society, in which the defects and abuses of the representative system were forcibly exposed. He supported the prayer of the petitioners in an able speech, in which he demanded a return to the old constitutional system of 'representation' as distinguished from the modern abuse of 'nomination.' He was outvoted on this occasion, and again in 1797. In 1799, he opposed the proposal for the Irish union, but recommended the abolition of forty rotten boroughs in Ireland as a means of securing the independence of Irish members. When the Whig administration of Lord Grenville came into office in 1806, G., now Lord Howick, became First Lord of the Admiralty. Mr Fox died in September, and was succeeded by G. as Secretary of State for Foreign Affairs, and leader of the House of Commons. The cabinet was broken up in 1807, but not before it had carried the abolition of the slave trade, and the enlistment of soldiers for a limited period instead of for life. It was unfortunate, both for G. and the Whigs, that he was, by the decease of his father in 1807, removed from the House of Commons, where he might have led the opposition, to the Upper House, where his advocacy of measures of progress and amendment found little response. G. and Lord Grenville, as the leaders of the Whig opposition, were more than once desired by the Prince of Wales, after he became Regent, to coalesce with the Tory ministry, but these overtures were firmly rejected. G. actively opposed the bill of Pains and Penalties against Queen Caroline. During the long period in which he remained in opposition, from 1807 to 1830, he gave a strenuous support to the abolition of religious tests, the removal of Roman Catholic disabilities, and the amelioration of the criminal code. The year 1830 was a period of great political disorder and discontent. The French revolution had familiarised the bolder and more ardent spirits with the idea of resistance to the government. Nightly conflagrations in the agricultural districts alarmed the timid. When parliament met in November, G. gave warning of the approaching hurricane, and again urged the adoption of measures of temperate reform. It was in answer to this speech that the Duke of Wellington made his memorable declaration against reform, and expressed his admiration of the existing system of representation. This was the death-blow to the Duke's government. Being outvoted on a motion of Sir H. Parnell's on the Civil List, the cabinet resigned, and William IV. sent for G., who formed a Whig government, of which he was of course premier. The Whigs set to work in good earnest to clear away the gross abuses and nests of corruption which had accumulated during nearly seventy years of Toryism; above all, a great, comprehensive, and searching measure of parliamentary reform was prepared by a sub-committee of the cabinet, consisting of Lord J. Russell, Lord Durham, Lord Duncannon, and Sir J. Graham. The bill was brought into the House of Commons, March 1, 1831, by Lord J. Russell, and electrified the nation. It was, however, fiercely opposed in both Houses. General Gascoyne carried a resolution against reducing the number of M.P.'s. G. thereupon advised the king to dissolve parliament. 'The bill, the whole bill, and nothing but the bill,' was the watchword at the elections; and when the new parliament met, the bill was carried through the Lower House by large majorities. The second reading was moved by G. in the House of Lords, October 3, 1831. After five nights, the bill was thrown out by 199 votes against 158. The reply of the House of Commons was an immediate vote of confidence in the ministers. The king prorogued parliament, in order that, after the shortest possible interval, the bill might be again introduced. Riots took place at Nottingham, Derby, and Bristol. At Birmingham, 150,000 men threatened to march upon London. The metropolis was in a fever of excitement. A second Reform Bill passed the House of Commons, which also passed a second reading in the House of Lords, the Tories being determined to mutilate it in committee. Lord Lyndhurst moved the postponement of the disfranchising clauses, and the Whigs being beaten, G. resorted to the extreme remedy of demanding from the king a new and large creation of peers. The king refused his consent, and G. resigned. The popular excitement increased. The king sent for the Duke of Wellington, but Sir Robert Peel refusing to join the Duke in the attempt to form a government, G. again returned to office, armed with the power of creating as many peers as might be necessary to secure the safety of the bill. On the 4th of June 1832, the Reform Bill passed the House of Lords, and G.'s friends crowded round him to congratulate him on having crowned his long, honourable, and consistent public career by a measure of such immense advantage and importance. G. took office on the principles of peace, retrenchment, and reform. His government, however, lost a good deal of its popularity in England by his deference to the hostility of the Lords, and his attempt to conciliate his opponents by a division of patronage. In Ireland, Mr Stanley's quarrels with Mr O'Connell and the Irish Repealers also tended to weaken the government. Many important measures were, however, passed—the measure for National Education in Ireland, the Irish Church Temporalities Bill, and the bill for abolishing slavery in the West Indies. In December 1834, the Grey ministry fell to pieces on the Irish Coercion Act. G. retired from the post of First Lord of the Treasury with the respect and esteem of the entire nation. A more honourable man never existed. A moral dignity stamped his every action, and over his truthfulness no cloud ever passed. He passed the last ten years of his life in comparative retirement, and died at his family mansion, Howick House, July 17, 1845. His personal appearance was stately and dignified, his gestures were animated, and his tones lofty and sonorous. He left eight sons and four daughters to lament the loss of a most revered parent.

GREY, LADY JANE, an English lady of royal birth and singular misfortunes, was the eldest daughter of Henry Grey, Marquis of Dorset, afterwards Duke of Suffolk, and Lady Frances Brandon. Lady Frances was the daughter of Charles Brandon, Duke of Suffolk, and of Mary, sister of Henry VIII., who had been married to Louis XII. of France, but had become a widow. Lady Jane G. was born at Broadgate, Leicestershire, in 1537. Having discovered, at an early age, surprising talents, she was furnished with an excellent tutor, Aylmer, afterwards Bishop of London, and under his care, made extraordinary progress in arts and sciences, and particularly in languages, being able to speak and write Latin and Greek, as well as French and Italian. We have the testimony of Roger Ascham, that he found her reading the *Phædon* of Plato in Greek, while the rest of the family were engaged in hunting. She also sang and played well, and was versed in other feminine accomplishments.

In 1553, after the fall of Somerset, the Dukes of Suffolk and Northumberland, now ruling in the name of the youthful King Edward VI., and foreseeing his speedy death, determined to change the succession to the crown, and secure it to their own families. Lady Jane G., now 16 years old, was therefore married to Lord Guilford Dudley, fourth son of the Duke of Northumberland, in May 1553. The king, failing in body, and weak in mind, and surrounded by selfish or fanatical advisers, was persuaded to make a deed of settlement, setting aside the right of succession of his sisters Mary and Elizabeth, and Mary Queen of Scots, leaving the crown to Lady Jane, who was innocent of the conspiracy. After the king's death, her ambitious relatives hailed her as 'queen.' Lady Jane at first shrunk from honour so treacherously won, but ultimately yielded to the force of their entreaties and commands, and allowed herself to be proclaimed. The people of England resented the unscrupulous conduct of Suffolk and Northumberland, and learned, brilliant, and amiable as Lady Jane was, they rallied, with the true English instinct of loyalty, round Mary. Northumberland was defeated, sent to the Tower, and beheaded 22d August 1553; and in the following November, Lady Jane and her husband were also condemned. For a while, Mary hesitated to pronounce sentence of death against the young couple, but at length she issued the fatal warrant on the 8th of February, and, four days after, both were executed. Lady Jane reigned only ten days. She met her fate with remarkable firmness, making a brief address, in which she confessed the justice of her sentence; but said: 'I only consented to the thing I was forced into.' Several epistles and other writings attributed to her are extant.

GREY, SIR GEORGE, K.C.B., governor and commander-in-chief of New Zealand, was born at Lisburn, Ireland, in 1812. He was educated at the Royal Military College at Sandhurst, and on attaining his captaincy, offered to explore the interior of Australia, then but little known, and on receiving the requisite permission from the Colonial Office, started on his arduous mission in 1837. In September 1838 he organised another expedition to explore the Swan River district. He returned to England in 1840, and began his *Journals of Two Expeditions of Discovery in North-western and Western Australia during* 1837–8–9. His enterprise and ability obtained for him, unasked, in 1841, from Lord J. Russell, then Colonial Secretary, the post of governor of South Australia. In 1846, he was made governor of New Zealand. Both here and in Australia, his first task was to acquire the language of the natives, with whom he became more popular than any preceding governor. His government appeared to the authorities at home to be so wise and conciliatory, that in 1848 he was made K.C.B. (civil), and in 1854 was appointed governor and commander-in-chief of the Cape of Good Hope. The task of allaying the asperities and irritation left by the Kaffir war demanded high powers of statesmanship; G. was, however, equal to the occasion. Industry revived, and brighter days began to dawn upon the colony. In 1858, however, the Colonial Office interfered with measures which he considered necessary, and he threw up his post, and came to England. Public opinion at the Cape was so strongly manifested in his favour, that he was requested by the government to resume his governorship. On the breaking out of the Indian mutiny, G. sent every soldier he could spare to the assistance of the Indian government, and received the acknowledgments of the British government and parliament for his promptitude and energy. In 1861 he was again appointed governor of New Zealand, in the hope that he would bring the war then raging there to a satisfactory conclusion. The natives received him with joy and veneration, and he succeeded in bringing about pacific relations with the Maories. He resigned his office and returned to England in 1867, but afterwards went to reside in New Zealand, where he has taken a prominent part in resisting the absorption of the provincial powers by the central colonial government. G. is the author of *Journals of Discovery in Australia* (1841); *Polynesian Mythology* (1855); and *Proverbial Sayings of the Ancestors of the New Zealand Race* (1858).

GREY FRIARS. See FRIAR.

GREYHOUND, a kind of dog distinguished by great slenderness of form, length of limbs, elongation of muzzle, swiftness, and power of endurance in running. There are varieties differing in other less important characters, but these are common to all. They have also prominent eyes and very keen sight, but their scent is not acute, and they pursue their prey not by the scent, like the Hounds (q. v.) properly so called, but by keeping it in view. Some varieties, however, as the *Scottish Greyhound*, probably from being crossed with the staghound or some other of the hounds, combine superior powers of scent with the ordinary qualities of the greyhound. Greyhounds have the parietal bones convergent, not parallel as in the hounds. The face exhibits an almost straight line from between the ears to the nose. The ears are small and sharp, half pendulous in the varieties best known in Britain, but quite erect in some of those of other countries. The chest is deep; the belly much contracted; the paws are small; the hair is long and rough in some varieties, short and smooth in others; the tail is long and slender, curved up at the tip, and in the common smooth-haired greyhounds of Britain and the west of Europe, is covered with hair similar to that of the rest of the body; but there are other varieties with a bushy tail. It is probable that the G. originally belonged to some of the wide plains of Central Asia, or to the north of Africa; it has been very long employed by man as a hunting-dog; it is figured in the monuments of ancient Egypt, and has been common from the earliest historic times in India, Persia, and other countries of Asia, as it has been also in Greece, and generally throughout Europe. To the western parts of Europe, however, there is every probability of its having been brought from the East; and old records shew that a very high value was set upon it. It was long employed chiefly in the chase of deer; and on one occasion Queen Elizabeth was entertained with the pleasant spectacle of 'sixteen bucks, all having fayre lawe, pulled down with greyhounds,' which she viewed from a turret at Cowdrey Park, in Sussex, the seat of Lord Montacute. The right to possess greyhounds was a proof of gentility; and the effigy of this dog often appears at the feet of monumental figures of knights in armour. The killing of a G., in the good old times, was a felony, punished as severely as murder.

Greyhounds.

The smooth-haired variety of G., at present so common in Britain, and used for hare-hunting or 'coursing,' was imported from France, and improved by further importations from Greece, Italy, the north of Africa, and India. The varieties previously in use were rough-haired, and some of them larger and stronger. The *Irish G.*, now almost if not altogether extinct, was large and powerful, so that whilst wolves existed in Ireland, it was used to hunt them. The *Italian G.* is a very small and delicate variety, of gentle manners, well known as a drawing-room pet. Greyhounds do not, however, generally shew the strong attachment to particular persons so common in other dogs; and although so long reduced to the service of man, are inferior to many other dogs in the degree of their domestication. Yet the Grecian and Turkish greyhounds have been trained to stop if a stick is thrown among them when in full pursuit of a doubling hare. A whole pack will thus be stopped, and then one, singled out, will pursue the game.

The fleetness of the G. is well illustrated by an anecdote related in Daniel's *Rural Sports*, of a brace of greyhounds in Lincolnshire running after a hare a distance of upwards of four miles in twelve minutes—the increase of distance by turns not being reckoned—when the hare dropped dead.

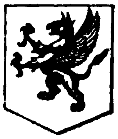
Various etymologies of the name G. have been proposed, than which none is more probable than that which refers it to the prevalence of a grey colour in the breeds once most common. Another derivation is from *Graius*, Grecian.—The *gazehound*, mentioned by old writers, is supposed to be the G., the name being probably given when a pure breed, hunting by sight alone, began to be introduced.

GREYWACKÉ (Ger. *Grauwacke*), a partially translated German word, used as the name of an indurated argillaceous rock, common in, though not confined to, Silurian and Cambrian strata. The great bulk of the Silurian strata of the south of Scotland is composed of this rock.

GRICES, in Heraldry, are young wild boars.

GRIESBACH, JOHANN JAKOB, author of the first critical edition of the New Testament, was born at Butzbach, in Hesse-Darmstadt, January 4, 1745. While G. was still a child, his father was called to St Peter's Church, in Frankfurt-on-the-Maine, where he was also made consistorial counsellor. G. accordingly received his first education at the gymnasium of that city, and afterwards studied theology at Tübingen, where the old dogmatic was still predominant; at Halle, where Semler influenced his whole after-life; and at Leipsic, where he became acquainted with Ernesti. Having resolved to devote himself specially to the criticism of the New Testament text, which had become a favourite study among theologians, G. undertook a journey to various libraries of Germany and Holland, to London, Oxford, Cambridge, and Paris. On his return, he published his *De Codicibus Evangeliorum Origenianis* (1771), and commenced lecturing as *Privatdocent* in Halle. In 1773, he was made extraordinary professor; but in 1776 was called as ordinary professor to Jena, where he continued to teach with great success, and in the enjoyment of many honours, till his death on 24th March 1812. The great work with which his name is associated is his critical revision of the New Testament text. Besides pointing out new sources for the discovery of the original reading, attempting a history of the sacred text (*Curæ in Historiam Textus Epp. Paul.*, 1777), and laying down more certain laws of criticism (*Symbolæ Criticæ ad Supplendas et Corrigendas Varias Lectiones N. Test.*, 2 vols., 1785—1793), G. was the first who dared to print the New Testament text, as he had been enabled to determine it by his critical science. The first specimen of the revised text that he published was the *Synopsis Evangeliorum* (2 vols. 1774—1775; 2d ed. 1809). This was followed, in 1775—1777, by an edition of the whole New Testament, which was published again in 1796—1806, and of which a re-issue was begun by D. Schulz in 1827, but has never been completed. The second edition has been twice reprinted in London, first in 1809, and again in 1818; an American edition was published at Boston in 1808. Besides smaller editions, a splendid one in 4to was published by Göschen at Leipsic in 1803—1807. G.'s other works, *Populäre Dogmatik* (1779; 4th ed., 1789), *Commentarius Criticus in Textum N. Test.* (2 vols., 1798—1811), and the *Opuscula Academica* (2 vols., 1824—1825, edited by Gabler), are now less known. A very competent authority, viz., the eminent Dr Marsh, has pronounced G. to be 'the most consummate critic that ever undertook an edition of the New Testament.' The grand feature of G.'s critical system is his threefold division or classification of the New Testament MSS. These divisions he called 'recensions,' or 'codices.' They consisted of—1. The Alexandrine recension; 2. The Latin or Western recension; 3. The Byzantine or Eastern recension. G. endeavours to shew that the early Fathers, according to their locality, made use of a particular set of MSS., exhibiting certain peculiarities such as justify the above division. G. expressed his decided preference for the Alexandrine recension, both in regard to antiquity and purity; the Byzantine he considered the least trustworthy. Among the most memorable of G.'s triumphs as a critic is his exposure of the interpolation of the well-known passage in defence of the doctrine of the Trinity, 1 John v. 7. His life has been written by Köthe (Jena, 1812), Augusti (Berl. 1812), and by Eichstädt (Jena, 1815).

GRIFFIN (Fr. *Griffon*, Lat. and Gr. *Gryps*), a chimerical creature, which the fancy of the modern has adopted from that of the ancient world. The G. is first mentioned by Aristeas, perhaps about 560 B.C. (see Liddel and Scott's *Gr. Dic.*), though the accounts of Aristeas seem to be about as fabulous as those of the Griffin. See Smith's *Dic. of Gr. and Rom. Biog.* The origin of those monstrous conceptions in general, of which the G. is one, has already been considered under Dragon (q. v.). The G. is variously described and represented, but the shape in which it most frequently appears is that of an animal generated between a lion and an eagle, having the body and legs of the former, with the beak and wings of the latter. In this form it appears on antique coins, and as an ornament in classical architecture. Like all other monsters, griffins abound in the legendary tales of the Teutonic nations, and the name in various forms, slightly differing from each other (Ger. *Greif*, Dan. *Grif*, &c.), is to be found in most Teutonic dialects. Whether in the two cases both the name and the notion might not be traceable to a common source, or whether it was through barbarian or classical channels that they found their way into the nomenclature and the practice of heralds, are subjects on which we do not venture an opinion. Certain it is, however, that there are few fabulous conceptions with which the science of heraldry is more conversant than the griffin. Nor were they regarded by the patriarchs of that science always as mere creatures of the imagination, for incredible as it may seem, we find Gerard Leigh, a herald of great reputation in the time of Elizabeth, talking of them with entire sincerity as existing animals. 'I think they are of great hugeness,' he says, 'for *I have a claw of one of their paws*, which should shew them to be as big as two lions.'—See Newton's *Display of Heraldry*, p. 126. In the heraldic G., the claws of the eagle are usually substituted for the fore-paws of the lion, the creature being represented as in the accompanying woodcut. Gwillim blazons a G. in this attitude 'rampant,' alleging that any fierce animal may be so blasoned as well as a lion. But the more appropriate and usual term is 'Segreant.' In representing the G., the ears ought not to be omitted, as they indicate the attribute of watchfulness, which, along with strength and swiftness, went to make up the classical conception of his character. See WYVERN.



Griffin.

The name GRIFFIN, in Natural History, is sometimes appropriated, as by Cuvier, to the genus *Gypaëtos*, of which the LÄMMERGEIER (q. v.) is the best known species; whilst in France it is generally bestowed, under the slightly modified form *Griffon*, on the TAWNY VULTURE (*Vultur* or *Gyps fulvus*), also called the G. Vulture or Griffon Vulture, a bird which inhabits most of the high mountainous regions of Europe, as well as those of Northern and Central Asia and of the north of Africa. A specimen was caught in the south of Ireland in 1843, the only one that is known to have ever found its own way to the British Islands. The G. Vulture is more than four feet in length; it is of a yellowish-brown colour, with darker quills and tail; the head and upper part of the neck covered with short white down, the lower part of the neck surrounded with a ruff of long slender white down. Its habits are very much those common to vultures in general.

GRILLPARZER, FRANZ, an Austrian dramatic poet, was born at Vienna, 15th January 1790, and first attracted the notice of the public in 1816 by a tragedy, entitled *Die Ahnfrau* (The Grandmother). In 1819 appeared *Sappho*, and in 1822 *Das Goldene Vliess* (The Golden Fleece), which, although they had not much success on the stage, were highly admired as literary productions. The most important of his subsequent works are *König Ottokar's Glück und Ende* (King Ottokar's Fortune and End, 1825), a tragedy regarded by some as in many respects his most masterly piece; *Melusina* (Vienna, 1833); *Des Meeres und der Liebe Wellen* (The Waves of Love and of the Sea, 1840), founded on the story of Hero and Leander, and remarkable not only for its particular beauties, but also for the unusual delicacy and simplicity of spirit characterising it as a whole; and *Der Traum im Leben* (The Dream of Life, 1840), a richly poetical drama. G. also wrote some comedies, and several very beautiful lyric poems, which betray a half-suppressed but genuine love of liberty. He died in January 1872.

GRILSE. See SALMON.

GRIMM, JAKOB LUDWIG, German philologist and antiquary, was born January 4, 1785, at Hanau, in Hesse Cassel. He was educated in classical and legal studies at Marburg, and afterward visited Paris, where he pursued a variety of studies, and assiduously cultivated his taste for medieval literature. On his return to Germany, he was appointed secretary to the minister of war at Hesse Cassel, and became successively librarian of Wilhelmshöhe, and auditor to the council of state. In 1814, he was secretary to the ambassador of the Elector of Hesse, whom he attended at Paris, and at the Congress of Vienna. In 1815, he was appointed a commissioner by the Prussian government to claim the restoration of valuable manuscripts, which had been removed to Paris by the armies of Napoleon I. In 1830 he received the appointment of professor of German literature, and librarian of the university of Göttingen. In this position he devoted seven years to the study of the language, ancient laws, history, and literature of Germany. He was one of seven professors who protested in 1837 against the abolition of the constitution by the king of Hanover, for which act he was outlawed, and obliged to retire to Cassel. In 1841 he was invited to Berlin, where, as member of the Academy, he was entitled to give lectures. He sat as a member of the Assembly of Frankfurt in 1848. Though holding at various times important public offices, his life was devoted to philological and antiquarian studies, and to works which are mines of erudition, and the results of a wonderful industry combined with an excessive enthusiasm for everything German. His German *Grammar*, in four volumes, the first volume of which was published in 1819, and the last in 1837, is perhaps the greatest philological work of the age; it may be said to have laid the foundation of the *historical* investigation of language. It traces the German language through all its dialects. Some idea of its thoroughness may be got from the fact that the vowels and consonants alone occupy 600 pages. His *Deutsche Rechts-Alterthümer* (Antiquities of German Law, published 1828), and *Deutsche Mythologie* (German Mythology, 1835), are exhaustive works upon the society of the middle ages in central Europe, and the religious traditions and superstitions from the earliest times. His *Geschichte der Deutschen Sprache* (History of the German Language), and *Ueber den Ursprung der Sprache* (On the Origin of Language), are also works of great importance. In company with his brother Wilhelm, he published numerous works of a more popular character, the best known of which is *Kinder und Hausmärchen* (Nursery and Fireside Stories). The greatest joint undertaking of the two brothers (now carried on by other scholars) is the *Deutsches Wörterbuch*, begun in 1852, and yet far from completion. Jakob G. died September 1863.

GRIMM, WILHELM KARL, brother of the preceding, was born at Hanau, February 24, 1786. He was the companion of his elder brother at the Lyceum of Cassel, and the university of Marburg. In 1814, he was secretary of the librarian of Cassel, and on removing to Göttingen, in 1830, was appointed under-librarian and supernumerary professor of philosophy. He joined his brother in the protest against the king of Hanover, shared his exile, and also his call to Berlin. They laboured together, and were commonly known as the Brothers Grimm. Wil. G. died December 1859. Among the works of the younger Grimm are—*Translations of Ancient Danish Heroic Poems of the Sixth Century; German Runic Characters; Heroic Legends of Germany, &c.*

GRIMM, FRIEDRICH MELCHIOR, BARON, an eminent critic of last century, who, during his long residence in Paris, was on terms of intimacy with the most celebrated personages of the day, was born at Regensburg, 25th December 1723. Having completed his studies, he accompanied the young Count de Schönberg to the university at Leipsic, and afterwards to Paris. Here he became reader to the crown-prince of Saxe-Gotha, but the situation proved more honourable than remunerative, and G. was in very straitened circumstances when he became acquainted with Rousseau. The latter introduced him to Diderot, Baron Holbach, Madame d'Epinay, and other persons distinguished by birth and talents, and he soon became a general favourite. His connection with the Encyclopedists (q. v.), and his multifarious acquirements and versatility of mind, soon opened to him a brilliant career. He became secretary to the Duke of Orleans, and now began to write his literary bulletins for several German princes, containing the ablest analysis of all the most important French works. In the composition of these notices, he is believed to have been assisted by the Abbé Raynal and Diderot. In 1776 he was raised by the Duke of Gotha to the rank of baron, and appointed minister-plenipotentiary at the French court. On the breaking out of the Revolution, he withdrew to Gotha, and in 1795 the Empress of Russia appointed him her minister-plenipotentiary at Hamburg, a post which he retained till ill-health obliged him to relinquish it. He returned to Gotha, where he died 19th December 1807. His *Correspondance Littéraire, Philosophique et Critique*, was published after his death, in 16 vols. A supplement to this is the *Correspondance inédite de Grimm et Diderot* (Paris, 1829). It contains a complete history of French literature from 1753 to 1790, and is remarkable for its brilliant and piquant criticism.

GRIM'MA, a small town of Saxony, in the circle of Leipsic, and 18 miles south-east of the town of that name, is attractively situated in a hollow on the left bank of the Mulde. In the middle ages, its importance as a trading town was much greater than at present, and the flourishing manufactures in cloth, flannels, hosiery, cottons, and linens, for which at an early period of its history this town was noted, have now almost entirely disappeared. Among the public buildings are the royal castle, now used as a court-house, and the ancient town-hall. Pop. (1871) 6536, who support themselves by manufactures and agriculture.

GRIMM'S LAW, the name—derived from the discoverer, J. Grimm (q. v.)—given to the principle which regulates the interchange of the mute consonants in the corresponding words of the different Aryan languages. A historical survey of this family of tongues shews the consonants to go through a cycle of changes (Ger. *Lautverschiebung*). What, for example, was a *p* in the original form of a word, or, at least, in the oldest form known, is found at a later stage transformed into *f*, which next passes into *b*; and this again tends to become *p*, and go through the cycle anew. The following table exhibits the transitions that manifest themselves in regard to the Greek, Gothic, and Old High German:

	Labials.			Dentals.			Gutturals.		
Greek (Latin, Sanscrit),	p	b	f	t	d	th	k	g	ch
Gothic, . . .	f	p	b	th	t	d		k	g
Old High German, .	b (v)	f	p	d	z	t	g	ch	k

There are of course many exceptions, arising from the influence of adjoining letters and other accidental causes. The following are examples of the law:

Sanscrit.	Greek.	Latin.	Gothic.	Old High German.
pâda-s	pod-os	pedis	fôtus	vuoz
pitrî	pater	pater	fadrein (pl.)	vatar
bhri	phero	fero	baira	pîru
tvam	tu	tu	thu	du
trayas	treis	tres	threis	drî
paçu	poü	pecus	faihu	vihu

It is in the High German dialects that the action of this principle is most marked. In the Teutonic tongues of the 'low' type, of which English is one, the consonants have remained at the same stage of development they had attained in the Gothic (e. g. Eng. *father*, *foot*, *bear*, *three*); the Old High German exhibits a third stage; and in modern High German the principle seems still at work, although its development is hindered by the crystallising effect of written language.

GRI'MSBY, GREAT, a parliamentary and municipal borough, seaport, and market-town of England, in the county of Lincoln, is situated on the right bank of the Humber, 40 miles north-east of the town of Lincoln. It consists of two portions—the older, comprising a number of streets irregularly laid out, is at the head of the harbour; and the newer part, called the 'Marsh,' extends along the east side of the harbour, and is regular and spacious. The parish church, a good specimen of the English pointed style, is an elegant cruciform structure, with a tower containing eight bells rising from the centre. Among its institutions G. has a free grammar-school, a national school, and other educational establishments; a mechanics' institute and a new town-hall. There are here an extensive and commodious suite of docks, opened in March 1852, and spacious enough to receive the largest ships of war; several ship-building yards, mills, and a tanyard and brewery. G., however, is now chiefly famous for its immense fishing trade. In 1872, 1627 vessels, of 398,689 tons, entered, and 1858, of 470,083 tons, cleared the port. The commerce of G. is benefited by its being the terminus of the Great Northern, and of the Manchester, Sheffield, and Lincolnshire Railways. It sends one member to the House of Commons. Pop. in 1871 of the municipal borough, 20,244; of the parliamentary borough, 26,982.

G. was formerly a port of such importance that, in the reign of Edward III., it sent eleven ships to aid that monarch in his expedition against Calais. But the gradual silting up of the harbour reduced it to comparative insignificance. Its present prosperity may be said to date from the beginning of this century, when measures were first taken to improve the harbour.

GRI'NDELWALD, one of the most beautiful of the high Alpine valleys, at a distance of 35 miles from the city of Bern, is about 12 miles long and 4 miles broad. G. owes its celebrity as a resort for travellers to two great glaciers, branches or arms, as it were, of the immense ocean of ice which covers the Bernese Oberland. The village of G., consisting of a number of widely scattered cottages, with about 3500 inhabitants, is about 3600 feet above sea level.

GRINDING, the operation of shaping any hard substance by rubbing away its surface with a rough stone or with a cutting powder. It is similar to filing, and is used in cases where, from the hardness of the material, or for other reasons, filing is inapplicable. Thus cutting-tools and other steel instruments may be filed before hardening and tempering; but after this, if further abrasion is required, they must be ground. Glass lenses and metal specula are ground to shape with emery-powder laid upon a metal tool. Ornamental glass is ground into facets or otherwise by means of stones and lapwheels. Diamonds and other gems are ground or cut with diamond-dust imbedded in soft iron. When large flat surfaces are required, they are obtained by first working two pieces of the substance nearly flat, and then laying one upon the other, and grinding their surfaces together with sand, emery, or other suitable cutting powder. Plate-glass is flattened in this manner; also surfaces of cast iron where accurate fitting is required, the iron surface being either prepared with a planing-machine, or by turning in a lathe with a slide-rest. Sockets and other bearings which require to be fitted with great accuracy are usually finished by grinding together. For brass and bell metal powdered pumice-stone is best adapted for such purposes, as emery is liable to imbed itself in the metal, and give it a permanent cutting action upon the bearings.

Dry grinding is the term applied to the grinding of steel with dry grindstones. Its principal applications are in the grinding of the points of needles and forks, the surfaces of gun-barrels, and in finishing steel-pens. This kind of work produces painful irritation in the throat and nostrils of the men and women who follow it; and although the distressing effects have been very much diminished of late by the introduction of currents of air to carry away the particles of steel, and mouth-pieces of damp cloth, the evil is not entirely obviated; in some branches, such as gun-barrel grinding, it is still very great. Besides this evil, the stones used for gun-barrel grinding, which are very large, revolve with great rapidity, and occasionally break with great force while revolving, and seriously endanger the lives of the men.

Another kind of grinding, quite distinct from the above, is that of crushing and rubbing a substance into a fine powder. This is effected by passing the substance between rough stones, as in the common flour-mill, or between rollers, either smooth or toothed, according to the degree of fineness required, or by a heavy stone or iron cylinder revolving upon a smooth plate. Colours are ground in small quantities with a *muller and slab*. The muller is a heavy piece of stone of somewhat conical shape, and which rests on its base upon the slab of stone, and is grasped by the hands, and the colour is mixed to a pasty consistence with the required medium of oil or water, and rubbed between the two surfaces until smooth and impalpable. On a larger scale, iron or stone cylinders revolve on a slab in such a manner that they shall not merely roll but shall also rub upon the surface of the slab. A knife or scoop follows one cylinder and precedes the other, scooping the paste into the position required to come fairly under the cylinder which follows it. Chocolate, spices, plumbago for crucibles, and a variety of other substances, are ground in this manner.

GRINDSTONES. Flat circular stones made to revolve upon an axis, and used for grinding steel, glass, other stones, &c. They are made of sandstone, or sandstone grit, of various degrees of coarseness, according to the purpose for which they are to be used.

GRIPING, or GRIPES, a popular name for all painful affections of the bowels, whether attended with Constipation (q. v.) or Diarrhœa (q. v.). When pains of this kind are spasmodic, they are termed Colic (q. v.). The action of purgative medicine is often attended by more or less of griping pain, which may be averted in certain cases by the careful choice of the medicine, or by combination of it with Carminatives (q. v.), or with a little opium.

GRIPPE, a French name for Influenza (q. v.).

GRI'QUALAND, a tract of country in South Africa, to the north-east of Cape Colony, lying about the junction of the Orange and Vaal Rivers to the west of the Orange River Free State. It derives its name from its inhabitants, the Griquas or Bastaards, a race sprung from the intercourse of Dutch settlers with Hottentot and Bush women. The area and population are uncertain. Some of the inhabitants are successful farmers, and there is a thriving settlement, Griqua Town, under the care of the London Missionary Society.—*Griqualand West* has of late years become famous from the discovery of the Cape diamond-fields, which are situated within its bounds. The first diamond was found in 1867, and since 1870 a strong tide of immigration has flowed unceasingly. Various settlements were formed; digging was vigorously prosecuted; and all nationalities were represented. The territory in which the diamond-fields lie had been secured to a native chief, Waterboer, by the British government; but both the Orange River Free State, and the Transvaal Republic contested his boundaries, and the result was constant disturbances at the diggings. At length, in October 1871, the British government of Cape Town issued a proclamation declaring Griqualand West British territory, and annexing it to Cape Colony. This was done with the assent of Waterboer, whose interests were not neglected. The principal settlements are Du Toit's Pan and De Beer. Pop. (1872) 25,477; area about 17,800 sq. m.—*Griqualand East* was also annexed to Cape Colony in 1874.

GRISE'LDA, or GRISELDIS, is the heroine of a celebrated medieval tale, which probably had its rise in Italy. A poor girl, who was a charcoal-burner, was raised to be the wife of the Marquis of Saluzzo, who put her humility and obedience to the severest tests. She, however, passed through them all triumphantly, and a reconciliation took place. In this legend, the endurance and self-renunciation of the loving woman are represented as carried to the highest pitch. We find the tradition first worked up into a tale, said to be founded on fact, in Boccaccio's *Decameron;* Petrarch translated it into Latin in 1373, under the title *De Obedientia, et Fide Uxoria;* and in the 14th c., the story was well known throughout Germany. In the year 1393, it was worked up into a 'mystery' play in Paris; in England, the drama of *The Patient Grissel* appeared in 1599, and one on the same subject by Hans Sachs in Germany in 1546. Versions of the story are also found in the literatures of Holland, Bohemia, Sweden, Iceland, &c. The old German people's book, entitled *Markgraf Walther*, has lately been reproduced with more or less fidelity in Schwab's *Buchder Schönsten Geschichten und Sagen*, Marbach's *Volksbücher*, and Simrock's *Deutschen Volksbücher*.

GRI'SI, Giulia, a celebrated vocalist, was born at Milan in 1810. From a very early period, she evinced the most remarkable musical genius, accompanied by a voice of the rarest promise. At the age of 16, she first appeared in the opera of *Zelmira*, at Bologna, and gathered her earliest laurels by the inimitable quality, melodiousness, and fidelity of her voice, as well as by her pathetic and lifelike impersonation of the rôle. Two years later, she appeared at Florence, and to no artist was pre-eminence ever more unanimously accorded. Her greatest triumph, however, was obtained at La Scala, Milan, where she played the part of Norma in the tragic opera of that name. So thoroughly did she identify herself with this character, that hardly any subsequent singer has ventured on an original and independent personation. G.'s début at Paris in 1832 was equally successful, and overcame the proverbial cynical apathy of the frequenters of the Théâtre Italien. London, however, was the scene of her grandest performances, and most appreciating audiences. G. was twice married, first, unhappily, to Mons. Gérard de Meloy, and secondly, to Signor Mario, the eminent tenor. She died in 1869.

GRIS-NEZ, or GRINEZ, Cape, a headland of France, in the department of Pas-de-Calais, opposite Dover, is the point of land nearest to the English shore, the distance being barely 21 miles. Cape G. is about equally distant from Calais on the north-east and Boulogne on the south. It is surmounted with a light-house, the lat. of which is 50° 52′ N., and the long. 1° 35′ E.

GRI'SONS (Ger. *Graubünden*), the largest and the most thinly peopled of all the cantons of Switzerland, is bounded on the N. by St Glarus, St Gall, and the Vorarlberg; on the E. by the Tyrol; on the S. by Lombardy; and on the W. by Uri and Ticino. Its area is 2673 square miles; its population (1870), 91,782, of whom 39,843 are Catholics. The canton divides itself naturally into three great valley-districts, of which the first and most important lies along the course of the Rhine, and stretches northward, occupying nearly the whole of the western portion of the canton; and the second, forming the Engadine (q. v.), extends north-east along the course of the Inn. The third valley-district comprises several smaller valleys whose streams run southward, belonging to the basins of the Ticino and the Adda. The whole canton is an assemblage of mountains intersected by narrow valleys. The climate is very varied, in some districts winter reigns for nearly eight months, while some of the southern valleys resemble Italy. In the colder districts, scanty crops of barley and rye are raised with difficulty; while in the southern valleys, wheat, maize, and also the vine, fig, and almond are successfully cultivated. Pastures and forests occupy a large portion of the canton; and cattle, timber, and cheese are the principal exports. The rivers abound in salmon and trout, and the mountains are still the haunt of the bear, wolf, lynx, and wild-cat.

The country was anciently inhabited by the Rhætii, who are by some connected with the Etruscans (see Etruria). It was conquered by the Roman emperor Constantius in the 4th c., and his camp (*Curia*, *Chur*, or *Coire*, the name of the present capital) was planted on the Rhine. Chur has been a bishopric since 450 A. D. In the 10th c. the country of the G. was added to the German empire, and remained till 1268 subject to the Swabian dukes. With the decay of the imperial authority it came to be oppressed by a numerous nobility, the ruins of whose castles still crown the heights. Against them the people began, in the end of the 14th c., to form leagues in the different valleys. One of these leagues, formed in 1424, was called the *gray* league (Ger. *der graue bund;* in the native language, *lia Grischa*), from the gray homespun worn by the unionists, and hence the German and French names of the canton—Graubündten and Grisons. In 1472, these separate unions entered into a general federation, which then formed an alliance with the Swiss cantons. It was not till 1803 that G. was admitted into the Swiss confederation as the 15th canton. The constitution of G. is very complicated, and suffers from the want of centralisation incident to its origin. Of the inhabitants, one-third speak German, and the others dialects derived from Latin. The dialects of the southern valleys are a kind of Italian; the Latin of the Engadine (q. v.) and the Romanese differ greatly from Italian, but are far from being Latin.

GRIT is a coarse-grained sandstone, the particles of which are more or less angular, and compacted together by a hard siliceous cement. See Millstone Grit.

GROAT (Dutch, *groot*, Ger. *groschen*, Fr. *gros*, Ital. *grosso*, Low Lat. *grossus*, from the same root as Eng. *great*, and meaning *thick*), a name given in the middle ages to all *thick* coins, as distinguished from the 'bracteates' (Lat. *bractea*, a thin plate or leaf), or thin coins of silver or gold-leaf stamped so as to be hollow on one side and raised on the other. Groats differed greatly in value at different times and in different countries. The silver groat once current in England (introduced by Henry III.) was equal to four pence. The coin—though not the name—has been revived in the modern fourpenny-piece. Groschen are still current in the north of Germany. The silver groschen, or neugroschen of Prussia and the Zollverein, is $\frac{1}{30}$th of a thaler, and worth 1⅕d.; the gute groschen of Hanover = $\frac{1}{24}$th thaler = 1½d.

GROATS (also locally *grits*, from the same root as *to grate*, to rub to powder; allied to Eng. *scratch*, and Lat. *rado*, to scrape), the grain of oats deprived of the integuments. Groats are much used for preparing *gruel* for invalids, and were formerly also often used in broths and soups like pot-barley.—*Embden Groats* are groats broken into small pieces by crushing.—Concerning the nutritive and other qualities of groats, see Meal and Oats.

GRO'DNO, a government of Russia, in the province of West Russia, and formerly a portion of Lithuania, is bounded on the N. by the government of Vilna, on the E. by that of Minsk, on the S. by Volhynia, and on the W. by Poland and the province of Bialystok. It has an area of 14,532 square miles, and a pop. of (1867) 958,852. The land is, in general, flat, and belongs in the south-west to the basin of the Vistula, in the north to that of the Niemen, and in the south-east to that of the Dnieper. In the south, extensive morasses occur, although much marshy land has been already converted into pasture-ground by draining; and in the north are extensive forests, chiefly of pine. The soil is light and sandy (except that of the river-valleys, which is clayey), and is in general fruitful. Rye is the principal agricultural product, the average annual yield being estimated at 2,346,000 English quarters. Barley, flax, hemp, hops, and timber are also extensively raised. The bear, the lynx, and the buffalo are found in the forests. Cattle, sheep, and bees are largely reared. The chief branches of industry are the manufactures of cloth, hats, paper, and leather, and the principal exports are corn, cattle, wool, leather, hops, honey, and wax.

GRODNO, a town of Russia, capital of the government of the same name, is situated on an elevation on the right bank of the Niemen, 160 miles north-east of Warsaw. It has twelve churches and convents, several synagogues and castles, some ruinous palaces, belonging formerly to old Lithuanian families; a gymnasium; manufactures in cloth, silk, and weapons; and a flourishing trade, which is almost wholly in the hands of the Jews, who form about three-fourths of the population. The modern palace, erected here by Augustus III., is an extensive and handsome edifice. The other principal buildings are the market-place, the equestrian seminary, the high school, the academy for medical science, connected with which are a library, collection in natural history, and a botanic garden. Here, in 1586, Stephan Bathori died in his own castle; and here, 25th November 1725, Stanislas Augustus abdicated the Polish crown. Pop. (1867) 24,789.

GROG, the name applied in the navy to the mixture of rum and water served out as a beverage to the men. Under recent regulations, men who prefer abstaining from grog are allowed to receive money or tea in lieu thereof. Forced potations of *six-water grog*, consisting of one part rum to six parts of sea-water, are administered occasionally, by way of punishment for dirtiness and some other offences. The quaint name of *grog* is said to be derived from a nickname of Admiral Vernon, who introduced it into the service. In bad weather, he was in the habit of walking the deck in a rough *grogram* cloak; the sailors thence called him *Old Grog*, and then transferred the name to the drink.

GROINED VAULTING is that kind of vaulting in which the vault is not a plain barrel-vault from end to end, but where one vault cuts into another. The angle formed by the intersection is called the groin. In Roman architecture, the groins were generally left as a plain sharp edge; in Gothic, they were usually protected and strengthened with *ribs*. See VAULT.

GROMWELL (*Lithospermum*), a genus of plants of the natural order *Boragineæ*, having a funnel-shaped corolla, stamens shorter than the corolla, and *achenia* of stony hardness. Probably, on account of the last-mentioned character, extraordinary virtues were formerly ascribed to them, particularly to the COMMON G. (*L. officinale*), in the cure of stone in the bladder, which, however, were wholly imaginary. The Common G. is a native of dry gravelly places in Europe, Asia, and North America. It has an erect, much-branched stem, broadly lanceolate leaves, and small greenish-yellow flowers.—CORN G. (*L. arvense*) with small white flowers, is more plentiful in Britain, and is of equally wide geographic distribution.—Two species, natives of the south of Europe, *L. tinctorium* and *L. anchusoides*, yield a dye-stuff similar to alkanet, and which passes under that name.

GRO'NINGEN (anc. *Cruoninga*), the most north-eastern province of the Netherlands, is bounded on the N. by the North Sea, on the E. by Hanover, on the S. by the province of Drenthe, and on the W. by that of Friesland. It has an area of 896 square miles, and in 1872 its population amounted to 228,883. It is watered by the Hunse, which is navigable for large vessels from the town of Groningen to its mouth in the Lauwer Sea, by other small streams, and by lakes and numerous canals. Its surface is flat, and is protected against the sea on the north by dykes. The soil, which is principally alluvium, forms excellent arable land. The north of the province contains the best soil, and is one of the most densely peopled districts of the kingdom. A considerable portion of the land (towards the south-east) is marshy, and lies in pasturage, which supports a fine breed of cattle, and great numbers of highly valued horses and sheep. Farming and grazing are the chief pursuits of the people; fishing, commerce, and trade are also carried on, as well as manufactures to some extent. Shipbuilding is extensively carried on, and much butter exported. The people are almost entirely of the Frisian race, and belong chiefly to the Reformed Church.

GRONINGEN, an important fortified town of the Netherlands, capital of the province of the same name, is situated on the Hunse, at the confluence of the Aa with that stream, 22 miles west of Dollart Bay. It is nearly circular in form, is surrounded by walls and a fosse, and is traversed by canals crossed by 18 bridges. The Hunse is here converted into a canal, and is navigable for large vessels, about 600 of which visit the town annually. The great market-place, said to be the largest in Holland, is 662 feet long and 389 feet broad, and contains the beautiful Gothic church of St Martin's, with a noble tower 343 feet high, the highest in Holland. The university, founded in 1614, possesses a library, a botanic garden, and a cabinet of natural history. The port of G. is good; it communicates by means of canals with Dollart Bay on the east, with the Lauwer Sea on the north-west, and with the entrance to the Zuider Zee at Harlingen on the west. There are ship-building yards and paper-mills. Pop. (1869) 38,528.

GROO'TÉ EY'LANDT (English, *Great Island*) lies off the western coast of the Gulf of Carpentaria, in North Australia, and is the largest island in that vast inlet, in lat. 14° S., and long. 136° 40′ E. Its extreme length and breadth are about 40 miles each. The centre is mountainous, and the shores are dry and barren.

GROS, ANTOINE JEAN, BARON, a French historical painter, was born at Paris on 16th March 1771, studied in the school of David, and first acquired celebrity by his picture of Bonaparte as the victor of Arcola. The latter was so much pleased with the work, that he appointed G. a member of the commission charged with collecting the objects of art which had been ceded to France by the treaty of Tolentino. His first great achievement, however, was the 'Pestiférés de Jaffa' (The Plague-smitten at Jaffa), which was executed at Versailles in 1804. It excited prodigious enthusiasm, the author being carried in triumph to the saloon of the Louvre, where the picture was crowned in his presence. Other important works executed by G. during the Consulate and the Empire are: 'Bonaparte aux Pyramides,' 'Le Combat d'Aboukir,' 'La Bataille de Wagram,' 'Charles-Quint reçu à Saint-Denis par François I^{er}.' After the return of the Bourbons, G. painted, among other pictures, 'Le Depart Nocturne de Louis XVIII. au 20 Mars 1815,' 'La Duchesse d'Angoulême s'embarquant à Pauillac,' and 'Charles X. au Camp de Reims.' Besides these, he finished, in 1824, an immense work for the cupola of the church of Saint-Geneviève in Paris, begun in 1811, to which, say his countrymen, 'there is nothing comparable.' It is not a fresco, but a painting executed in oil upon a peculiar kind of plaster, representing the four great dynasties of France doing homage to the tutelary genius of the nation. Charles X. was so charmed with the work, that he raised G. to the dignity of a baron, and doubled the sum which the painter had originally stipulated for. The rise of the romantic school bore away from him the tide of popularity, and G. felt the ebbing of his fame so acutely, that it is suspected he committed suicide in a fit of profound chagrin. At all events, his body was drawn out of the Seine near Meudon, 26th June 1835. G.'s paintings are all marked by strength of effect, and dramatic movement in the scene; they are, however, deficient in delicacy and sentiment, and exhibit a very ordinary power of imagination.

GRO'SBEAK (*Coccothraustes*), a genus of birds of the family *Fringillidæ*, distinguished chiefly by the great thickness of the bill, which has also a proportionate strength, and notwithstanding the small size of the birds, is used for breaking the stones of cherries, olives, &c. The Hawfinch (q. v.) and Greenfinch (q. v.) are the British species, nor are there any others in Europe; but some are found in

Grosbeak (*Loxia coccothraustes*).

other parts of the world, as the beautiful EVENING G. (*F. vespertina*) and the ROSE-BREASTED G. (*F. Ludoviciana*) in North America.

GRO'SSENHAIN, or **HAIN**, formerly also called **Markgrafenhain**, is a small manufacturing town of Saxony, situated on the left bank of the Röder, 20 miles north-west of Dresden. It is famous for its woollen and cotton manufactures. Pop. (1871) 10,438.

GROSSETESTE, ROBERT, a celebrated English prelate of the middle ages, was born at Stradbrook, in Suffolk, in the latter part of the 12th c. He studied at Oxford, and subsequently at Paris. On his return to England, he obtained a great reputation as a divine, and was the first lecturer in the Franciscan school at Oxford. In 1235, he was elected Bishop of Lincoln, and at once commenced in the most vigorous fashion the reformation of abuses in his diocese. The most conspicuous and offensive ecclesiastical sin in G.'s days, was the conduct of the pope (Innocent IV.) in the matter of church appointments. It was common for His Holiness to make grants of vacant benefices in England to Italians, and other foreigners, many of whom, it would appear, never shewed face in this country at all, but contented themselves with drawing the revenues of their office. This was intolerable to a man like G., and he set himself strongly against it, incurring, by his boldness, a temporary suspension from the exercise of his episcopal functions, and a continual menace of excommunication. One of these transactions in the year 1253 has been the subject of much controversy. It is alleged by some writers that Innocent wrote to G., ordering his nephew, an Italian youth, to be promoted to the first canonry that should be vacant in the cathedral of Lincoln, accompanying his injunctions with threats. The bishop was filled with indignation, and at once addressed a letter either to the pope or his agents, in which he declares, that 'if an angel from heaven commanded him to obey a mandate so absurd and sinful, he would not do it,' and compares the nepotism of the pope to the sin of Lucifer and Anti-Christ. Innocent, according to these writers, was violently enraged at his opposition; he excommunicated G., and even appointed a successor to the bishopric, but in this instance the thunder of the Vatican was harmless. G. quietly appealed to the tribunal of Christ, and troubling himself no more about the matter, continued to discharge his episcopal functions. The general feeling of the English nation sustained him; the clergy of his diocese went on obeying him as if nothing had happened; and at his death, October 9, 1253, Archbishop Boniface conducted the funeral services. But Dr Lingard (ii. p. 502) has shewn that the mandate came not from the pope, but from the nuncio; that Innocent, on receiving G.'s reply, not only rescinded the order, but adopted measures for the reform of these abusive appointments; and that the story of his having died under a sentence of excommunication rests on very questionable authority. G. is commonly regarded as one of the 'reformers before the Reformation.' It is assumed that because he quarrelled with the head of the church on a matter of discipline, he must have been a 'Protestant.' But nothing could be further from the fact than such an assumption. He belonged to that class of minds who look at truth not from the side of *doctrine*, but of *practice*. He would have accepted, with acquiescence, any new doctrine from the Vatican, but a knavish trick was not to be endured, even at the hands of an angel from heaven! It is in the last degree futile, therefore, to claim him as a precursor of men like Luther, or Calvin, or Knox. In politics, he was a constitutionalist, and a friend of Simon de Montfort, heartily interested in the preservation and extension of such liberty as England then enjoyed. His learning was prodigious, almost inspiring awe among his contemporaries. Latin, Greek, Hebrew, French, mathematics, medicine, and music were among his attainments. His knowledge of the Scriptures is also particularly lauded. G. was one of the most voluminous authors that England ever produced. The list of his works, as given by Dr Pegge, of which only a few have been published, occupies 25 closely-printed pages in quarto. For an intelligent estimate of his life and character, see Mr Brewer's *Monumenta Franciscana*, and the collection of his letters edited by Mr Luard, and published (1862) under the title, *Roberti Grosseteste Episcopi quondam Lincolniensis Epistolæ*.

GROSSULARIA'CEÆ, a natural order of exogenous plants, containing about 100 known species, all shrubs, natives of temperate climates, and chiefly of the northern hemisphere. They have alternate lobed leaves. The calyx is 4—5-cleft, the tube entirely or in part adherent to the ovary; the petals are very small, alternate with the segments of the calyx; the stamens are alternate with the petals, and inserted into the throat of the calyx; the ovary is one-celled, with two opposite parietal placentæ; the fruit is a berry crowned with the remains of the flower, having numerous seeds immersed in pulp, and suspended by long threads; the *testa* externally gelatinous, adhering firmly to the horny albumen. The most important species of the order are the Gooseberry (q. v.) and Currants (q. v.).

GROSSWA'RDEIN (Magyar, *Nagy-Varad*), a town of Upper Hungary, in the county of South Bihar, is situated in a beautiful plain, on the Sebes Körös ('the rapid Körös'), 38 miles south-south-east of Debreczin. It is the seat of a Roman Catholic, and of a non-united Greek bishop, and consists of the town of G. proper, and eight suburbs. The town is surrounded by a wall, and was formerly a fortress. The principal buildings are the churches, of which there are 22, including the cathedral, a magnificent edifice. A great trade is carried on here, especially in pottery, in cattle-rearing, and in the cultivation of the vine. The town is connected by railway with Vienna. The entire population of this town in 1869 was 28,698. G. was taken and pillaged by the Turks in 1660, and by the Austrians in 1692.

GROTE, GEORGE, politician, historian, and philosopher, was born 1794 at Clay Hill, Beckenham, Kent. His grandfather, Andrew Grote, a native of Bremen, settled in London in the beginning of the last century, and, in conjunction with Mr G. Prescott, founded the London banking-house that still bears their joint names. His mother, Selina Mary Peckwell, was the daughter of the Rev. Dr Peckwell, chaplain to the Countess of Huntingdon, who married an Irish lady, descended from an old French family in Touraine, one of whom, being a Protestant, settled in this country after the revocation of the edict of Nantes. G. was educated at Charter House, and at sixteen entered his father's banking-house, employing all his leisure hours in study. In 1823, he began to amass materials for a history of Greece. Previous to 1832, he wrote on parliamentary reform, and threw himself into the agitation for the Reform Bill. After the passing of the bill, he was elected, at the top of the poll, a representative of the city of London in parliament, and continued a member of the House of Commons till 1841. His parliamentary career was chiefly distinguished by his annual motion for the ballot, but he spoke with great effect on many other questions. In 1843, he retired from the banking-house, and devoted himself exclusively to his history; the first two volumes appeared in 1846, and the last (twelve volumes in all) in 1856. He forthwith commenced the study of Greek philosophy, and in 1865 brought out his work on Plato. The remainder of his studious life was devoted to Aristotle, but he did not execute more than a part of what he intended. He died in 1871. After his death, appeared what he had composed on Aristotle; also a collection of essays, written at various times, entitled *Minor Works*. His Life, entitled *The Personal Life of George Grote*, was written by Mrs Grote. He spent much of his time, in later years, in the management of the great unsectarian educational institutions—University College, and the University of London—being, at the time of his death, president of the one, and vice-chancellor of the other. His whole career was marked by attachment to liberal opinions. He was not merely a man of erudite research; he devoted himself also to mental philosophy and logic, by which he became as much distinguished in his capacity of historian of philosophy as he was in political history.

GROTE'SQUE, a style of classical ornament, so called, in the 13th c., from its having been rediscovered in the excavations made in the baths of Titus and other ancient Roman buildings, the Italian word *grotto* applying to any subterranean chamber. This light, fantastic style was much in favour during the Renaissance. It abounds in all kinds of transformations, from the animal to the vegetable, and mingles all the natural kingdoms in the most fanciful and picturesque confusion. The name *grotesque* thus came by degrees to mean a fanciful combination of natural ideas as applied to ornament. Thus, all the picturesque animal and vegetable *inventions* of the medieval artists are grotesques. Some of these are very beautiful, and others very picturesque, and, generally, an idea of some value, such as boldness, fierceness, dignity, &c., is expressed. In this mode of application, the grotesque is a valuable quality in art; it is only when it becomes debased, as in the monstrosities of the Renaissance, that its value is lost.

Grotesque.

GRO'TIUS, Hugo, or De Groot, was born at Delft, 10th April 1583. His father, Jan de Groot, was burgomaster of the town, and also curator of the university of Leyden. In his 11th year he entered the university of Leyden, where he enjoyed the advantage of studying under Joseph Scaliger. In his 15th year he took his degree. In the following year he accompanied Olden Barneveldt, the grand-pensionary, on his embassy to France, where, notwithstanding his extreme youth, his talents and conduct gained him the favour of Henry IV. On his return, he began to practise as a lawyer; and in 1607 was appointed fiscal-general, and in 1613 council-pensionary at Rotterdam. But the disputes between the Remonstrants and their opponents were now at their height in Holland; Olden Barneveldt had the misfortune to be the protector of the former, and G. also supported them by his writings and favour. These religious, or rather theological strifes had, however, a *political* significance also; and the consequence was, that both Olden Barneveldt and G. were arrested, tried, and condemned by the dominant party under Prince Maurice (see BARNEVELDT). Olden Barneveldt was beheaded in 1619, and G. sentenced to imprisonment for life in the castle of Lovenstein. He escaped, however, by the contrivance of his wife, who managed to have him carried out of the castle in a chest used for the conveyance of books and linen, while she remained in prison in his stead. Her devotion was applauded even by his stern masters, and she was set at liberty.

For some time, G. wandered about in the Catholic portion of the Netherlands, and finally escaped to France, where Louis XIII. bestowed upon him a pension of 3000 livres; but not paying sufficient court to Richelieu, he lost the king's favour, and in 1631 his pension was withdrawn. A friendly letter from Prince Frederick of Orange induced him to return to his native country; but by the intrigues of his enemies, sentence of perpetual exile was soon passed upon him. He now removed to Hamburg, and, while there, he received invitations from the kings of Denmark, Poland, and Spain; but the protection promised him by the Chancellor Oxenstiern, and Queen Christina's taste for literature, induced him to enter the Swedish service in 1634. As ambassador at the French court (1635—1645), he gained universal respect. On his return to Sweden, he passed through his native country, and was received in Amsterdam with the most distinguished honour. Equally flattering was his reception by the Swedish queen; but the literary dilettantism of Christina's court did not suit so serious and solid a scholar, whose thoughts were always of the broadest and most forecasting nature. Besides, the climate of Sweden did not agree with him, and he was probably anxious to spend the evening of his life in his native land. In consequence, he sent in his resignation of office to the queen, who, when she found that nothing could induce him to stay, presented him with a sum of 10,000 crowns and some costly plate, besides placing at his disposal a vessel to conduct him down the Baltic to Lübeck. A storm compelled him to land on the coast of Pomerania. While proceeding towards Lübeck, he was seized with a fatal illness, and died at Rostock, 28th August 1645. To the talents of a most able statesman, G. united deep and extensive learning. He was a profound and enlightened theologian—perhaps the best exegete of his day, a distinguished scholar, an acute philosopher, a judicious historian, and a splendid jurist. Altogether, he was what Ménage called him, 'a monster of erudition.' His metrical translations from the Greek authors also display superior poetical powers; he was one of the best modern writers of Latin verse, and likewise composed poems in the Dutch language. In spite of his broken, wandering, and checkered career, G. found time to write a great variety of works. The first was the *Mare Liberum*, in which he defended the freedom of the Dutch East India trade. His chief work, however, is that entitled *De Jure Belli et Pacis*, which has been translated into all the languages of Europe. It may be considered as the basis of international law, and has long been used as a text-book on the subject in many universities. Among his other works we may mention *Annales et Historiæ de Rebus Belgicis* (Amsterdam, 1657), written in a style that equals Tacitus for concise and pointed power; *Annotationes in Vetus Testamentum* (Paris, 1644); *Annotationes in Novum Testamentum* (Paris, 1644); *De Satisfactione Christi;* and *De Veritate Religionis Christianæ* (Leyden, 1627), translated even into several Oriental languages, and remarkable for its clear arrangement, vigorous logic, and eloquent style. It is reckoned the best 'apology' for Christianity in modern times. —Compare Butler, *Life of Grotius* (London, 1826); De Vries, *Huig de Groot en Maria van Reigersbergen* (Amst. 1827); Creuzer, *Luther und Hugo Grotius* (Heidelb. 1846).

GROTTA DEL CANE, or **GROTTO OF THE DOG**, is a noted cave near Naples, in the vicinity of Lake Agnano and of Puzzuoli. It is about 10 feet deep, 4 feet wide, and 9 high, and is so full of carbonic acid gas, especially near the floor, that little animals introduced into it soon die, and tapers placed near the ground are extinguished. This cave was known to the ancients, and is described by Pliny. It derives its name from the practice of introducing small dogs, which are soon almost deprived of life by the gas, but recover if quickly plunged into water.

GROTTA'GLIE, a town in the south of Italy, in the province of Lecce, 12 miles north-east of Taranto. Pop. 7858. It dates its origin from the 10th c., when the inhabitants of several surrounding villages, that had been laid in ruins by the Longobards and Saracens, sought refuge here, and gave the name of G. to their new dwellings, from the *grotte* or caves which intersect the hill at the foot of which the town stands.

GROUND, in Painting, the coating or preparation put on the surface of the panel, board, or canvas on which a picture is to be painted. Artists attach great importance to the colour and texture of the ground, as tending in no small degree to affect the technical quality of the work. In forming an opinion on paintings by old masters, the kind of ground used is always taken into consideration, for in different epochs and schools, particular grounds were used. The works of the Italian school preceding and during the time of Raphael were all painted on white grounds, and almost always on panels, even when the works were large, and many pieces had to be joined. The preparation was composed of *gesso*, plaster of Paris, or chalk mixed with size, and the ground was of course absorbent. Afterwards, when canvas came to be generally used, the works of the Italian and Spanish schools were generally painted on an oil ground of a dull red colour; and when this was not covered by the artist with a thick *impasto* or body of paint, the picture was apt to become black and heavy, a fault very marked in the works of the school of the Carracci and the Neapolitan and later Roman schools. The works of the Dutch and Flemish masters, which are distinguished for brilliancy and transparency, were painted on light grounds, varying from white to gray, and their practice is generally followed in this country and in the modern schools abroad. The term *ground* is also applied to different parts of a picture, as the *foreground*, or portion of the picture on which are placed the figures or objects represented as nearest the spectator; *background*, the part, particularly in portraits, behind or on which it is intended to set off or relieve the head, figure, or group depicted. The portion of a model or carving from which the figures are projected, is styled the ground.

GROUND-ANNUAL, in the Law of Scotland, is an annual rent or annuity paid by the owner of land to a creditor or to the vendor of the land, and in most respects corresponds to Ground-rent (q. v.) in England, though the parties stand in a converse relation. It also resembles a rent-charge (see RENT) in England, with a like distinction. Thus, when a vendor sells his land, and instead of taking a lump sum for the price, prefers a sum by way of a perpetual annuity or rent, he conveys the land in fee to the disponee or purchaser, subject to this ground-annual, which is a burden on the lands for ever after. The vendor or creditor is then called the ground-annualer, and if the ground-annual is not paid, he is entitled as a remedy to poind the ground, i.e., seize all the goods, whether of the owner or his tenants, which are found on the lands, and pay himself, or he may sue the debtor. But he cannot, as a ground-landlord can do in England, poind the goods of the debtor's tenants to a greater extent than the current term's rent or arrears due by them.

GROUND DOVE AND **GROUND PIGEON** are names given to those birds of the family *Columbidæ* which in characters and habits approach most to the ordinary gallinaceous type. They have short and rounded wings, with much inferior power of flight to pigeons in general; their legs are longer, and their feet rather adapted for walking than for grasping. They are little arboreal in their habits, but live mostly on the ground. Many of them run very quickly. They have not in general much brilliancy of plumage, but among them are the beautiful Bronze-wings (q. v.) of Australia.

GROUND-IVY (*Glechóma hederacea*, united with the genus *Népeta* by some botanists as *N. Glechoma*), a plant of the natural order *Labiatæ*, a common native of Britain and other parts of Europe, growing in waste places, plantations, hedges, &c., in a dry soil. It has a creeping stem, kidney-shaped crenate leaves, and axillary blue flowers growing in threes. The flowers have four ascending stamens, two long and two short, a 15-nerved 5-toothed and equal calyx, the anthers before bursting approaching in pairs and forming a cross. A tea prepared from the leaves is in great repute among the poor in many places, and the plant is stimulant, aromatic, and of use in pectoral complaints. The leaves were formerly used in England for clarifying and flavouring ale, which was then called Gill-ale or Gell-ale, from Gill or Gell, an old name of this plant; but this use has been discontinued since the introduction of hops.

GROUND-NUT, a term variously employed, to denote the seed of the *Arachis hypogæa* (see ARACHIS), and the tubers of certain umbelliferous plants, also called EARTH-NUTS (q. v.).

GROUND-RENT, in the Law of England, is the rent which a person, who intends to build upon a piece of ground, pays to the landlord for the use of the ground for a certain specified term, usually 99 years. The usual arrangement between the owner of the freehold of land and a speculating builder, is of this kind. The builder pays a certain annual sum by way of rent to the owner, who is thereafter called the ground-landlord, and then commences to build upon the land. The builder then lets the houses, and in doing so he of course includes in the rent which he puts upon each house a proportionate part of this ground-rent, which he himself is bound to pay to the ground-landlord, so that practically the tenant pays both the rent and the ground-rent, the latter being so called because it issues out of the ground, independently of what is built upon it. Ground-rents often form a safe investment for capital, because the security is good. This security consists in the ground-landlord being able, whenever his ground-rent is in arrear, to distrain all the goods and chattels he finds on the premises, to whomsoever they may belong; and as the ground-rent is generally a small sum, compared with the furniture of the tenant, he is always sure to recover its full amount. This power of distress exists whether the tenant has paid his rent to his own landlord or not; but if at any time the tenant has been obliged to pay the ground-landlord the ground-rent, which it is the duty of his own landlord in general to pay, he may deduct such sum from the next rent he pays, or, as it is called, may set off the one against the other so far as it will go. Strictly speaking, there are thus two landlords. The ground-landlord is the over-landlord, and has the paramount security; the other landlord is landlord to the tenant who actually occupies, but is himself tenant to the ground-landlord, for he merely holds a lease. He is what is called a mesne landlord. At the end of the 99 years, or whatever other term is fixed upon, the whole of the building becomes the property of the ground-landlord, for the interest of the builder or his assignees then expires by effluxion of time; and as the building is a fixture, and cannot be carried away, it thus falls in to the landlord, and often thereby creates a great accession of wealth.

Ground-rent corresponds to *feu* in Scotland, with this difference, that the feu-rent in the latter case lasts for ever, there being no definite term fixed for its ceasing.

GROUND SQUIRREL (*Tamias*), a genus of rodent quadrupeds of the Squirrel family, differing from the true squirrels in the possession of cheek-pouches, in having a more slender body and shorter legs, and in other less important particulars; but most of all in their habits, residing chiefly on the ground, and seldom ascending trees to any considerable height. They are of small size, are all longitudinally striped on the back and sides, are extremely active and restless, and emit a peculiar 'chipping clucking sound, very widely differing from the quacking, chattering cry of the squirrels.' A well-known species is the HACKEE or CHIPPING SQUIRREL (*T. Lysteri*) of North America, of a brownish-gray colour, striped with black and yellowish white, the belly white. It is much persecuted by boys, with whom the hunting of it is a favourite sport. The fur is used for muffs, tippets, &c. Other species of G. S. are found in America, Asia, and Africa.

Ground Squirrel.

GROUNDLING (*Botia tænia*), a small fish of the family *Cyprinidæ*, found in some of the rivers of England. It is never more than three or four inches long. It receives its name from habitually keeping close to the bottom. It is probably often mistaken for the Loach (q. v.), which it much resembles; but, besides its smaller size, it is of a much more compressed form, and is particularly distinguished by a forked spine beneath each eye. These have been made generic distinctions. Several species having these characters are found in the Ganges.

GROU'NDSEL, the common name of those species of *Senecio* (q. v.) which have small heads of flowers either destitute of ray or with the ray rolled back. The COMMON G. (*S. vulgaris*), one of the most plentiful of weeds in waste and cultivated grounds in Britain and most parts of Europe, is usually destitute of ray. It is a coarse-looking annual, of rapid growth, about a foot high, branched, with pinnatifid leaves, and small yellow heads of flowers; flowering at all seasons, even in winter, when the weather is mild; and its seeds, like those of other *Compositæ*, are widely diffused by means of their hairy pappus, being wafted about by the wind. It has a rather disagreeable smell; but birds are very fond of the young buds and leaves, and cage-birds are fed on them. It has a saltish taste, whence its name. Its leaves, beaten into a coarse pulp, and externally applied to the stomach, cause vomiting some hours after their application; it also makes a good poultice for boils and sprains.—The other British species are weeds of very similar appearance, but are stronger, have a more disagreeable odour, and are viscid to the touch.—Like other annual weeds, the groundsels are to be hoed down or pulled as they appear, when the ground is in crop.

GROUP, the combining of several bodies so as to form an agreeable whole. In drawing, one or more groups compose the picture. A bunch of grapes, a cone, or a pyramid have been taken by different artists as the model form of a group.

GROUSE (*Tetrao*), a genus of gallinaceous birds, which, as defined by Linnæus, included partridges, quails, and all the birds now forming the family *Tetraonidæ*, and divided into many genera. The *Tetraonidæ* have a very short bill, rather thick, sharp, and a little curved, and very generally a naked red patch over or behind the eye. They have three toes before, and generally one hind toe, placed high on the tarsus, but the hind toe is often very short, and sometimes wanting. Those to which the name G. is popularly given have the legs feathered to the feet, but in the genus *Tetrao*, as now restricted by ornithologists, the toes are not feathered; in moorfowl and ptarmigan, they are completely so, and these have therefore been separated into a distinct genus, *Lagopus*. Partridges, quails, &c., which have not the tarsi feathered, are regarded as connecting the families *Tetraonidæ* and *Phasianidæ*, and are sometimes referred to the latter, although their intimate connection with the former is generally recognised. Some of the *Tetraonidæ* are polygamous, and this is the case with all, or almost all, the species of the genus *Tetrao*, whilst those of *Lagopus*, so nearly allied to them, pair.—The genus *Tetrao* contains the largest birds of the family, exceeded in this respect by almost no other gallinaceous birds. They have a full figure, with much muscular power, the tail is longer than in most of the family, is composed of broad feathers, and generally rounded. The females differ very considerably in plumage from the males, which are often resplendent in black, brown, green, and blue. The species are natives of the northern and temperate parts of Europe, Asia, and America, the regions in which the *Tetraonidæ* in general are most abundant, although some of the family are found in warmer and more southern countries.—The largest species of *Tetrao* is the Capercailzie (q. v.), Wood G., or Cock of the Woods (*T. urogallus*); and next to it, among European species, ranks the Blackcock (q. v.), (*T. tetrix*), the only other European species indeed, if the somewhat rare *T. hybridus* of continental Europe, the *Racklehahn* of the Swedes (see Blackcock), be regarded as the result of a mere accidental intermixture of these two.—The Pinnated G., or Prairie Hen (*T. cupido*) of North America, is rather smaller than the blackcock; the general colour of the plumage is yellowish-red, with bars and crossings of black; the tail is very short and much rounded. The male has neck-tufts of narrow feathers, the largest of which are five inches long, and is still more remarkably adorned with two loose pendulous wrinkled skins, extending along the sides of the neck for two-thirds of its length, capable of inflation with air, and when inflated, resembling in bulk, colour, and surface, middle-sized oranges. This species of G. chiefly inhabits dry open districts, studded with trees or patches of brushwood. It was at one time common in New Jersey and Pennsylvania, as well as in the western prairies, but has always become rare as a district has become cultivated and populous, notwithstanding laws in some cases enacted for its preservation. It has almost disappeared from the state of Kentucky, where it was at one time so extremely abundant, that children were constantly employed to prevent its depredations in the cultivated fields, and multitudes were shot and trapped merely to be thrown away. In the north-eastern parts of the United States it exists, but is not abundant. It congregates in flocks in winter, which break up into smaller parties in spring. The males have many combats at the approach of the breeding season. Their voice is described as a low *tooting* or *booming*. They strut, after the manner of turkey-cocks, with wings let down to the ground, and neck-feathers erected. Certain spots, known in the western parts of America as their *scratching-places*, seem to be specially appropriated for their displays and combats, and there considerable numbers often meet about daybreak, dispersing again after the sun is up. Many are shot on such occasions. The food of the Pinnated G. consists of seeds, berries, the buds of trees and bushes, insects, &c. It is highly prized for the table in those parts of America where it is rare. The flesh resembles that of the blackcock.—The Spotted G., or Canadian G. (*T. Canadensis*), is smaller than the Pinnated G., about equal to the Scottish moorfowl. It inhabits the northern parts of America, and is plentiful near Hudson's Bay. It is chiefly found in forests of pine or fir, feeding much in winter on the leaves and branchlets of these trees, as well as on their seeds, whence it is often called the Spruce Partridge. From this food the flesh acquires a strong and peculiar flavour in winter. The plumage of the upper parts is mostly brownish-black, transversely barred with brownish-gray; in some parts varying to a rusty orange. The tail is rounded.—The Dusky G. (*T. obscurus*) is a species almost as large as the capercailzie, a native of the shady forests of the Rocky Mountains and the banks of the Columbia. The general colour is blackish-brown, the wings lighter. The tail is large and rounded.—The Moorfowl (q. v.), or Red G. of Britain, is allied to the ptarmigans rather than to these species, and is called Red Ptarmigan by some systematic writers, although it is the species to which, in popular language, the name G. is almost exclusively appropriated in Britain. Other species, often popularly called G., are noticed in the articles Bonasia, Cock of the Plains, Ganga, Syrrhaptes, &c.

GROVES have, among almost all nations, been associated with religious rites, being chosen as suitable places for them, or even planted in order to this use. The pleasantness of groves may have had something to do with this, but probably far less than the sentiments of awe and solemnity naturally excited by the gloom of deep forests. Groves became so intimately associated with the idea of sacrifice and other religious rites, that the planting of a grove became itself an act of religion, like the erection of an altar or the building of a temple. Thus, 'Abraham planted a grove in Beersheba, and called there on the name of the Lord, the everlasting God' (Gen. xxi. 33). Afterwards, however, the Jews were forbidden to plant groves near the altar of the Lord (Deut. xvi. 21, 22), because of their association with idolatry, and with the cruel and abominable rites of the nations of Canaan, and of the neighbours of the Jews.

GROWING CORN on a farm, or on land let to a tenant, may be distrained in England by the landlord for rent which is already due and in arrear; that is, the landlord may seize and sell the corn to pay his rent. In Scotland, growing corn may also be sequestrated by the landlord (which means the same thing); but this can be done only for the rent which is current, and which will become due for the same year to which the crop belongs. In England, the landlord can distrain for several years' rent at one time.

GROWLER (*Grystes salmoides*), a fish of the Perch family, abundant in many of the rivers of North America, as in the neighbourhood of New York. It attains a length of two feet. It is of an olive colour, dark on the upper parts, and becoming grayish-white beneath. The G. is much esteemed for the table. It affords good sport to anglers. It receives its name from a sound which it emits. The genus Grystes has small scales and only fine cardlike teeth. Another species is found in the Macquarie River, in New Holland.

GRUB, the name commonly given to the larvæ of coleopterous insects. See Coleoptera. Some grubs are too well known to farmers and gardeners for the injury they do to the roots of plants, and thus we hear of crops suffering from *the grub*, but different species are destructive to different kinds of plants. The most important are noticed under their proper names, and reference is made from the more important cultivated plants to those grubs most hurtful to them.

GRUBBER, an agricultural implement which has recently come into very general use, and of which there are many forms or varieties, all, however, essentially the same in their principle as well as in their uses. Some of the forms are called by their inventors *Cultivators* and *Scarifiers*. The grubber consists of a framework of cast or wrought iron, in which are fixed *tines* or teeth, somewhat like those of a harrow, but curved, and so placed as to enter the ground somewhat obliquely when the implement moves forward; the whole moving on wheels, by which the depth to which the teeth may penetrate is regulated; it is provided with various mechanical adaptations, enabling the workman somewhat to vary the depth, or to lift the teeth out of the ground partially or altogether, when it may be necessary to clear them of obstructive clods or accumulations of weeds, to turn at the head of a ridge, or to travel to or from the field. The grubber is sometimes used for tearing up clover-fields and stubbles before the plough is used, but more generally in land already ploughed, to stir it afresh, to clear it of weeds, to bring clods to the surface, that they may be broken, &c. A grubber with five teeth gives work for two strong horses.

GRU'GRU, the grub or larva of *Calandra palmarum* (also called *Rhyncophorus palmarum*, and *Cordylia palmarum*), an insect of the weevil family (*Rhyncophoræ*), inhabiting Guiana and other tropical parts of America. The perfect insect is an inch and a half long. The grub is an ugly inactive creature of a whitish cream colour, as long and as thick as a man's thumb, and lives in the soft and spongy central part of the Cabbage Palm (*Euterpe oleracea*), on which it feeds. It is extremely fat and oily, and is esteemed a great delicacy, not only by the Indians, but by many of the European colonists and their descendants, particularly the Dutch. It is cooked by roasting, and eaten with bread and butter, after being sprinkled with cayenne pepper. The fragrance of roasted grugru is said to be most tempting to epicures. A cabbage palm which has been cut down often becomes in a short time almost filled with grugrus; but they are usually obtained from the upper part of the stem of growing palms near the crown. A negro is often sent up with a cutlass, to cut them out of the wood.

GRÜ'NBERG, a town of Prussia, in the province of Silesia, is prettily situated near the northern boundary of the province, on the Golden Lunse, 59 miles north-north-west of the town of Liegnitz. It consists of the town proper, surrounded by a wall, pierced by three gates, and of four important suburbs, and is seated amid vine-clad mountains. G. is chiefly known for the fine sparkling wine which is extensively produced in the vicinity. The 700th year of its trade in this excellent commodity was celebrated here in October 1850. G. has also an active trade in the manufacture of woollen cloths and tobacco, and in silk-spinning and dyeing. Pop. (1871) 11,735.

GRUS AND GRUIDÆ. See CRANE.

GRUYÈRES, a small decayed town of Switzerland, in the canton of Freiburg, and 16 miles south-south-west of the town of that name, is situated about a mile from the left bank of the Saane or Sarine. The town is known chiefly from its giving name to the famous Gruyères cheese, which is made in great quantities in the surrounding district. Pop., including adjacent hamlets, 972.

GRY'LLUS, a Linnæan genus of insects of the order *Orthoptera*, answering to the section *Saltatoria* (Lat. leapers) of later entomologists, and containing crickets, grasshoppers, locusts, &c. The genus has been subdivided into many genera, which have been grouped into families; but great confusion exists in the nomenclature, the crickets and their allies being the genus *Gryllus*, and family *Gryllidæ* of some authors, *Acheta* and *Achetidæ* of others; grasshoppers being *Gryllus* and *Gryllidæ* of some, *Locusta* and *Locustidæ* of others; and locusts, in like manner, being *Locusta* and *Locustidæ*, or *Acrydium* and *Acrydidæ*. See CRICKET, GRASSHOPPER, and LOCUST. The three groups are very closely allied. They are all characterised by the large thighs of the last pair of legs, and great power of leaping. The stridulous sounds which they emit are produced in some—crickets and grasshoppers—by rubbing together the bases of the elytræ; in others—locusts—by rubbing the thighs against the elytræ. The females generally lay their eggs in the ground.

GRYS-BOC (*Antilope melanotis* or *Calotragus melanotis*), an animal of the antelope family, a native of South Africa, and common in most parts of Cape Colony. It is about three feet in length, and about a foot and a half in height at the shoulder. The grys-boc lives in pairs on the plains. It is not very swift, is easily captured, and its flesh is much esteemed.

GUA'CHARO (*Steatornis Caripensis*), a remarkable South American bird, of the order *Insessores*, and tribe *Fissirostres*, generally referred to the family *Caprimulgidæ*, but widely differing from the goatsuckers and most of that family, and indeed from the *Insessores* generally, in having a strong bill, and being frugivorous. The food of the G. consists of hard and dry fruits. It is about the size of a common fowl; the plumage brownish gray, with small black streaks and dots. The G. is a nocturnal bird, a circumstance very singular among frugivorous birds. It spends the day in deep and dark caverns, where great numbers congregate and make their nests. Humboldt gives a most interesting account, in his Personal Narrative, of a visit to the great Guacharo cavern in the valley of Caripe, near Cumana. This cavern is visited once a year for the sake of the fat of the young birds, which are slaughtered in great numbers, and their fat melted and stored for use as butter or oil. The clarified fat is half liquid, transparent, inodorous, and will keep for a year without becoming rancid.

Guacharo (*Steatornis Caripensis*).

GUACHINA'NGO, a small town of Mexico, in the north of the state of Puebla, and 103 miles north-east of the city of Mexico, has a population of 6000, and is noted for the great quantity of excellent vanilla raised in the vicinity.

GUA'CHOS, the name given to the country-people who inhabit the Pampas in the states of La Plata, and are engaged in rearing cattle. Although they pride themselves on being whites, they belong chiefly to the Mestizo class, and by their intercourse with Indian women, contribute to approximate the population of the inland provinces to the type of the aboriginal inhabitants, whom they likewise greatly resemble both in their manners and turn of mind.

GUADALAJA'RA, or **GUADALAXARA**, one of the handsomest towns in Mexico, is the capital of the state of Xalisco, in the Mexican Confederation. It stands on the Rio Grande de Santiago, which, after passing through Lake Chapala, enters the Pacific at San Blas. The population has been estimated at 90,000. As the houses are mostly of one story, the place covers a wide extent of surface. It contains the buildings for the government, a cathedral, a mint, an episcopal palace, an opera, large barracks, a college, and many inferior seminaries. It has well-supplied markets, and extensive manufactures of cotton and earthen-ware.

GUADALAJARA (anc. *Arriaca*), a decayed town of Spain, capital of the province of the same name, is situated on the left bank of the Henares, 35 miles north-east of Madrid. It is a large but ill-built town, and contains many buildings of interest, which, however, are for the most part falling to ruin from neglect. The chief of these are the palace of the Mendozas, the feudal lords of G.; the *Panteon*, in which they are buried; and the churches of San Francesco and San Esteban. G. is the chief town of the fine pastoral and wheat district of the Alcarria. Pop. 6650.

GUADALAJARA, a province of Spain, the most north-eastern of the five modern provinces into which New Castile has been divided. Pop. (1870) 208,638. See CASTILE.

GUADALAVIA'R, or **TURIA**, a river of Spain, has its source near that of the Tagus, in the south-west of Aragon, and after a course of 130 miles, in a generally south-south-east direction, falls into the Mediterranean, at Grao, a mile and a half east of Valencia. The G., in passing through the beautiful gardens of Valencia, is divided, for purposes of irrigation, into eight canals. Its mouth is much silted up.

GUADALQUIVI'R (Arab. *Wad-al-Kebir*, the great river; anc. *Baetis*), the most important river of Spain, for the mass of waters which it conveys to the ocean, and for the extent of its natural navigation; has its origin in the Sierra de Cazorla, near the eastern border of the province of Jaen; flows in a general south-west direction through the provinces of Jaen, Cordova, Sevilla; and forming the boundary for about ten miles between the provinces of Huelva and Cadiz, falls into the Atlantic at San Lucar de Barrameda, after a course of about 260 miles. The principal towns upon its banks are Montoro, Cordova, and Sevilla, to the last of which, about 80 miles above its mouth, the river is navigable. Below Sevilla it twice divides itself into two branches, forming two islands—the Isla Menor and the Isla Mayor. Its chief affluents are the Gadajos and the Jenil on the left, and the Guadalimar and the Guadiato on the right. The lower course of the G. is sluggish and dreary in the highest degree; the stream itself is turbid and muddy, and eats its way through an alluvial level given up to herds of cattle and to aquatic fowls. There are no villages in this district, which, though favourable to animal and vegetable life, is fatal to man, from the ague and fever caused by the numerous swamps. There is no great trade on the G.; foreign vessels are generally moored at the Isla Menor, and their cargoes sent up to Sevilla by means of barges.

GUADALU'PÉ, a river of North America, rises in the southern section of the state of Texas, and flows in a south-eastern direction, emptying its waters into Espiritu Santo Bay, after a course estimated at about 250 miles. The geography of this stream and its capabilities are not yet well known.

GUADALUPE-Y-CALVO, a town of Mexico, in the state of Chihuahua, and 170 miles south-south-west of the town of that name, is situated in a mountainous district, in close vicinity to several important silver mines. Pop. 10,000.

GUADELOU'PE, one of the Lesser Antilles in the West Indies, and the most important of those which belong to France, lies in lat. 16° N. and long. 61° 45′ W., and contains 534 sq. m., with a pop. (including dependencies) in 1870 of 157,705, of whom ¾ths are coloured. It is divided into Grande Terre on the east, and Basse Terre or Guadeloupe Proper on the west, by a strait of about 40 yards in width, which, under the name of Salt River, is navigable for vessels of fifty tons. The nomenclature of the separate islands is apparently out of place, for of the two, Basse Terre is the loftier, and Grande Terre is the smaller. Grande Terre, generally low, is of coral formation; Basse Terre, on the contrary, is traversed by volcanic mountains, which culminate in La Soufrière (the 'Sulphur Mine') to the height of 5108 feet. Though this range shews no regular crater, yet it emits, by several orifices, columns of smoke, and even sparks of fire. In addition to these symptoms of subterraneous action, may be mentioned a boiling spring and frequent earthquakes. Basse Terre, on the island of its own name, is the chief town, having an indifferent harbour. Connected with G., as dependencies, are the neighbouring islets of Desirade, Marie Galante, Les Saintes, and the north part of St Martin. In 1867, the exports and the imports respectively amounted to £746,625 and to £563,167. In 1848, slavery was abolished by a decree of the French republic. The island was discovered by Columbus in 1493; but it was not before 1635 that it was colonised by the French; and after repeatedly falling into the hands of England, during her wars with France, it was at length permanently ceded to the latter power in 1816.

GUADIA'NA (anc. *Anas*), one of the longest but at the same time the narrowest and poorest in volume of the five great Spanish rivers, rises on the western boundary of Murcia, about 8 miles north-west of the town of Alcaraz. From its source it flows north-west for about 30 miles, after which it disappears among swamps; flows underground in a westward direction for nearly 30 miles; and rises again at Daymiel, after throwing up in its subterraneous course numerous lakes called *Los ojos* (the eyes) *de la Guadiana*. From Daymiel it pursues a westward course through La Mancha and the province of Estremadura, until, passing the town of Badajoz, it bends southward, and flows in that direction, forming, for about 35 miles, the boundary between Spain and Portugal. Near the town of Monsaras it enters the Portuguese territory, and flows through the eastern district of the province of Alemtejo. Finally, turning eastward, and again forming the international boundary for about 30 miles, it enters the Atlantic below the town of Ayamonte. It is about 420 miles in length, and is navigable only for about 35 miles. Its chief affluents are the Giguela on the right, and the Javalon and Ardila on the left.

GUA'DUAS, a city of the United States of Colombia, is situated in that portion of the republic which belongs to South America. It stands near the east or right bank of the Magdalena, high among the Andes, and is one of the most elevated towns on the globe, being 8700 feet above the level of the sea. It contains about 4000 inhabitants.

GUAIA'CUM, a genus of trees of the natural order *Zygophyllaceæ*, natives of the tropical parts of America, having abruptly pinnate leaves, and axillary flowers on one-flowered stalks, often in small clusters. The flowers have a 5-partite calyx, five petals, ten stamens, and a tapering style; the fruit is a capsule, 5-angled and 5-celled, or the cells by abortion fewer, one seed in each cell. The trees of this genus are remarkable for the hardness and heaviness of their wood, generally known as *Lignum Vitæ*, but sometimes as *Guaiacum Wood*, and sometimes as *Brazil Wood;* as well as for their peculiar resinous product, *Guaiacum*, often but incorrectly called *Gum Guaiacum*. The species to which the commercial Lignum Vitæ and Guaiacum are commonly referred, is *G. officinale*, a native of some of the West India islands, and of some of the continental parts of America; a tree sometimes 30 or 40 feet high, with two or three pairs of ovate, obtuse, and perfectly smooth leaflets, pale blue flowers, a furrowed bark, and generally a crooked stem and knotty branches. It seems probable, however, that other species, as well as this, supply part of the G. wood and resin of commerce. At present, they are obtained chiefly from Cuba, Jamaica, and St

Domingo. The wood is imported in billets about three feet long and one foot in diameter, of a greenish-brown colour. This is the colour of the heartwood, the sap-wood is pale yellow. G. wood is remarkable for the direction of its fibres, each layer of which crosses the preceding diagonally; annual rings are scarcely to be observed, and the pith is extremely small. It sinks in water. It is much valued, and used for many purposes, chiefly by turners; ships' blocks, rulers, pestles, and bowls (see Bowls) are among the articles most commonly made of it. When rubbed or heated, it emits a faint disagreeable aromatic smell; its taste is also pungent and aromatic. Shavings and raspings of the wood are bought by apothecaries for medicinal use. The bark is also used in medicine on the continent of Europe, although not in Britain. The virtues of both wood and bark depend chiefly on the resin which they contain, and which is itself used in powder, pill, and tincture. It is an acrid stimulant, and has been employed with advantage in chronic rheumatism, in chronic skin diseases, in certain cases of scanty and painful menstruation (and hence it is occasionally an effectual remedy in cases of sterility), and in chronic catarrh. It has also been highly praised as a preventive of gout. The resin is an ingredient of the well-known *Plummer's Pills*. In the 16th and 17th centuries, G. was the remedy most in repute for syphilis. The resin sometimes flows spontaneously from the stem of the G.-tree; it is sometimes obtained artificially. It is of a greenish-brown colour, and has a brilliant resinous fracture. It has scarcely any taste, but leaves a burning sensation in the mouth. One of its most striking characteristics is, that it is coloured blue by its oxidising agents. It contains *guaiacic acid* ($HO,C_{12}H_7O_5$), which closely resembles benzoic acid, and yields, on distillation, certain definite compounds known as *guaiacine*, *pyroguaiacine*, and *hydride of guaiacyl*.

Guaiacum Officinale.

GUAN, or YACOU (*Penelope*), a genus of large gallinaceous birds of the family *Cracidæ*. They have a naked skin on the throat capable of being inflated or swollen, and a naked space around each eye. The name G. more particularly belongs to *Penelope cristata*, a species of which the entire length is about thirty inches. It is a native of the forests of Brazil and Guiana, and has been long domesticated in South America. It has been found to endure the climate of Britain and of Holland so well, that hopes are entertained of its becoming common in the poultry-yards of Europe. Its flesh is much esteemed.

Guan (*Penelope cristata*).

GUANABACO'A. See Havanna.

GUANAHA'NI, or CAT ISLAND, one of the Bahamas, is generally regarded as Columbus's first discovery in the New World, being presumed to be identical with the San Salvador of the illustrious navigator. Recent criticism, however, appears to have transferred this honour to Watling Island (q. v.), which is about 50 miles to the east-south-east.

GUANAJUA'TO, or GUANAXUATO, an inland state of Mexico, in lat. between 20° and 22° N., and long. between 99° 40′ and 102° 40′ W., is bounded on the N. by the states of San Luis Potosi, on the E. by Queretaro, on the S. by Michoacan, and on the W. by Xalisco. It has an area of 12,619 square miles, and a population in 1868 of 874,043. The surface, a portion of the lofty plateau of Anahuac, has an elevation of 6000 feet above sea-level, and is traversed by chains of mountains, among which those of Santa Rosa are porphyritic, and present elevations of 11,400 feet in height. The state is watered by no river of consequence. The soil is fertile; maize, wheat, and frijoles (beans) are the chief grain crops raised; the vine, the *chili colorado*, or red pepper, and the olive, are also largely cultivated. Among the valuable mineral products of the state are silver, iron, lead, and copper, the first in the greatest abundance. The manufactures are woollens, cottons, leather, earthen-ware, and refined sugar. The climate is mild and pure. The population of the state divides itself into three races—25 per cent. of the whole being whites, 39 per cent. Indian, and 36 per cent. mixed.

GUANAJUATO, or SANTA FÉ DE GUANAJUATO, a city of Mexico, capital of the state of the same name, is irregularly built on an extremely uneven district of hill and valley, in lat. 21° N., and long. 100° 50′ W. The streets are steep and tortuous, but the houses are generally well built, and have gaily painted outsides, green being the favourite colour. It contains many fine public buildings, the chief of which are the cathedral, the monasteries (eight in number), the college, the gymnasium, the theatre, and the mint. G. stands in a district in which, within a circuit of five leagues, there are upwards of 100 mines. Pop. 56,000.

GUANAPA'RO, a river of Venezuela, in South America, rises in the department of Caraccas, and, after an easterly course of 230 miles, joins the Portuguesa, which again, through the Apure, sends its tribute to the Orinoco.

GUANA'RÉ, a river of Venezuela, in South America, is an affluent of the Portuguesa. See GUANAPARO. On its banks are two towns, both of which derive their names from it: Guanarito, an inconsiderable place; and Guanare, a city of 12,000 inhabitants.

GUANCABELI'CA. See HUANCAVELICA.

GUA'NINE is a yellowish-white, amorphous substance, which derives its name from its being a constituent of guano; it, however, also forms the chief constituent of the excrement of spiders, has been found attached to the scales of fishes—the bleak, for example—and seems to be a normal constituent of the mammalian liver and pancreas.

G. belongs to that class of bodies which were formerly called bases, but which, from their combining equally with acids, bases, or salts, are now often termed amides or amide-like compounds.

By oxidation with permanganate of potash, it is converted into urea, oxalic acid, and oxyguanine, a substance not yet sufficiently studied.

With regard to its occurrence in guano, as it has not been found in the recent excrement of sea-birds, there is every reason to believe that it is formed by slow oxidation (from atmospheric action) of the uric acid, much as uric acid can be made to yield urea and oxalic acid. And in the pancreas and liver it probably represents one of those transitory stages of disintegrated nitrogenous tissue which are finally excreted by the kidneys in the more highly oxidised form of urea.

GUA'NO (derived from the Peruvian word *huano*, dung) is the excrementitious deposit of certain sea-fowl, which occurred in immense quantities on certain coasts and islands where the climate is dry and free from rain. Although the use of guano as a manure is comparatively recent in this country and in Europe, its value in agriculture was well known to the Peruvians long before they were visited by the Spaniards. We learn from the *Memoriales Reales* of Garcilaso de la Vega, published in 1609, that in the times of the Incas no one was allowed, under pain of death, to visit the guano islands during the breeding season, or, under any circumstances, to kill the birds which yield this substance; and that overseers were appointed by the government to take charge of the guano districts, and to assign to each claimant his due share of the precious material. Alexander von Humboldt first brought specimens of guano to Europe in 1804, and sent them to Fourcroy, Vauquelin, and Klaproth, the best analytical chemists of the day.

Mr Nesbit, in a useful little pamphlet entitled *The History and Properties of the Different Varieties of Natural Guano*, remarks that the quality and value of these manures, commercially, depend almost wholly upon the amount of decomposition to which they have been subjected by the action of the atmosphere. The fæcal matter of the fish-eating birds, which, by its long accumulation, forms the guano deposits, consists essentially of nitrogenous and phosphatic compounds, the former being chiefly ammonia salts derived from the decomposition of the uric acid and urates which exist in the fresh excrements of these birds. The ammoniacal portion of these deposits, and some of the phosphates, are tolerably soluble in water, and are readily washed away by rain. The late Professor Johnston remarked, that 'a single day of English rain would dissolve out and carry into the sea a considerable portion of one of the largest accumulations, and that a single year of English weather would cause many of them entirely to disappear.' In dry climates, where very little rain falls, as in some parts of Bolivia and Peru, on the western coast of South America, the dung deposited suffers very little from the action of the atmosphere, and retains nearly the whole of its soluble nitrogenous and phosphatic compounds. Guanos, on the other hand, found in regions where rain falls freely, lose a great part of their soluble constituents, but remain rich in their less soluble constituents—the phosphates of lime and magnesia. Mr Nesbit divides guanos according to their composition, into three classes: 1. Those which have suffered little by atmospheric action, and which retain nearly the whole of their original constituents, such as the Angamos and Peruvian guanos. 2. Those which have lost a considerable portion of their soluble constituents, such as the Ichaboe, Bolivian, and Chilian guanos. 3. Those which have lost nearly all their ammonia, and contain but little more than the earthy phosphates of the animal deposit. Many of these are largely contaminated with sand. In this class we place the various African guanos (excepting that from Ichaboe), West Indian guano, Kooria Mooria (islands off the coast of Arabia) guano, Sombrero guano, Patagonian guano, Shark's Bay guano (from Australia), &c.

Most of the so-called Peruvian guano has been obtained from the Chincha Islands, which are three in number, and are situated about 12 miles off the coast of Peru, between 13 and 14 degrees S. lat. Each of these islands is from 5 to 6 miles in circumference, and consists of granite covered with guano, in some places to a height of 200 feet, in successive horizontal strata, varying in thickness from three inches to a foot, and in colour from a light to a dark brown. Sometimes, however, is found a vertical surface of upwards of 100 feet of a perfectly uniform appearance. If Humboldt's statement is correct, that 'during 300 years the coast-birds have deposited guano only a few lines in thickness,' the extreme age of the lower strata becomes at once obvious.

The following table represents the mean of 78 samples of Peruvian guanos, analysed by Mr Way:

Moisture, ...	13·67
Organic matter and salts of ammonia, .	52·05
Earthy phosphates, ...	22·78
Alkaline salts containing 3·34 phosphoric acid, and equal to 6·89 soluble phosphate of lime,	9·67
Sand, &c., ...	1·83
	100·00
Ammonia, per cent., ...	16·32

The following, from Muspratt's *Chemistry*, gives the mean of several analyses of the inferior kinds of guano, the first four belonging to Nesbit's second class, and the remaining three to his third class:

	Ichaboe.	Ichaboe.	Chilian.	Bolivian.	Patagonian.	Kooria Mooria.	Saldanha Bay.
	Earlier cargoes.	Recent cargoes.					
Moisture, ...	27·3	20·0	20·4	10·0	25·0	18·1	20·0
Organic matters and salts of ammonia,	34·3	24·4	18·6	21·6	18·3	12·4	14·9
Earthy phosphates, ...	30·3	20·4	31·0	51·5	44·0	42·7	56·4
Alkaline salts, ...	5·0	6·2	7·3	14·1	2·1	4·2	5·8
Carbonate of lime, ...						4·1	
Sand, &c., ...	3·1	29·0	22·7	2·7	10·6	18·5	2·9
	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Ammonia per cent., . . .	7·3	6·0	5·47	4·5	2·5	2·05	1·47

The nitrogen in these analyses is calculated as ammonia for the purpose of comparison. In reality, it exists in various forms of combination—viz., as uric acid, urea occasionally, urate, oxalate, hydrochlorate, phosphate, &c., of ammonia, other urates, guanine (q. v.), and undefined nitrogenous compounds. Hence, as may be inferred, a complete analysis of guano is a work of very considerable labour; but as its agricultural value depends mainly on the quantities of ammonia, soluble and insoluble phosphates, and alkaline salts, which it contains, such analyses as those we have given are sufficient for practical purposes, and they are easily made.

As good Peruvian guano sold long at from £11 to £13, and latterly at about £14 per ton, there was a strong inducement to adulterate it. Umber, powdered stones, various earths, partially decomposed sawdust, and other substances, were used for this purpose, and specimens have been sold containing mere traces of the genuine article. Hence it is expedient that large purchasers should either send a sample to a good chemist for analysis, or should cork up and retain a small quantity in a bottle for analysis, provided the crops to which he has applied his guano do not answer reasonable expectation. A chemist is attached to most agricultural societies and clubs, who performs such analyses for a moderate fee. The numerous analyses of Professor Anderson, late chemist to the Highland Society, and of other chemists, have had a very material effect in checking the sale of adulterated guano in Scotland. Still, the adulteration of manures has for some time been rather more common in Scotland than in England. True, guano is not so often adulterated as some other fertilisers; but in England, the rigorous measures adopted by Dr Voelcker and the Royal Agricultural Society to expose dealers in spurious articles, and to suppress such traffic, have had a very beneficial effect. In Scotland, the agricultural public awakened to the magnitude of the question. Several district analytical associations have been formed throughout the country. With all this machinery in full play, the fraudulent dealer will fortunately find his avocation as stiff work in Scotland as he has latterly discovered it in England.

Such facilities for analysis will to a considerable extent supersede the following ancient yet simple modes of testing the quality of guano. A pretty good idea, however, can be formed of the superiority or otherwise of the samples of guano by these tests:

1. *Test by Drying.*—If the guano, as is generally the case with the Peruvian and Chili varieties, is a uniform powder, weigh out two ounces, spread it on paper, and let it lie for two days in a dry and moderately warm room. What it may then have lost in weight must be esteemed superfluous water. Many sorts of guano are so moist as to lose 20 or 25 per cent. of their weight by this gentle drying. If we wish to determine the water with greater accuracy, a smaller quantity of guano should be placed in a shallow platinum capsule, and moistened with a few drops of hydrochloric acid. A heat of 212° may then be applied without loss of ammonia.

2. *Test by Combustion.*—Pour half an ounce of the guano into an iron ladle, such as is used for casting bullets, and place it upon red-hot coals, until nothing but a white or grayish ash is left, which must be weighed after cooling. The best sorts of Peruvian guano do not yield more than 30 or 33 per cent. of ash, while inferior varieties, such as Patagonian, Chili, and African guano, leave a residue of 60, or even 80 per cent.; and those which are intentionally adulterated, may leave a still larger residue. Genuine guano of all kinds yields a white or gray ash; and a yellow or reddish ash indicates the adulteration with earthy matter, sand, &c.

This test is based upon the fact, that the most important ingredients, viz., the nitrogenous compounds, become volatilised, and escape, when subjected to a sufficient amount of heat. The difference of odour of the vapours evolved in the process, according as we are working with first or third rate guano, must also be noticed. The vapours from the better kinds have a pungent smell like spirits of hartshorn, with a peculiar piquancy somewhat resembling that of rich old decayed cheese; while those rising from inferior varieties smell like singed horn-shavings or hair.

3. The *Lime test* affords a ready means of roughly determining the relative quantities of ammonia in different specimens of guano. Put a teaspoonful of each kind of guano, and an equal quantity of slaked lime, into a wine-glass; then add two or three teaspoonful of water, and mix the substances together with a glass rod. Lime being a stronger base than ammonia, liberates the latter from the ammonia salts contained in the guano; and the better the guano is, the stronger will be the pungent ammoniacal odour which escapes from the mixture. The slaked lime should be preserved in a dry and well-corked bottle, so as to exclude the air.

4. The *Hot-water test* affords a simple means of determining the goodness of guano. We may either boil half an ounce of dried guano in five or six ounces of water, and filter the solution while hot, or we may place the guano on a filter, and continue to pour boiling water over it, until the drops that come through the filter cease to yield any residue when heated to dryness on a glass slip held over the spirit-lamp. As a general rule, the larger the quantity of guano that is dissolved in hot water, the more ammonia salts does it contain, and the better it is. In the best or Peruvian guano, the insoluble residue ranges from 50 to 55 per cent., while in the inferior varieties it may amount to 80 or 90 per cent.

5. The *Acid test* serves to detect the chalk which occurs in the Kooria Mooria guano, and is used as an adulteration for other varieties. Mix the powdered guano with a little water, and add a little hydrochloric acid or strong vinegar. If chalk is present, effervescence from the liberation of carbonic acid occurs.

6. The *Weight* affords the easiest test for the purity of guano. According to Professor Anderson, a bushel of pure Peruvian guano should not weigh more than from 56 to 60 lbs.; but according to most authorities it should weigh almost exactly 70 lbs. If heavier than 73 lbs., it is adulterated with clay, marl, sand, or some other impurity.

If the value of a manure be calculated, as is done by Boussingault and other chemists, according to the amount of nitrogen which it contains, one ton of good Peruvian guano is equal to 33¼ tons of farmyard manure, 20 tons of horse-dung, 38½ tons of cow-dung, 22½ tons of pig-dung, or 14½ tons of human excrement.

When we consider what guano is—viz., that being the more or less decomposed excrement of fish-eating birds, it consists essentially of the ash constituents of the flesh of fish, together with ammonia salts—we need not wonder that its application to the land as a manure should so largely increase its productiveness, 'for guano,' says Liebig, 'contains not only the mineral elements which a soil must possess to produce corn, but also in the ammonia an indispensable element of food which serves to quicken their action, and to shorten the time required for their assimilation. On many fields, the ammonia in the guano may, if the weather prove propitious, possibly effect the assimilation of double the ordinary quantity of these mineral constituents, and thus render the amount of produce yielded in one year equal to what would have been otherwise obtained in two years by these mineral matters alone.'

The introduction of guano into this country as a manure is comparatively recent. In 1840, only 20 casks of it were imported. In 1841, the Earl of Derby—then Lord Stanley—spoke strongly in its recommendation at the Liverpool meeting of the Royal Agricultural Society of England; and from that time it has come rapidly into use, as may be seen by the following table of imports:

Years.	Tons.	Years.	Tons.
1841, . . .	2,881	1852, . .	129,889
1842, . . .	20,398	1854, . . .	235,111
1843, . . .	30,002	1855, . .	305,061
1844, . . .	104,251	1857, . . .	288,362
1845, . . .	283,300	1858, . .	353,541
1846, . . .	89,203	1859, . . .	84,122
1847, . . .	82,392	1860, . .	141,435
1848, . . .	71,414	1865, . . .	257,393
1849, . . .	83,438	1867, . .	192,308
1850, . . .	116,925	1870, . . .	280,311
1851, . . .	243,014	1872, . .	118,704

As the chemical composition of natural guano is known, an artificial guano may be readily compounded by the admixture, in due proportions, of its constituents. The following mixture, recommended by the late Professor Johnston, forms one of the best imitations of guano, 132⅛ lbs. of it being equal in power to 1 cwt. of good Peruvian guano: Mix 78¾ lbs. of bone-dust, 25 lbs. of sulphate of ammonia, 1¼ lb. of pearl-ash, 25 lbs. of common salt, and 2⅛ lbs. of dry sulphate of soda. All these materials, excepting the bone-ash, may be procured from any druggist.

Guano was largely used for all the cultivated crops on the farm, and is yet, as far as it can be procured. Being a high-priced, but concentrated and powerful fertiliser, in ordinary farm-management it is applied with more economical results to some crops than to others. On grasses proper, it is sown broadcast in the early part of spring, when vegetation begins to start. At this time the roots take it up, and prevent it from being washed out of the soil. Clover, on the other hand, being a deep-rooted plant, is supposed by some to be best dressed with it in autumn, before vegetation is stopped for the season. The roots store up the active principles of the manure till spring, and the plants are in a far more vigorous state for the summer growth. From two to three cwts. of guano per acre is the common allowance for grasses intended to be cut for hay, but the Italian variety of ryegrass will sometimes bear a large quantity with beneficial results. Guano is rather too soluble to be applied to early autumn sown wheat. It both stimulates the plant too much before winter, and is apt to be partially washed out of the soil with the winter rains. In moist springs, when there are abundance of rains to wash it in, guano forms an admirable top-dressing for winter wheat. For spring sown wheat, and other cereals, no manure has a more powerful influence. The closer that it is put to seed, the better. The common dressing is from three to four cwts. to the acre for cereals. It should be kept in mind, in regulating the quantity, that the stronger the land is, the larger the quantity that can be applied with a prospect of yielding a profit. The same principle should be observed in its use for the turnip crop. As much as from four to six cwts. may sometimes be beneficially applied to early sown turnips on deep and able soils, while two to three cwts., when farmyard manure is given, will in general prove the most economical quantity. Guano is apt to produce too much heat when it is applied in large quantities to late sown turnips, and to prevent the formation of bulbs. In such circumstances, phosphoric manures will often yield better crops at less expense. When guano is applied to beans or potatoes, they should be also dressed with farmyard manure. Guano does not possess the power of sustaining the healthy growth of these plants on most soils without something else in addition.

Mixed with rough bones, guano is valuable, applied above dung for turnips, and a great deal of it has been so used. Its value as a fertiliser was so highly appreciated, and its use so extensive, that farmers got not a little alarmed and disappointed at the diminution of the genuine Peruvian guano supplies. Agriculturists of necessity betook themselves of late to various artificial substitutes for Peruvian guano, but the results are not generally so satisfactory. Farmers learned, in the spring of 1874, with satisfaction, of the discovery of new guano deposits on the coast of Peru. For the Peruvian government, Mr M. H. Thierry explored the new deposits, and he estimated the total quantity at 7,500,000 tons. Of seven different places mentioned as containing that deposit, Pabellon de Pica, having 5,000,000 tons, is the principal. Analyses already made of the new guano on behalf of the government prove it equal in quality to the guano of the Chincha Islands.

GUAPEY′, a river of South America, rises in Bolivia, and joins the Mamore on its way to the Amazon, after a winding course of 550 miles.

GUAPO′RÉ, a river of South America, rises in Brazil, and, after a course of 400 miles, unites with the Mamore to form the Madera, an affluent of the Amazon.

GUARA′NA BREAD is a kind of food prepared by the savages of Brazil from the seeds of a plant supposed to belong to the genus *Paullinia* (natural order *Sapindaceæ*), and which has been called *P. sorbilis*. It is in round or oblong cakes, which are regarded in all parts of Brazil as very efficacious in the cure of many disorders, and which contain, besides other substances, some of them nutritious, a considerable quantity of a substance supposed to be identical with theine or caffeine. The Brazilians pound the Guarana Bread in water, sweeten it, and use it as a stomachic and febrifuge. It is also reputed aphrodisiac.—The genus *Paullinia* contains several species remarkable for their extremely poisonous properties.

GUA′RANTY, or GUARANTEE, is a contract by which one person binds himself to pay a debt or do some act in case of the failure of some other person, whose debt or duty it is to do the thing guaranteed. The person so binding himself is generally called the surety in England, while the person who is primarily liable is called the principal. Thus, where A borrows money, and B joins as a party in a bill of exchange or a bond to secure the loan, B is a surety. Where B guarantees that certain goods which are supplied to A shall be paid for, he is more usually styled a guarantor than a surety, but the liability is the same.

Such a contract must be in writing, for the Statute of Frauds (29 Charles II. c. 3) required that no action should be brought whereby to charge the defendant upon any special promise to answer for the debt, default, or miscarriage of another person, unless the agreement or some memorandum or note thereof should be in writing and signed by the party to be charged therewith, or some other person by him lawfully authorised. So that a surety can only be bound by some writing signed by himself or his agent. And Lord Tenterden's Act (9 Geo. IV. c. 14, s. 6) enacted the same thing as to persons making representations as to the character, ability, or dealings of another, with intent that the latter may obtain credit. In order to bind the surety, there must also be no deceit or misrepresentation used as to the nature of the risk or as to the state of the accounts. If a guaranty is given to a firm, it is not binding after a change in the firm, unless the parties expressly stipulate to the contrary. If the creditor discharge the principal, or even give time, by way of indulgence to him, the surety is released, for he is thereby put to a disadvantage. In general, the creditor can sue either the principal or the surety for the debt at his option. If the surety is obliged to pay the debt of his principal, he can sue the principal for the money so paid, and is entitled to have all the securities assigned to him, so as to enable him to do so more effectually.

In Scotland, the law is substantially the same as regards principal and surety, or, as they are there called, principal and cautioner; but there are some minor differences, though many of the differences which formerly existed between the laws of the two countries were swept away by the statutes 19 and 20 Vict. c. 97, and 19 and 20 Vict. c. 60. The chief differences now are, that in Scotland it is not necessary to prove any consideration for the contract, though the contract is not by deed; that liability of the surety continues seven years, whereas in England it continues generally only six years—and that the discharge of the surety can be proved only by the writ or oath of the creditor, whereas in England it can be proved by oral evidence. See Paterson's *Comp. of E. and S. Law.*

GUARDAFUI', CAPE (anc. *Aromatum Promontorium*), the most eastern point of the African continent, and the extremity of an immense promontory stretching seaward in an east-north-east direction, and washed on the north-west by the Gulf of Aden and on the south-east by the Indian Ocean. The cape is in lat. 11° 50′ N., long. 51° 20′ E.

GUA'RDIA-GRELÉ, a small and unimportant town of S. Italy, in the province of Chieti, 12 m. south-south-east of the town of Chieti. Pop. 7970.

GUARDIAN, in English Law, is the legal representative and custodier of infants, i. e., persons under the age of 21, and various species are distinguished. Guardian by nature is rather a popular than a legal term, especially when used in reference to a father or mother, who are often called guardians by nature. In its technical sense, it is confined to an ancestor who is said to be guardian of his heir-apparent. *Guardian for nurture* is the name given to a father, or, after his death, to the mother, who, as such, has the custody and control of children until the age of 14. *Guardian in socage* is the term anciently given to the next of blood who had the legal custody of the person as well as estate of the heir to lands which descend in socage or freehold, until the heir attains the age of 14. A father may, by deed or will, appoint a guardian to his child. If he do not, the lord chancellor will do so; but practically, this is only done when the child is entitled to property. When a guardian is appointed by the Court of Chancery, the infant is called a ward of court, and requires the sanction of the guardian for most purposes, and requires the permission of the Court of Chancery to marry, or rather, if the infant marries without such permission, those who were privy to such a contempt of court may be punished. A *guardian ad litem* is a person (usually the father, if alive) appointed by the Court of Chancery for the purpose of carrying on a suit in the name of an infant. In general, the power of a guardian extends to the person as well as the property of the infant; but in the case of guardians appointed by the Court of Chancery, their powers are under the strict control of that court.

The guardian of a Lunatic (q. v.) is usually called a committee. In Scotland, the word 'guardian' is sometimes used in reference to lunatics, but seldom applied, except in a popular sense, to those who have the custody and care of children. In corresponding cases in Scotland, the custody of a child under 12, if female, or 14, if male, belongs to her or his Tutor (q. v.); and from those ages to 21, the child has no legal guardian, being *sui juris*, but the care of the child's property belongs to a Curator (q. v.).

Guardian of the poor, is in English parochial law an important functionary, being a person elected by a parish or union of parishes to manage the affairs of the poor. The ancient officers of the parish who attended to the affairs of the poor were called overseers; but by statutes, most of which are recent, it has been thought better to have a larger body of persons elected by the ratepayers of the parish to discharge most of these duties. Hence, many of the larger parishes are, either by a special statute or by order of the Poor-law Board, put under a board of guardians, and all poor-law unions are managed by guardians also. The ratepayers, in voting, have one vote for each £50 of rent they pay, but in no case are allowed more than six votes. The guardians have the management of the workhouse, and the maintenance, clothing, and relief of the poor, and in the regulations must comply with the orders of the Local Government Board, whose president is a member of the government, acting by these orders and by statutes. The office of guardian is compulsory, but may be refused, if notice is given during the election.

In Scotland, the corresponding duties are discharged by the Parochial Board (q. v.), which is subject to the general Board of Supervision. See also POOR.

GUARDS are in all armies the élite of the troops, and usually those most heavily armed. In the British service, the Guards constitute, in time of peace, the garrison of London, and the guard of the sovereign at Windsor. The Guards compose what is called the Household Brigade, and include in cavalry the 1st and 2d Life Guards, and the

Royal Horse Guardsman (1742).

Royal Horse Guards (Blue); and in infantry, the Grenadier Guards, the Coldstream Guards, and the Scots Fusilier Guards. These distinguished corps comprise 1302 cavalry in three regiments, and 5940 infantry in seven battalions. Before the abolition of purchase, the officers of the regiments of Foot Guards held higher army rank than that they bore regimentally; that is, ensigns ranked with lieutenants of other regiments, lieutenants with captains, captains with lieutenant-colonels; and on exchanging into the line, they were thus enabled to exchange into the higher positions, a circumstance which often placed officers of comparatively short service over veterans of the line, and caused, perhaps, more heart-burning than any other anomaly among our regulations. When purchase was the rule, every officer in the Guards was quite ready to accede to it; when it was abolished in 1871, this exceptional rank was also abolished in regard to all officers newly entering the Guards.

GUARDSHIP, the ship-of-war in charge of a port. She generally acts also as a dépôt for seamen raised there until appropriated to other vessels, and her captain is responsible for the safety and proper preservation of the men-of-war which may be laid up—out of commission in the harbour. The superintendent of a dock-yard, if a flag-officer, carries his flag at the mast-head of the guardship; if he be only a captain, the guardship is usually under his nominal command, although the actual duties are carried on by the commander or next senior officer.

GUAREA, a genus of tropical American trees of the natural order *Meliaceæ*, of some of which the bark is used as an emetic and purgative. *G. grandifolia* is called MUSK-WOOD in some of the islands of the West Indies; the bark smelling so strongly of musk, that it may be used as a perfume.

GUARI'NI, GIOVANNI BATTISTA, a popular and elegant poet, was born at Ferrara in 1537. At the termination of his studies in the universities of Pisa, Padua, and Ferrara, he was appointed to the chair of literature in the latter, and soon after, the publication of some sonnets obtained for him great popularity as a poet. At the age of 30, he accepted service at the court of Ferrara, and was intrusted by Duke Alfonso II. with various diplomatic missions of delicacy and importance. Differences between him and the duke induced him to withdraw from the court of Ferrara about the year 1587. Having resided successively in Savoy, Mantua, Florence, and Urbino, he returned to his native Ferrara, and discharged one final public mission, that of congratulating Pope Paul V. on his election to the tiara. He died in 1612 at Venice, whither he had been summoned to attend a lawsuit. An irascible sensitiveness, joined to an exaggerated estimate of his personal dignity, neutralised many qualities both brilliant and solid, which seemed to fit G. exactly for a court career. To these defects, in part, may be attributed the frequent mortifications which tracked him through life. As a poet, he is remarkable for refined grace of language and sweetness of sentiment, while his defects are occasional artificiality, a too constant recurrence of antithetical imagery, and an affected dallying with his ideas. His chief and most popular work, *Il Pastor Fido* (The Faithful Swain), is regarded in Italy as a standard of elegant pastoral composition, and obtained a high measure of popularity on its appearance. The writer designed it as a tragi-comic pastoral; its first dramatic representation was in honour of the nuptials of the Duke of Savoy and Catherine of Austria, 1585. It subsequently ran through forty editions during G.'s life, and was translated into almost all the modern languages. Tasso and G. have been frequently compared; the two poets were literary friends and reciprocal admirers, although rivals in love. G.'s varied writings, including sonnets, comedies, satires, and political treatises, were published at Ferrara in 1737, 4 vols. 4to.—See *Storia della Letteratura Italiana del Tiraboschi.*

GUARI'NO (Lat. *Varinus*), a learned Italian, born at Verona in 1370, went to Constantinople in 1388 to learn Greek under Chrysoloras. After his return, he taught in Verona, Padua, and Bologna, was tutor to Prince Lionella of Ferrara, acted as interpreter at the council of Ferrara, and died in 1460. He performed great services for the revival of classical studies; translated the first ten books of Strabo, and a portion of Plutarch; commented on Cicero, Persius, Juvenal, Martial, and Aristotle; and wrote a *Compendium Grammaticæ Græcæ*, which was printed at Ferrara in 1509.—Compare Rosmini, *Vita e Disciplina di Guarino* (3 vols. Brescia, 1805—1806).

GUATEMA'LA, the name of two cities in Central America.—1. Guatemala (Old) stands at the foot of Volcan d'Agua, in lat. 14° 30′ N., and long. 90° 45′ W. Once the capital of the country, it was twice destroyed, first in 1541, by an eruption, and again in 1773, by an earthquake. Though, after the second disaster, it was supplanted by its more modern namesake, yet it was, to a certain extent, rebuilt. It numbers about 20,000 inhabitants; and many of its ancient buildings, more especially a cathedral and a palace, remain entire.—2. Guatemala (New), capital of the republic of the same name, is situated in a rich and spacious table-land, at an elevation of 4961 feet above the sea, in lat. 14° 37′ N., and long. 90° 30′ W. It is 24 miles to the east-north-east of the original capital. Population estimated at 45,000. The people manufacture muslins, cotton-yarn, plate, artificial flowers, and beautiful embroidery, carrying on at the same time a prosperous trade in the agricultural productions of the neighbourhood. The place is well supplied with water by an aqueduct.

GUATEMALA, nominally a republic, but really an oligarchic state of Central America, terminates this division of the new continent towards the north-west, being washed at once by the Caribbean Sea and the Pacific Ocean. It stretches in N. lat. from about 14° to 17°, and in W. long. from 89° to 94°, containing 43,380 square miles, and 1,180,000 inhabitants. The surface presents great variety, mountains and valleys, plains and table-lands. The different levels, ranging from the sea-shore to an elevation of 5000 feet, have each its own climate and temperature. The country is subject to earthquakes, and abounds in active volcanoes. Being nearly as populous as all the other states of Central America put together, G. popularly gave name, in the early days of independence, to the confederation which they temporarily formed; and, from the same pre-eminence, it had given name, under the Spanish domination, to a still more extensive region. The government is in the hands of a president elected for four years, with a Council of State and a House of Representatives. Formerly, the president was elected for life, and under Rafael Carrera (1854—1865) the government was carried on in the interest of a dissolute aristocracy and a debased priesthood. The banished Jesuits were recalled, the convents re-established, &c. Now a different order of things prevails. A new code of laws has been drawn up; the monastic order has been wholly suppressed; and, though the Roman Catholic is the established religion, there is complete religious toleration. In 1868, the imports and the exports respectively amounted, in dollars, to 956,109 and 956,085—the trade with Great Britain, partly direct and partly through Belize, comprising two-thirds of the former, and nearly three-fourths of the latter; while, taken in order of value, the articles imported were cottons, silks, woollens, hardware, ironmongery, linens, and jewellery; and the articles exported were cochineal, indigo, sugar, hides, country manufactures, sarsaparilla, and mahogany. The exportation of cochineal alone was 2,012,425 lbs. in quantity, while in estimated worth it far more than doubled all the other productions.

Guava (*Psidium pyriferum*):
a, section of fruit.

GUA'VA (*Psidium*), a genus of trees and shrubs of the natural order *Myrtaceæ*, mostly natives of tropical America, and some of them yielding fine and much valued fruits. They have opposite entire, or almost entire leaves, a 3—5-lobed calyx, 4—5 petals, and a 1—5-celled berry with many-seeded cells.—The Common G. or White G. (*P. pyriferum*) is a low tree of 7—20 feet, with numerous branches, obtuse smooth leaves 2—3 inches long, and fragrant white flowers on solitary axillary stalks. It is said to be a native both of the East and West Indies, and is now much cultivated in both. It is not improbable, however, that it was introduced into the East Indies from America, but it has now become fully naturalised. Sir James E. Tennent says, it is to be seen in the jungle around every cottage in Ceylon. It has long been occasionally grown as a stove-plant in Britain. The fruit is larger than a hen's egg, roundish or oblong, smooth, yellow; the rind thin and brittle; the pulp firm, full of bony seeds, flesh-coloured, aromatic, and sweet. The jelly or preserve made from it is highly esteemed, and is now regularly imported into Britain from the West Indies and South America. The rind is stewed with milk, and is also made into marmalade. This fruit is rather astringent than laxative. G. buds, boiled with barley and liquorice, make a useful astringent drink in diarrhœa.—The Red G. (*P. pomiferum*), also now common in the East as well as in the West Indies, produces a beautiful fruit, with red flesh, but not nearly so agreeable as the white guava. It is very acid.—The China G. (*P. Cattleyanum*), a native of China, produces fruit readily in vineries in Britain. It is a larger tree than the white guava. The fruit is round, about the size of a walnut, of a fine claret colour, growing in the axils of the leaves; the pulp purplish red next the skin, becoming paler towards the centre, and there white, soft, subacid, and of a very agreeable flavour. It makes an excellent preserve. It succeeds in the open air in the south of France.—On some of the mountains of Brazil grows a dwarf species of G., called Marangaba (*P. pygmæum*), a shrub 1—2 feet high, with fruit about the size of a gooseberry, much sought after on account of its delicious flavour, resembling that of the strawberry.—The Bastard G. of the West Indies is a species of *Eugenia* (q. v.).

GUAXA'CO. See Oajaco.

GUAYAQUI'L, a term of various application in Ecuador, South America, indicates at once a river, a bay, a department, and a city.—1. The river is the only stream on the western coast of South America which can, without qualification, be said to be navigable for sea-going vessels. It is navigable for about 110 miles to Caracol, and is known in its upper course successively as the Caracol and Babahoyo.—2. The bay which receives the river, stretches in S. lat. between 2° and 4°, and in W. long. between 80° and 81°. It receives also the Daule and the Tumbez.—3. The department extends from the Pacific on the west to the departments of Quito and Assuay on the east, comprising a much wider belt of low and level land than is generally found further to the south, between the Andes and the sea.—4. The city, the capital of the department, stands on the right bank of the river, at the distance of 40 miles from its mouth. It is divided into two parts, the old and the new. The houses are mostly of wood; the principal are the cathedral, the two hospitals, and the two colleges, the last of which have faculties of theology, philosophy, and law. G. possesses the best, perhaps the only really good harbour on the Pacific shores of South America, the naturally deep channel being aided by a tide which sometimes rises and falls 24 feet. Occupying such a position, and being in lat. 2° 11′ S., the place is necessarily unhealthy. Still it has a population of 25,000, and carries on an extensive trade. In 1873 (besides the steam-packets), 128 vessels, of 113,034 tons, entered, and 118, of 110,662 tons, cleared the port. In 1870 the imports amounted to £760,500, the exports to £783,000. In 1869, the imports were £405,200; the exports, £594,500. In order of worth, they were—cottons (more than a quarter of the whole), woollens, wines, spirits, grocery, soap, &c., metals, flour and linens; and the exports, according to a similar arrangement, were cocoa, straw-hats, timber, bark, hides, orchilla, tobacco, sarsaparilla, canes, india-rubber, and coffee.

GUAY'RA, La, the principal sea-port of Venezuela, in South America, stands on an open roadstead of the Caribbean Sea, in lat. 10° 36′ N., and long. 67° W. It has a pop. (1873) of 6523, and carries on an extensive trade. In 1872—1873, 177 vessels, of 93,424 tons, entered, and 168, of 131,110 tons, cleared the port. The imports in 1872 were £846,000; the joint exports of G. and Puerto Cabello amounted, 1872—1873, to £2,200,000, about half belonging to each. The chief exports of G. were coffee, cotton, cocoa, and hides. The principal imports were, in the same year, woollens, calicoes, guns, cutlery, and china-ware from Great Britain; wines from France and Germany; flour, wheat, petroleum, machinery, and cotton goods from the U. S. of America.

GU'BBIO (anc. *Iguvium*), the chief town of a district of the same name in Central Italy, is beautifully situated on the south-western declivity of the Apennines, in the district of Urbino, and about 27 miles south of the city of that name. Pop. 8000. It contains several fine public edifices of importance. On the most elevated point of the city, where the ancient fortress stood, is the ducal palace, so called from having been erected and inhabited by the Dukes of Urbino, who also governed Gubbio. The municipal palace is a noble old pile of building, erected in 1332 by Matteo di Giannello, a native architect. In the palaces Brancaleone and Beni are valuable pictures, collections of Etruscan and other antiquities. G. possesses several fine churches, and some excellent public establishments for sanitary and educational purposes. The most important ancient remains are the ruins of a theatre, supposed to have been destroyed by the Longobards, a temple of Mars, and an Etruscan sepulchre of great antiquity. At a short distance from G. are the ruins of the famous temple of Jupiter Apenninus; and here, in 1444, were discovered the famous Eugubine Tables (q. v.).

GU'BEN, a manufacturing town and river-port of Prussia, in the province of Brandenburg, is charmingly situated on the Neisse—the banks of which are here planted with vines—at its confluence with the Lubst, 28 miles south-south-east of Frankfurt. Except its gymnasium, it has no notable buildings. The principal manufactures are woollen goods and tobacco. The shipping-trade of the Neisse is of some importance; ship-building is also carried on. On the neighbouring heights, fruit-trees and vines are cultivated. The red wine produced here is esteemed one of the finest grown in the eastern portion of the kingdom. Pop. (1871) 21,423.

GUDGEON (*Gobio*), a genus of fishes of the family *Cyprinidæ*, having a short dorsal fin, a short anal fin, and no strong serrated ray in either, the body covered with rather large scales, and barbules at the angles of the mouth. The COMMON G. (*G. fluviatilis*) is abundant in many of the rivers of England, particularly in such as have gravelly bottoms, and occasional pools and rapids. It seldom exceeds eight inches in length; the depth is not one-fifth of the length. The tail is forked. The eye is placed high up on the side of the head. The upper parts are olive brown, spotted with black; the under parts white. Gudgeons swim in shoals. They feed on worms, molluscs, and other small animals, and are extremely ready to bite at a bait, which is commonly a small piece of a red worm. Great numbers are often taken even by young anglers, and the readiness with which the G. is lured has become proverbial. The G. is much esteemed for the table. Many are taken with casting-nets in shallow water, and kept in well-boats till wanted. Fishmongers also keep them in tanks, constantly supplied with fresh cold water. They thrive well in ponds supplied with fresh water by brooks.

The G. is usually one of the first objects of the juvenile angler's ambition; and with a crooked pin and thread, with a fragment of a worm for bait, the angler often imbibes his first love of the art while catching his first gudgeon. The G. is very easily captured. Swimming in large shoals at the bottom, it watches with incessant industry for every trifling matter brought down by the stream. A small red worm is by far the best bait for the G.; next to it, perhaps, a maggot or gentle. A small hook and a light float are required. A fragment of worm is fixed on the hook, neatness in baiting not being a desideratum, for the same bait, without much alteration, will often take ten or a dozen gudgeons in succession. The bait should drag or trip along the bottom; and if there be gudgeons about, it will hardly fail to attract them. Ground-bait is not required for G.; but if the angler will, with a large rake or any other heavy matter, disturb the gravel, and rake a clear bright spot, a yard in width, and two or three in length, the gudgeons, attracted by the dislodged particles, will swarm up to the spot in great numbers in search of food; and thus it is no uncommon thing to take, by one or two rakings, from five or six to ten or twelve dozen of gudgeons in one spot. There is no art required in the angling, as they bite very boldly, and the angler can hardly miss catching them.

GUDIN, JEAN-ANTOINE-THÉODORE, French landscape and marine painter, was born at Paris, 15th August 1802, and studied for some time under Girodet-Trioson, but soon abandoned the style of this artist, and ranked himself with the Romanticists, on the side of Géricault and Delacroix. He first attracted notice by his picture, 'Brick en Détresse,' exhibited in 1822. Most of his marine pictures appeared at the Paris Exhibition of 1855. Between 1838 and 1848, G. painted more than eighty of such pieces for the Museum of Versailles. Since 1855 he has exhibited many new paintings.

GUE'BRES, GHEBRES, GABRES, GHAVRES (Turk. *Ghiaur* or *Ghaur*), the followers of the ancient Persian religion as reformed and consolidated by Zerdusht (Zoroaster). This name, Guebres, which is commonly, but against all linguistic laws, derived from the Arabic *Kafir* (a word applied to all non-Mohammedans, and supposed to have been first bestowed upon this sect by their Arabic conquerors in the 7th c.), is evidently nothing but an ancient proper name taken from some pre-eminent tribe or locality, since the Talmud (Jebam. 63 b., Gitt. 17 a. &c.) already knows them only by this name (Cheber); and Origen (*Contra Cels.* vi. 291) speaks of Kabirs or Persians, asserting that Christianity has adopted nothing from them. They are also called *Atesh Perest*, or fire-worshippers; *Parsees*, or people of Pars or Fars—i. e., Persia; *Madjoos*, from their priests the Magi; and by themselves *Beh-Din*, 'Those of the excellent belief'; or *Mazdaasnan*, worshippers of Ormuzd. For the origin, nature, and early history of this religion, see ZOROASTER, ZEND-AVESTA, SUN-WORSHIP. When the Persian empire became subject to the Mohammedan rule, the great mass of the inhabitants were converted to the religion of Islam. A very small number still clinging to the ancient religion, fled into the wilderness of Khorassan, or the island of Hormuz; but even this remnant was for many centuries the victim of constant oppression. Mahmoud the Ghiznevide, Shah Abbas, and others, are conspicuous by their untiring persecution of them; and the manner in which they were held up to general detestation is best shewn by the position assigned them in most popular Mohammedan tales as sorcerers and criminals. At this present moment, there are, according to the very latest native information, about 8000 Guebres scattered over the vast dominions of their ancestors, chiefly in Yezd and twenty-four surrounding villages. There are a few at Teheran, a few at Ispahan, at Shiraz, and some at Baku, near the great naphtha mountain, but all plunged in the depths of ignorance, and, with very few exceptions, of poverty. They have a high reputation for honour, probity, obedience to the law, chastity, and endurance. Another portion, after various migrations—which are told at length in the *Kissah-i-Sanjan*, written by Behram (1599 A. D.)—reached India, where they are now settled under the name of Parsees, chiefly in Bombay, where they are very numerous, forming a population of above 50,000, or about 8 per cent. of the whole population. See PARSEES.

GUELDER ROSE, or **GUELDRES ROSE**, a cultivated variety of the Water-Elder (*Viburnum Opulus*—see VIBURNUM), in which the flowers are all barren, and instead of forming flat cymes, as in the wild plant, form much larger globose corymbs. It is sometimes called the SNOW-BALL TREE. When abounding in flowers, it is a very ornamental shrub, and is therefore very often planted.

GUE'LDERLAND. See GELDERLAND.

GUE'LPHIC ORDER, an order of knighthood for Hanover, instituted by George IV., when Prince Regent, on the 12th August 1815. It is both a military and civil order, unlimited in number, and consisted originally of three classes—Knights Grand Cross, Commanders, and Knights—to which the revised statutes of 1841 have added another class of simple members. The Grand Mastership is vested in the crown of Hanover. The badge of the order is a gold cross, surmounted by the Hanoverian crown—between each division of the cross is a lion passant gardant. In the centre is the horse courant of Hanover, surrounded by a blue circle, and the motto, *Nec aspera terrent.*

GUELPHS AND GHIBELLINES, the names of two great parties, the conflict of which may almost be said to make up the history of Italy and Germany from the 11th till the 14th century. The origin of these names was formerly the subject of much speculation; but antiquarians are now agreed in tracing them respectively to the two families, Waiblinger and Welf, which, in the 12th c., were at the head of two rival parties in the German empire, and whose feuds came to be identified historically with the respective principles for which these parties contended. The actual origin of the assumption of the names is commonly fixed at the great battle of Weinsberg, in Suabia, 1140 A.D., in which the two rival claimants for the empire, Conrad of Hohenstaufen, Duke of Franconia, and Henry the Lion, of the House of Welf, Duke of Saxony, rallied their followers by the respective war-cries, 'Hie Waiblingen!' 'Hie Welf!' but it is certain that the names were in use from an earlier date, although, probably, rather as representing the family feud, than the political principles which the two families afterwards severally supported. As the chief theatre of the conflict of these parties was Italy, the original names took the Italian form of *Ghibellini* and *Guelfi*. The former may, in general, be described as the supporters of the imperial authority in Italy, the latter, as the opponents of the emperors; and as the opposition to imperial authority in Italy arose from two distinct parties, which, for the most part, made common cause with each other—from the church, which asserted its own spiritual independence, and from the minor principalities and free cities, which maintained their provincial or municipal rights and liberties—the history of the struggle is involved in much confusion, and is variously related, and its merits variously appreciated, according to the point of view from which it is regarded. To the churchman, it is the struggle of the church against the state; to the friend of popular principles, it is the conflict of liberty against absolutism and centralisation. The same individual—as, for example, the poet Dante—is found to change sides in the struggle. For the most part, however, the interests of the church in these medieval contests, although regarded by Protestants as excessive in degree, must be confessed to have fallen in with the claims of political and personal freedom. Five great crises in the strife of the Guelph and Ghibelline parties are commonly noted by historians: under Henry IV., in 1055; under Henry the Proud, in 1127; under Henry the Lion, in 1140; under Frederick Barbarossa, in 1159; and in the pontificate of the great champion of churchmanship, Innocent III. The cities of Northern Italy were divided between the two parties—Florence, Bologna, Milan, and other cities, as a general rule, taking the side of the Guelphs; while Pisa, Verona, and Arezzo, were Ghibelline. The great Italian families, in like manner, took opposite sides; but the policy of each family frequently varied from one generation to another. In general, it may be said that the nobles of the more northern provinces of Italy inclined to the Ghibelline side, while those of the central and southern provinces were Guelph. By degrees, however, especially after the downfall of the preponderance of the German emperors in Italy, the contest ceased to be a strife of principles, and degenerated into a mere struggle of rival factions, availing themselves of the prestige of ancient names and traditional or hereditary prejudices. Even in 1272, Gregory X. could with truth reproach the Italians with their sanguinary animosities for the sake of what were but names, the meaning of which few of them could understand or explain; and, in the following century, in 1334, Benedict XII. practically disallows altogether the reality of the grounds of division between the parties, by prescribing, under pain of the censures of the church, the further use of those once-stirring names, which had long been the rallying words of a sanguinary warfare. From the 14th c. we read little more of Guelphs or Ghibellines, as actually existing parties; but in the sense already explained, the conflict of principles which they represent is found in every period of political history.

GUERA'RA, or **GERRARA**, a town of Algeria, in the district of the Beni-M'zab, stands on the left bank of a river called the Zighrir or Zegerin, in lat. 32° 45' N., long. 5° E., and about 40 miles north-east of Ghardaia. It is a walled town, has three gates, and is a favourite commercial rendezvous for all the neighbouring tribes, who frequent this place for the purchase or disposal of horses, asses, sheep, ivory, gold-dust, ostrich feathers, cotton, silk, cutlery, &c. The market of G. is supplied chiefly from Tunis and Algiers. The pop. is about 12,000.

GUERCINO, 'the squint-eyed,' properly GIAN-FRANCESCO BARBIERI, a celebrated master of the Bolognese school of painting, was born in 1590 at Cento, a pretty town not far from Bologna. G. gave early proof of his intuitive love of art, by sketching with the roughest materials on the house-door a Virgin so full of artistic promise, that his father, in spite of the straitened circumstances of the family, took immediate measures for training the boy's talents, by securing for him the best tuition in drawing which the place afforded. In 1616 he opened an academy at Cento, to which pupils flocked from all quarters. From 1619 to 1623 he visited different cities of Italy, particularly Rome and Venice, to improve himself by the study of the works of other eminent painters. In 1642 he went to live at Bologna, where he died in 1666. Some of the early paintings of G. bear perceptible traces of his admiration of Caravaggio's style, both in their powerful effects of deep colouring and strong fidelity to nature, while they much surpass those of the great realist in dignity and refinement of tone. They are deficient, however, in accuracy of design. His works, which are too numerous for notice, are to be found in the galleries of Rome, Bologna, Parma, Modena, Perugia, and Paris. His master-pieces are considered to be the fresco of 'Aurora,' which decorates the ceiling of one of the casinos of the Roman villa Ludovisi; the famous 'Persian Sibyl,' and 'Saint Petronilla,' both in the Capitoline Gallery at Rome. At Cento, the artist's house, *Casa di Guercino*, is carefully preserved, with its fine paintings and fresco decorations, and is the chief object of interest to those who visit the place. The church of Cento also contains several fine works of this master, who had an intense love for his birth-place.

GUERICKE, Otto von, a celebrated physicist, was born at Magdeburg, in Prussian Saxony, 20th November 1602. His personal history contains nothing of interest. As a natural philosopher, he is chiefly known by his discoveries regarding the nature and effects of air. The experiments of Galileo and Pascal on the weight of air led G. to attempt the creation of a vacuum. His first experiment was made by filling a stout barrel with water, and then pumping out the water; but it was found that no sooner was a vacuum produced in the barrel than the air forced its way through. He now took a globe of copper, with an opening at the bottom into which a pump was fitted, provided with a stop-cock, and to his astonishment found that the pump extracted the air quite as well as the water; then, on opening the cock, the air was heard rushing in with a whistling noise. This, the first air-pump, was invented about 1650. G.'s invention soon became famous, and in 1654 he was summoned to the presence of the Emperor Ferdinand III. of Germany at Ratisbon, at which time he made the famous experiment commonly known as the Magdeburg Hemispheres (q. v.). He died at Hamburg, 11th May 1686.

GUÉRIN, Pierre Narcisse, Baron, one of the most eminent historical painters of the French classic school, was born at Paris, 13th May 1774, and first attracted notice by his 'Corps de Brutus rapporté à Rome' (1796). Some of his pieces are regarded as master-pieces of the French classic school. The few portraits executed by G. are admirable. Among others may be mentioned one of Henri de la Roche-Jacquelin storming an intrenchment. In 1829 he was raised to the rank of baron, and died at Rome, 16th July 1833. Purity of design, dignity of style, taste in grouping, and harmony of colour will be generally conceded to G., but the coldness which marks the classic school of painters is as visible in him as in others.

GUERITE, a small loopholed turret in the wall of a fortress, from which a sentry may command a view and fire over the ditch.

GUERNSEY, the second in size of the Channel Islands (q. v.), is situated in lat. between 49° 24′ and 49° 30′ N., and in long. between 2° 33′ and 2° 41′ W.; is distant 69 miles south-east from Start Point, in the south of Devonshire—the nearest point of the English coast; and is about 46 miles south-west from Cherbourg, in France. Its length is 9 miles, its greatest breadth about 6, and its circumference 31 miles. In 1871 it had a population of 30,593. The coast is of difficult approach, owing to the number of rocks and the rapidity of currents around the island. The northern part of the island is flat, the southern more elevated, but intersected by deep valleys and glens, and with a lofty and abrupt coast. St Peter's, on the south-east coast of the island, is the only town. For particulars about the climate, soil, productions, trade, &c., see Jersey.

GUERRAZZI, F. D., a patriotic Italian statesman and brilliant writer, was born at Leghorn in 1805, and, educated for the legal profession, won a great reputation among his countrymen by his political fictions, which are said to have exercised an immense influence on contemporary Italian events by their exalted strain of patriotic enthusiasm and abhorrence of despotism. G.'s own words are, 'he wrote a book when impotent to fight a battle.' On the eve of the definite breach between the people and the Grand Duke of Tuscany, in 1849, G. was induced to accept office in the ministry. On the flight of the Grand Duke, he was proclaimed member of the provisional government, and subsequently dictator. During this crisis of the state he energetically refused his adhesion to 'the substitution of republicanism for monarchy;' and preserved the strict autonomy of Tuscany until the return of the Grand Ducal rule, when he was immediately seized and imprisoned on the grounds of having neglected due measures of repression when the revolution first gathered strength during his ministry. His defence, entitled *Apologia della vita Politica di F. D. Guerrazzi*, or 'Justification of the Political Career of F. D. Guerrazzi,' is a masterpiece. After an imprisonment of three years, he was condemned for life to the galleys, but was subsequently permitted to select Corsica as the refuge of his perpetual banishment. Restored to liberty and action by later events, G. sat in the parliament of Turin in 1862 and 1865. He died in Sept. 1873.

His chief works of fiction are *L'Assedio di Firenze* (the Siege of Florence), a magnificent historical novel, treating of the downfall of the republic of Florence; *La Battaglia di Benevento*, remarkable for exquisite expression and beautiful poetic imagery; *Beatrice Cenci; Isabella Orsini; L'Asino;* and various other writings, which have run through innumerable editions and translations.

GUERRI'LLAS (diminutive of Sp. *guérra*, 'war,' literally 'petty' or 'partisan wars,' or 'partisan warriors'), the name given in Spain to the armed bands, composed of peasants and shepherds, who, on occasion of foreign invasion or civil wars, carry on an irregular warfare on their own account. From 1808 to 1814 they were regularly organised against the French, and being favoured by the character of the country, were successful on many occasions, especially at the commencement of the war, under Empecinado, the Pastor Merino, Mina, and other leaders. The country itself suffered from the guerrillas, who revenged political treachery, or even the bare suspicion of it, by fearful devastations. Many of them, particularly Mina's band, joined Wellington, and after having undergone a course of discipline, rendered signal service as regular troops. In all the recent civil wars of Spain, the guerrillas, especially those of the Basque provinces, acted a prominent part on the Carlist side.

GUESCLIN, Bertrand du, Count of Longueville, Constable of France, the most eminent French general of the 14th c., was born of an ancient family in the district of Rennes, sometime between 1314 and 1320. As a boy, he was remarkably dull, and could never be taught either to read or write, but exhibited a passion for military exercises. In his 17th year he bore away the prize at a tournament at Rennes, and from this time was always successful in such encounters. In the contests between Charles de Blois and Jean de Montfort for the dukedom of Brittany, he took part with the former. After King John had been taken prisoner by the Black Prince at the battle of Poitiers, in 1356, G. rendered important services to the Dauphin, afterwards Charles V. He took Melun and several other fortified towns, freed the Seine from the English, and on Charles's accession to the throne, in 1364, was created governor of Pontorson. In May of the same year he gained the battle of Cocherel, and was rewarded by the title of Count of Longueville and Marshal of Normandy. On the 29th September he was defeated and taken prisoner by the English, under Sir John Chandos, at the battle of Auray, but liberated on payment of a ransom of 100,000 livres, paid by the king, the pope, and several other princes. He now supported Henry, Count of Trastamare, against Pedro the

Cruel, king of Castile, but was defeated and taken prisoner by the Black Prince. Being again ransomed on payment of a large sum, to which even the enemy contributed from feelings of respect, G. renewed the contest, and in 1369 defeated and slew Pedro, and placed the crown of Castile on the head of Henry of Trastamare. As an acknowledgment of his services, Henry created G. Count of Burgos, Duke of Molina, and Constable of Castile. He was, however, soon recalled by Charles V. of France, at that time hard pressed by the English, and raised by that monarch to the dignity of Constable of France. In the year 1370, G. opened his campaigns against the English, and in a short time the whole of their possessions were in the hands of the French, with the exception of a few fortified towns. While assisting his friend Sancerre in the siege of Châteauneuf de Randon, in Languedoc, G. was taken ill, and died July 3, 1380. Charles V. caused him to be interred with great pomp beside his own burial-vault at St Denys.—Compare Guyard de Berville, *Histoire de Bertrand du Guesclin* (2 vols., Paris, 1767).

GUGLIELMI, Pietro, a celebrated musician and composer, was born at Massa di Carrara in 1727. From his father, who was *Maestro di Cappella* in the ducal chapel of Modena, he acquired the elements of music. His first opera, composed at the age of 28, was performed at Turin, and was greeted with enthusiasm. Previous to setting out on a continental tour he visited the chief cities of Italy, and was everywhere successful. After a residence of some months at Dresden, Vienna, and various other towns, G. passed over to London, where he remained five years, assiduously engaged in composition. At the age of 50 he returned to Naples with the double prestige of great fame and wealth. In 1793, Pope Pius VI. appointed him *Maestro di Cappella* at St Peter's, and from that time his official duties seem completely to have engrossed him. He died at Rome in 1804. The characteristics of his style are pre-eminently simplicity, purity, and precision, and these qualities he inexorably demanded from the exponents of his inspiration—'Sing *my* music and not *yours!*' His best known operas are—*La Clemenza di Tito; Artaserse; La Didone; Enea e Lavinia; La Morte di Oloferne; Debora e Sisera;* and the comic operas *La Virtuosa di Mergellina; I due Gemelle; La Serva Innamorata; La Pastorella Nobile; La Bella Pescatrice.*

GUIA'NA, British (Fr. *Guyane*, Sp. *Guayana*, Port. *Guianna*), a section of the extensive tract forming the north-eastern portion of South America, lying between 8° 40′ N. and 3° 30′ S., and between the meridians of 50° and 68° W. The greatest length of this tract, from Cape North to the confluence of the river Xie with the river Negro, is calculated at 1090 miles; its greatest breadth, between Punta Barima, at the embouchure of the river Orinoco, and the confluence of the river Negro with the river Amazon, at 710 miles. It is at present politically divided into Venezuelan, British, Dutch, French, and Brazilian Guiana. The name G. is usually supposed to have been applied by the Dutch to the whole country from the name of a small river Wai-ini, a tributary of the Orinoco, on which stands a small town, called Guayana Vicija.

The limits of the British possessions have never yet been accurately determined. If we adopt the idea of Sir Robert Schomburgk, the latest authority upon the subject, and assume the natural indications to be the proper guide to the geographical boundaries, we shall include all the regions drained by the waters falling into the river Essequibo; and taking the river Corentyn as the acknowledged line of demarcation between British and Dutch G., we arrive at an area of 76,000 square miles, a territory much larger than England and Wales. If, on the other hand, the claims of the Venezuelan and Brazilian governments respectively are to be admitted, the British portion will be reduced to something above 12,000 miles, and become the smallest of the European colonies in this region.

The coast-line of the British territory consists of an alluvial flat, composed of a blue clay impregnated with marine salts, and mixed with decayed vegetable matter, which, in its decomposed state, forms a rich and highly productive soil. The inland depth of this fertile coast varies from ten to forty miles, where it is bounded by a range of sand-hills, varying in height from 30 to 120 feet. In the fifth parallel N. lat. occurs a chain of mountains composed of granite, gneiss, and trappean rocks, with their various modifications, and it has been conjectured that it was the ancient boundary of the Atlantic Ocean. A peculiar feature of the interior is the savannas extending between the rivers Demerara and Corentyn, and at the river Berbice closely approaching the sea-shore. There is another series of such savannas further inland, and the geological structure of the region indicates that it was once the bed of an inland lake, which, by some great elemental disturbance, burst its barriers, and forced for its waters a passage to the Atlantic. This supposition may throw light upon the origin of the tradition of the White Sea and the city of the gold-besprinkled Manoa, which inflamed the ardour of the chivalric Raleigh, and led him to the pursuit of those discoveries by which his name has been immortalised.

The fluvial system of British G. consists mainly of four great and seven smaller streams, the whole of the first named and six of the latter pouring their waters directly into the Atlantic. The four great rivers are the Essequibo (q. v.), the Demerara (q. v.), the Berbice (q. v.), and the Corentyn (q. v.). The smaller streams are the Pomeroon, the Moruca, and the Wai-ini, between the Orinoco and the Essequibo; the Mahaica, the Mahaicony, and the Abany, between the Demerara and the Berbice; and the Canje, which joins the latter immediately before it falls into the ocean. In addition to the foregoing, there are numerous creeks of considerable size, formed by the surplus waters of the savannas behind the sea-coast.

All these streams are continually bringing down quantities of detritus; the coast outline is consequently undergoing perpetual changes: in one place, the drainage of the estates is blocked up by banks of drift mud; in another, incessant exertion is required to repel the encroachments of the sea.

Climate.—The climate of G. is genial and equable, and for a tropical country comparatively healthy. The thermometer ranges from 90° to 75° F., the mean temperature being 81°·226. The barometric pressure—highest, 30·05 inches; lowest, 29·74; mean, 29·916.

History.—Whether Christopher Columbus himself ever actually landed on the shores of G. seems not to be positively ascertained. It is, however, certain that the Spaniards must have settled in the neighbouring countries early in the 16th c., as in 1580, when the Dutch began to establish themselves on the banks of the Pomeroon and other rivers, they were speedily driven out by the Spaniards, nor was it until 1602 that they succeeded in obtaining a footing on the river Essequibo. During the 17th and the early part of the 18th centuries, the Dutch were frequently harassed by incursions of the French and by internal insurrections: three distinct colonies were constituted, until, in 1789, those of Essequibo and Demerara were united. Berbice remained a separate colony until 1831, when the three were constituted into the colony of British G., consisting of the counties of Demerara, Essequibo, and Berbice.

Towards the close of the 18th c., the feelings of the inhabitants had become strongly influenced by a desire to place themselves under British sovereignty, and in 1796 effect was given to that desire by the cession of the colonies to an expedition under Major-general Whyte. At the peace of Amiens, in 1802, however, the colonies were restored to the then 'Batavian republic,' to be again surrendered to Great Britain in 1803, which was finally confirmed at the peace of 1814.

Government.—The political constitution of the colony has undergone but little modification since its affairs were administered by the Dutch. It retains peculiarities which distinguish it from that of any other colonial dependency; the principal variations introduced have been the division of the colony into electoral districts; a new definition of the qualification for holding the electoral franchise, and open instead of secret voting. The electors return members of two distinct bodies; one is termed the 'college of electors,' seven in number, who hold office for life, unless they quit the colony; the special function of this body will be explained hereafter. The other elected body is termed the 'college of financial representatives,' and consists of six members. The legislative body comprises ten members, five of whom, including the governor, who personally presides over its deliberations, are nominated by the crown, and hold office under it, the remaining five are chosen as vacancies occur by the existing members of the court from a double nomination sent up by the college of electors above described. Once in each year, what is called the 'combined court' holds a session for the purpose of agreeing upon the annual expenditure, and determining the nature and amount of the taxes to be levied. This court, which is also presided over by the governor in person, consists of the court of policy 'combined' with the college of financial representatives, and its legislative functions are confined to passing the annual tax ordinance. Practically, in the legislative body, or court of policy, the governor is able to carry any measure he desires, possessing, as he constitutionally does, a double vote; but it is hardly necessary to add that this power has been very sparingly resorted to, and the same may be said of the power of vetoing any proposition brought forward either in that or the combined court, should he deem it objectionable. The direct responsibility of the governor to the crown for any and all of his acts, has been found in practice an ample safeguard against any abuse of these large prerogative powers. Another privilege reserved to the governor is that of originating all money votes; and while the majority in the combined court may reduce, they are prohibited from increasing the amount of any item of the public expenditure as annually settled.

The judicial system of the colony continued until a comparatively recent period, to be as it was established by the Dutch; and the Roman code is still the basis of the administration of justice in civil matters. Trial by jury in such cases, at the option of either party, was introduced in 1844; and in criminal cases, trial by jury was established by law in 1846, and the English criminal code was adopted as the law of the colony.

Besides the supreme and inferior courts, presided over by judges, there are police and stipendiary magistrates in each town and district, with the ordinary powers of summary jurisdiction; a jail in each county, and a penal settlement for the more heinous classes of criminals, situated on the banks of the river Massaruni, about 70 miles from Georgetown. The stipendiary police consists of about 300 men, and there is a strong body of rural constables throughout the colony, consisting usually of the most trustworthy men on the estates, and in the villages, without distinction of races.

There are but two towns, properly so called, in the colony—George Town (q. v.) and New Amsterdam (q. v.).

The cultivated portion of the colony is confined to the sea-coast, and to a short distance up each of the rivers Berbice and Demerara. The estates were laid out by the Dutch in the shape of a parallelogram as nearly as circumstances would permit, and the staples were sugar, and its contingent products rum and molasses, cotton and coffee. In 1747, two schooners sufficed to carry to Europe the crop of 559 half-hogsheads of sugar; in 1752, the culture of cotton and coffee commenced. Immediately after the conquest by the British in 1796, a great impetus appears to have been given to agricultural operations; since that period the fluctuations, arising no doubt from various causes at different times, have been considerable, of which some idea may be perhaps arrived at by glancing at the gradual decrease of the numbers of estates in cultivation. In 1831, there were altogether 322; thirty years later there were not more than 160. Cotton and coffee have entirely ceased to be exported; the former is not cultivated at all, the latter to a very trifling extent. All available resources have been concentrated upon the production of sugar and rum; molasses have much diminished in quantity, owing to the improvement in the manufacture of sugar. By the introduction of improved machinery, and an accession of labour by means of immigration, the produce of many estates has been increased from 50 to 100 per cent. The timber-trade has also assumed a vastness of proportion never dreamed of in years gone by, and for this the colony is mainly indebted to the interest excited in its natural resources by the Great Exhibitions at London in 1851, and Paris in 1855, at which much Guiana produce was exhibited.

It has been ascertained that the population of the colony in the year 1871 amounted to 193,491, inclusive of the aborigines and the troops in garrison. As the increase of nearly 70,000 since 1851 is more than accounted for by the net results of immigration during that period, it seems to follow that the native or Creole population has rather receded than advanced—a circumstance which, especially as it is believed to be borne out by the experience of some of the smaller West India insular colonies where immigration has had little or no influence, is matter of serious concern. It is, however, to be remembered, that in the interval the colony has been visited by epidemic cholera and small-pox, both extensively fatal, especially to the aged and the young.

The population is of a singularly diversified character; the aboriginal Indians, many of whose tribes are rapidly becoming extinct, are supposed to number from 7000 to 10,000, within the limits of the British claimed territory; the native African, the mixed race; the immigrants from Madeira, from the East Indies, and from China, crowned by a sprinkling of Europeans, chiefly British, French, and Dutch. The total number of immigrants of all races introduced from 1835 to 1860 inclusive, was 89,458. On the 30th June 1866 there were 32,124 under indenture on the several estates.

For ecclesiastical purposes, the colony is divided into 17 parishes, of which seven belong exclusively to the Church of Scotland, and eight exclusively to the Church of England, while the two in which the towns are situated have a minister of each church appointed to them. The ministers of both churches, with those of the Roman Catholic Church and the Wesleyan Church, are maintained by salaries from the public chest, secured by law for a term of years. There are also independent missionaries scattered throughout the colony, who are supported exclusively by the voluntary contributions of their flocks. In 1866, there were 118 public schools, with an average attendance of 6615 pupils; and, according to the governor's report, this shewed 794 pupils more than there were in 1865.

The actual position of this important dependency, as contrasted with what it was twenty-five years ago; may be described as one of advancing prosperity; but until a still more ample supply of available labour induces a greater influx of capital, it cannot be asserted that its condition is positively safe and satisfactory. Like the other sugar-producing colonies of Great Britain, it has had to struggle against great difficulties—partly, at least, arising from imperial legislation; it has still to contend with fiscal burdens in the shape of a scale of duties increasing in amount in proportion to the superior quality of the article manufactured, thus operating as a discouragement to its production, and with an expensive system of recruiting the deficient labour-market from distant regions.

The respective statistics of the years 1861 and 1871 shew the steady progress of the colony. In 1861, the revenue was £301,761; the expenditure £325,032; while in 1871, the revenue was £379,647; the expenditure only £338,053. The public debt has, during these ten years, decreased from £576,499 to £512,865. Within the same period the imports have risen in value from £1,339,713 to £1,897,184; the exports from £1,583,649 to £2,748,720. In the trade with Great Britain, the imports in 1871 amounted to £1,025,181; the exports to £1,266,426. Of wool, which is one of the chief articles exported, 2,203,239 lbs. were sent out of the country in 1871. Molasses, rice, rum, and raw sugar are the other principal exports; while the imports consist mainly of flour, dried fish, rice, malt liquor, brandy, manure, machinery, oils, opium, lumber, and pork. The shipping of 1871 exceeded that of 1861 by 100,000 tons.

GUIANA, Dutch, or SURINAM, occupies a central position between British and French Guiana, from the former of which it is separated by the river Corentyn, which forms its western boundary, while the river Marony separates it from the territories of the latter, and constitutes its eastern boundary. To the N. it is bounded by the Atlantic, and to the S. by the mountain-range of the Acarai, which divides it from the empire of Brazil. It extends from 2° to 6° N. lat., and from about 53° to about 57° W. long.; and has an area of 45,000 square miles. Pop. (1872) 52,209, of whom 725 were Europeans, and 823 Chinese.

Although the physical character, climate, and productions are very nearly the same as those of British Guiana (q. v.), the natural advantages of the colony are not so fully developed, and in the hilly districts in the interior and south, which are held by the Maroons, or runaway slaves, the lands are wholly uncultivated. The rivers all fall into the Atlantic, and the most considerable is the Surinam, which has a course of nearly 300 miles, but is not navigable for large ships many miles above Paramaribo (q. v.), the capital, which is built about 10 miles from its mouth. Dutch laws are in force, and the coinage, weights, and measures of the mother-country are generally used. The colony is divided into nine districts, and the government is administered by a governor-general (who is nominated by the king of the Netherlands) and a general council of native freeholders. All religions are tolerated, and the Jews have synagogues in different parts of the colony. The Moravian Brothers have 31 missionaries, and 23,703 persons enrolled.

The principal exports are sugar, coffee, cacao, rum, molasses, many sorts of valuable wood, gums, balsams, and drugs. In 1871, the goods imported were carried by 26 Netherlands vessels, 26 American, and 152 belonging to other nations; the values being Netherlands, £156,126; American, £62,305, and other lands, £114,728. Cleared inward, 204 vessels; outward, 203. The following figures represent the value of the trade: Imports—(1869) £299,704; (1870) £336,843; (1871) £333,159. Exports—(1869) £233,371; (1870) £238,156; (1871) £241,838.

There were (1871) 273 plantations, the chief product being sugar; then, in order, cacao, cotton, coffee. The live-stock were 3711 cattle, 236 horses, 98 mules, 203 asses, 2033 sheep, 391 goats, and 1557 swine. The revenue (1871) was £70,932; expenditure £94,047, requiring a subsidy of £23,115. The letters by mail were 35,834; newspapers, 41,365; producing a clear profit of £921. A bill for the emancipation of the slaves was passed 8th August 1862, and came into force 1st July 1863. The compensation given was £25 for each slave. The emancipated were to be under government surveillance during 10 years.

The Dutch, who were the first European settlers in G., organised trading stations on the coast as early as the year 1580, from which period till 1790, when Demerara and Essequibo fell into the hands of the English, they retained possession of most of Guiana. The present limits of Dutch G. were settled by the Congress of Vienna.

GUIANA, French, includes the districts lying between 2° and 6° N. lat., and 51½° and 54½° W. long., and is bounded on the N. by the Atlantic; on the W. by the Marony River, which separates it from Dutch Guiana, and by the little-known districts lying beyond the Rio-Branco; and on the S. and E. by the river Oyapock and the range of the Tamucumaque Mountains, which separate it from the empire of Brazil. The area, according to the best French authorities (Block, &c.), is 18,000 square leagues, but the boundary-line of French G. is not well defined, and has long been a subject of discussion with the Brazilian and Dutch governments. Pop. (1868) 25,151. In addition to the continental districts, French G. comprises several islands in the immediate vicinity of the coast, the principal of which are Cayenne, in which is situated the capital of the same name, Le Grand Connétable, and Le Petit Connétable. The country is divided into high-lands and low-lands, the former of which commence at the first cataracts of the rivers, and gradually increase in height towards the central districts, which they traverse in a granite mountain-range, which nowhere exceeds an elevation of 1000 feet. The low alluvial lands, which extend from the cataracts to the Atlantic, are at present mostly covered with vast forests, but the soil is well adapted to the cultivation both of grain of every kind, and all the products of tropical vegetation. Among the 20 navigable streams or rivers, the principal are the Marony, lying to the west, and the Oyapock to the east of Cayenne, the navigation of which is rendered difficult from the numerous cataracts and rapids by which they are obstructed. The overflowing of the rivers gives rise at various points in lower French G. to swamps or marshy savannas, which are covered with forests of mango-trees and palms, while in other parts lakes are formed, the most extensive of which are those of Mapecucu, Macari, and Mapa.

French G. has a rainy season, which lasts with short intermissions from November to June; and the heat is less oppressive than in most places in the West Indies, in consequence of the influence of the trade-winds, which bring with them the temperate moisture of the Atlantic. The thermometer seldom rises above 90° or falls below 75°.

The chief products and exports are choice woods for ornamental purposes, rice, maize, coffee, cacao, sugar, cotton, nutmeg, cloves, and pepper.

French G. or Cayenne, which was first occupied by France in 1633, is now divided into 14 communes comprised under the two cantons or districts of Cayenne and Sinnamary, and placed under the command of a governor assisted by a privy-council. The French budget for 1859 stood charged with the sum of 134,360 francs for ordinary expenses of government in Guiana, and 2,000,000 francs for the penal settlements at Cayenne. The administration of justice is centered in the tribunal or Imperial Court at Cayenne, the chief town of the province, and is under the jurisdiction of a president, assisted by counsel, auditors, and notaries. There are 9 free elementary schools in the colony, giving instruction to 1100 children, which are under the superintendence and management of the clergy of the Romish Church, of which the majority of the population are members, although various forms of faith are tolerated, and supported at the charge of the state.

In accordance with an imperial decree of 1854, Guiana has been made the principal seat of the penal settlements of the mother-country, which are maintained at Cayenne at the national charge. All persons sentenced to 8 years' hard labour, are condemned, on the expiration of their sentence, to reside for the remainder of their lives in the colony, unless when specially pardoned by the emperor, in which case they are seldom allowed to return to France. Grants of lands, with the restitution of civil rights, may be accorded by the local authorities as a recompense for good conduct; but the discipline is in all cases severe, and the labour heavy and continuous. The mortality among the prisoners is believed to be very great, but the French government does not include the death-rate of G. in its otherwise very full tables of mortality.

GUIANA BARK, FRENCH, the bark of *Portlandia hexandra*, also called *Couteria speciosa*, a tree of the natural order *Cinchonaceæ*, with opposite ovate leaves, and corymbs of very large purple flowers, a native of Guiana. The bark is esteemed a very powerful febrifuge, and the value of the widely known medicine, called *Warburg's Fever Drops*, is believed to depend mainly upon it.

GUICCIARDINI, FRANCESCO, an Italian statesman and historian, was born of noble parentage at Florence in 1482. The combined studies of law and literature engrossed his earliest attention, and were cultivated with such signal success, that before he reached the age of 23, he was elected professor of law by the Signoria of Florence, and acquired, at the same time, a reputation of great skill as a legal practitioner. His knowledge of international law, and tact in the conduct of public affairs, caused him to be selected in 1512, by the Signoria, as ambassador to the court of Ferdinand, king of Aragon. During a period of two years, he discharged his diplomatic duties with consummate ability. On his return to Florence, he was received with every mark of public approval, and in 1525 was despatched by the republic to receive at Cortona Pope Leo X. This sharp-sighted pontiff at once secured G.'s services, and committed to him the government of Modena and Reggio, and finally of Parma. Clement VII. continued to shower dignities on G., and appointed him, with unlimited powers, governor of the Romagna, and finally of Bologna. On the accession of Paul III., G. resigned all his dignities, and after 18 years of papal service, returned to Florence, where Alexander de' Medici had just been thrust on the citizens as their sovereign by Charles V. On the assassination of Alexander, G. promoted materially the elevation of Cosmo de' Medici; but meeting with no special favour from that prince, he withdrew from Florence to his villa at Arcetri, where he commenced his famous work, *La Storia d'Italia*. He died in 1540, before its completion. In 1561, 21 years after his death, the first sixteen books of his history were published, and three years later, four additional books appeared. The work is considered a standard of classical historical writing, independent of its value as a minute and faithful record of the period it embraces, from 1490 to 1534. A magnificent Italian edition was published at Freyburg 1775—1776, four vols. 4to, strictly in accordance with the manuscripts deposited in the Magliabecchi library at Florence, and another at Pisa, 1819, ten volumes 8vo, edited by Rosini. Recently (1857—1858), there has appeared at Florence *Opere inedite di Francesco Guicciardini*, comprising a series of aphorisms and discourses on the Florentine Institutions, in the form of dialogue, recovered from the manuscripts in the family archives.

GUIDES, in military affairs, are usually persons drawn from the country in which an army is encamped. A sufficient body of intelligent men is collected at head-quarters, to enable one or more to be sent with every detachment of troops which leaves the camp. A guide should be quick of eye, experienced in the topography of the country, and, above all, faithful. As, however, guides must on most occasions be drawn from the midst of a hostile population, and have probably only a pecuniary interest in serving well, their conduct is always watched with the utmost jealousy, death being awarded as the punishment for the least departure from trustworthiness. Any treason or incompetence on the part of a guide might involve the most disastrous consequences to a whole expedition. In the French army, a considerable corps of cavalry and infantry bear the name, but the name only, of 'guides.' They were first formed in 1744, as a small company of messengers on active service. The number was gradually increased until the time of Napoleon I., who formed them into a guard 10,000 strong.

GUIDO, ALESSANDRO, an Italian poet, was born at Pavia in 1650. Literature and poetry engrossed his earliest attention, and to the taste and ability of his first pieces, he owed the notice of the Duke of Pavia, whose favour he further secured by the talent he evinced in setting his verses to fine spirited airs of his own composition. In 1685, with the sanction of the duke, he set out to Rome, where his kind patron assigned him apartments in the Farnese palace. He was fortunate enough to obtain the friendship of Christina, queen of Sweden, and composed, at her desire, the pastoral drama of *Endimione*, the princess condescending to be his fellow-labourer in the work. He died at Rome in 1717. The dramas of G. fail in sweetness and affection, but are interesting and elevated in sentiment. As a lyrical poet, G. ranks very high.

GUIDO ARETINO, so called from his birthplace, Arezzo, was a monk of the Benedictine order, and flourished about the year 1030, but neither the date of his birth nor death is known. He has the reputation of being the inventor of musical notation, and the regenerator of music. The circumstances which led to G.'s invention are differently stated; but the most reliable account seems to be, that on one occasion while chanting with the monastery choir a hymn in honour of St John, he was struck with the gradual and regularly ascending tones of the opening syllabic sounds of each hemistich, in the three first verses:

Ut queant laxis *re*-sonare fibris
Mi-ra gestorum *fa*-muli tuorum
Sol-ve polluti *la*-bii reatum, &c.

With the intuitive foresight of genius, he instantly, we are told, comprehended the fitness of these sounds to form a new and perfect system of solfeggio, and forthwith proceeded to mature and systematise this idea. On introducing his new theory into practice among the youthful choristers of the monastery, the experiment proved entirely successful. The fame of G.'s musical invention drew upon him the attention of the pope (John XX.), who invited him to Rome. G. repaired thither, and obtained a very gratifying reception. The pope himself found pleasure in becoming a student of the new system, under the guidance of its founder and teacher. Ill health, however, compelled G. to return to the pure and bracing climate of his birthplace, and, re-entering the monastery of Pomposa, he there tranquilly ended his days. G. has left some interesting writings, explanatory of his musical doctrines, viz., the *Micrologus;* and the *Argumentum Novi Cantus inveniendi.*

GUIDO RENI, a celebrated painter of the Bolognese school, was born at Bologna in 1575, and at first aimed at the sombre coarse strength of Caravaggio's creations, but subsequently followed the more refined and ideal school of the Caracci, previous to finally striking out a style for himself. His works are extremely numerous, and the majority reflect a sentiment of fervent spiritualism, more characteristic of the devotion of the early Bolognese school, than of the later spirit infused by the Caracci, the founders of the modern standard of Bolognese art. G. was unhappily an infatuated gambler, and with the view of replenishing his often-squandered finances, produced with extreme rapidity many inferior works undeserving his name. He died in 1642. Amongst his best productions are, 'The Crucifixion of St Peter,' a magnificent work in the Vatican Museum; the 'Crucifixion,' in the church of St Lorenzo, in Lucina, Rome; and the famous 'Portrait of Beatrice Cenci,' one of the most interesting paintings in Rome. The 'Aurora' of G., on the roof of one of the halls of the Rospigliosi Palace, is a fresco of world-wide fame, and is considered the greatest of his works.

GUIDON—The standard borne by regiments of light cavalry; it is broad at one end, nearly pointed at the other, and usually of silk.

GUIENNE, the name of one of the 32 provinces into which France, previous to the Revolution, was divided. It comprehended the territory now formed by the departments of Gironde, Lot, Dordogne, Aveyron and portions of Tarn-et-Garonne, and Lot-et-Garonne, and formed with Gascony (q. v.) what was originally the country of Aquitania, of which name G. is a corruption. Its earlier history is described under Aquitania (q. v.).

GUIGNES, Joseph de, born at Pontoise, 19th October 1721, acquired a great reputation as an orientalist, at a time when the acquisition of Eastern languages was a matter of no small difficulty. Chiefly on account of his thorough knowledge of Chinese, he was appointed interpreter for oriental languages in the Bibliothèque du Roi. G. died at Paris, 19th March 1800. His great work, *L'Histoire Générale des Huns, Turcs, Mogols, et autres Tartares occidentaux, avant et depuis J. C. jusqu'à present* (Paris, 1756—1758), is a rare specimen of human industry and research, and of which his countrymen are justly proud. De G. also contributed a history of Tartary to the new edition of the *Bibliothèque Orientale* of D'Herbelot (1777—1779).—His son Chrétien-Louis-Joseph, born at Paris, August 25, 1759, was also a very distinguished oriental scholar, and published a Chinese Dictionary (Paris, 1813), by the orders of Napoleon I. He died at Paris, March 9, 1845.

GUIJA'R, or **GUIXAR**, a lake of Central America, in the north-west of the state of San Salvador, is 60 miles in circumference, and encloses a large island, which abounds in game, and contains the ruins of what must formerly have been a large town.

GUILANDI'NA, a genus of shrubs of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*, having pinnate leaves, and remarkable for the stony hardness of their seeds, the coating of which is so silicious that they are said even to strike fire with flint. The seeds are used for beads and for children's marbles. *G. Bonduc* is the best known species, and is of very wide geographic distribution, although, like the rest of the species, growing only in the warm parts of the world. It is called the *Bonduc*, and the *Nicker Tree*, and its seeds, which are often thrown ashore on the coasts of Scotland and Ireland, are called *Molucca Beans*. The cotyledons are very bitter, and are much used in India for the cure of intermittent fevers.

GUI'LDFORD, a market-town, and parliamentary and municipal borough of England, capital of the county of Surrey, is situated in a depression in the North Downs, on the navigable river Wey, 30 miles south-west of London. Here the Reading and Reigate Branch of the South-Eastern Railway crosses the Direct Portsmouth line. The town consists mainly of one street, running along the steep east side of the Wey, crossed here by an old bridge of four arches, and is distinguished by a remarkable air of order and cleanliness. Its streets are rich in quaint old gables, overhanging panelled fronts, and long latticed windows. The chief buildings are the castle, a fine ruin, in the early Norman style; Archbishop Abbot's hospital, in which reside a master, 12 brothers, and 8 sisters; the church of the Holy Trinity, with several memorable monuments; St Mary's, an interesting specimen of the Transition style, and one of the oldest and most remarkable churches in the county; the Grammar School founded by Edward VI.; the town hall; and the corn-market. A county hall and assize court was erected in 1862, and a county hospital in 1863—1866. G. is now chiefly famous for its grain-market, the 'Surrey wheats' being celebrated. It has paper, powder, and corn mills; breweries, brick-fields, coach-works, and two iron-foundries. G. now returns one member to parliament, instead of two, as formerly. Pop. (1871) 9801.

This ancient town is first mentioned by name in the will of Alfred the Great, who bequeaths it to Ethelwald his nephew. In the time of the Confessor, the town and manor were included among the demesnes of the kings of England. Henry II., John, and Henry III. frequently resided here.

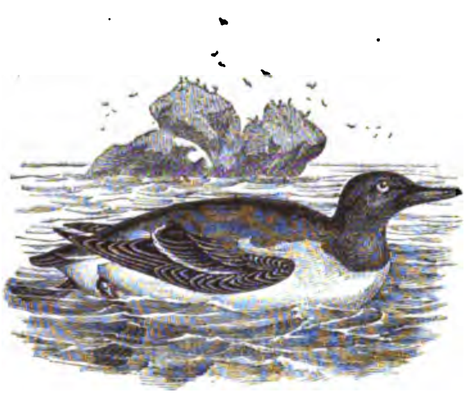
GUILDHALL, an important public building in London, which may be regarded as the town-hall, and is the place of assembly of several courts, as the Court of Common Council, the Court of Aldermen, the Chamberlain's Court, &c., and a police-court presided over by one of the aldermen. The Guildhall of London was formerly situated in Aldermansbury. The original building was erected in 1411, but was almost wholly destroyed by the Great Fire of 1666. In 1789 the Guildhall was rebuilt in its present form. The hall proper is 153 feet in length, 48 in breadth, and 55 in height. It has been famous for centuries for the magnificence of its civic feasts. The first time it was used for this purpose was in 1500 A.D., when Sir John Shaw, goldsmith, who had been knighted on the field of Bosworth, gave here the first lord-mayor's feast. These feasts had formerly been held at Ewees's Hall.

GUILDS (Sax. *gildan*, to pay). Guilds were originally associations of the inhabitants of particular towns, for promoting the common interest of the fraternity. They are said to be of Saxon origin, but unquestionably similar institutions existed at a very early period among the southern nations of Europe, where they were known by the name of Confraternities. In England, guilds were in use during the Saxon rule, and several records are preserved of the purposes of these institutions. The Saxon guilds appear to have resembled our modern friendly societies. On condition of a certain payment, the members were entitled to relief in case of sickness, and to protection from violence. At a later period, guilds were of two kinds, religious and secular. Both classes retained, as a general rule, the principle of mutual relief to the members in sickness; but the former were established for the performance of works of charity, and for the regular observance of certain religious services; while the main object of the latter was the advancement of the commercial interests of the fraternity. In order to the establishment of a guild, religious as well as secular, it was necessary that it should receive the sanction of the sovereign; and in the reign of Henry II. several guilds were subjected to heavy fines, as having been established without that authority. In London, there were a large number of religious guilds. In the reign of Richard II., a guild to the honour of St George the martyr, consisting of an alderman, master, brothers, and sisters, was established in Norwich; and here, it may be observed in passing, that the term alderman was a name for a chief officer or governor in a guild, whence it was extended to an officer of a burgh on the extension of guilds, as noticed below. It having been an orderly virtuous society for the space of thirty years from its erection, King Henry V. confirmed it by letters-patent under the Great Seal, made it perpetual, and granted it certain privileges and immunities (Madox, *Firma Burgi*). In like manner, guilds were formed in Bristol, Exeter, and other large towns. These guilds, through the munificence of individuals, by degrees amassed considerable wealth. By Henry VIII. the property and revenues of these religious guilds were seized and perpetually vested in the crown.

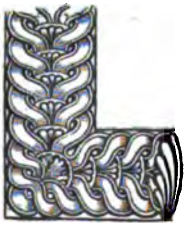
The most important branch of this subject is that of the secular guilds, or, as they were styled in the south of Europe, confraternities. These institutions were the germ of the modern burghs or municipal corporations. They consisted originally of the members of some particular trade, united for the purposes of mutual assistance in sickness, and for maintaining the interests of the trade. Thus we have the guild of goldsmiths, of weavers, of cordwainers, of patten-makers, of spectacle-makers, &c., the names of which are preserved to the present day. Every trade had its separate guild, of which it was necessary that a man should be a member before he was allowed to practise the particular craft. As trade increased in importance, the influence and power of the guilds increased in proportion, until at length the towns or united guilds claimed from the sovereign special rights and privileges—*quod habeant gildam mercatoriam*. The town of Southampton received a charter confirming their liberties as early as Henry II. Liverpool was made a *gilda mercatoria* by Henry III. In the reign of Henry VI., the title used was *communia perpetua* or *corporata*, which phrase has continued to be used in the modern corporations. This title of *communia* appears to have been borrowed from the continent, where, under the title of communities, the towns at a very early period obtained charters declaring their independence, and bestowing on them extensive privileges. —See Robertson's *Charles V.*, and Madox, *Firma Burgi*.

The exclusive privileges of English and Scottish guilds or corporations are now abolished, as being contrary to public policy; and these associations exist only for mutual beneficiary purposes. Thus, in various boroughs in England, a custom had long prevailed, and by-laws had been made, to the effect that no person, not being free of the borough or of certain of these guilds, should keep a shop for merchandise, or exercise certain trades within the borough; but since 1835, when the Municipal Corporation Reform Act (5 and 6 Will. IV. c. 76, s. 14) passed, every lawful occupation is free, notwithstanding any such custom or by-laws. The exclusive privilege of trading in Scotch burghs was abolished by the statute 9 and 10 Vict. 17. For the functions of the Dean of Guild in Scotch burghs, see Dean of Guild.

GUI'LLEMOT (*Uria*), a genus of web-footed birds, of the group *Brachypteræ* (q. v.) or Divers, and included by Linnæus in the genus *Colymbus* (see Diver), but now more generally ranked among the *Alcadæ* (see Auk) than among the *Colymbidæ* (q. v.). The bill is moderately long, straight, and pointed, as in *Colymbus*, but rather more compressed, and covered with feathers as far as the nostrils; the feet, as in the other *Alcadæ*, are three-toed, having no hind-toe, and entirely webbed. The legs are placed very far back, and are very short, the tibia scarcely appearing beneath the abdomen, so that they are ill adapted for walking, and the posture of the bird on land is erect, even when hatching its eggs. The tail is very short. The wings are short, and are moved with great frequency in flight, which, however, the guillemots are able to sustain remarkably well, in consequence of the abundant provision made for aëration of the blood by their very large air-cavities. On the same account, they usually float very high in the water, though, when danger approaches, they can sink their bodies under water, till the head, neck, and upper part of the back are alone visible. They excel in diving, and use their wings for progression under water, where they seek their food, which consists chiefly of small fishes and crustaceans. They are seldom seen in the seas of warm latitudes, but are extremely abundant in those of the arctic regions and the colder parts of the temperate zone, particularly in the neighbourhood of rocky coasts. The Common G., or Foolish G. (*U. troile*), is abundant on many parts of the British coasts, breeding even on those of the south of England, although large flocks also arrive in winter from the north. It abounds in all the arctic regions. Its winter migrations extend as far south as the Mediterranean, and in America to New York. It is called Foolish G., from its often suffering itself to be taken by the hand rather than leave the cliffs on which it breeds, and where prodigious numbers may be seen stationed close together on the ledges of rock. The parent birds are said to carry their young on their backs from the high ledges to the water. The entire length of the Common G. is about 18 inches. The Common G. lays only one egg, which has a very thick shell, is pear-shaped, and remarkably large, being more than three inches long. If the egg is destroyed or taken away, another is laid in its stead. The egg is esteemed a delicacy, but the flesh of the bird is coarse. The skin with the feathers is used for clothing in some northern regions. Young birds and eggs are among the objects in pursuit of which the rock-fowlers of the northern coasts scale or descend the most tremendous precipices. Great numbers of the eggs are exported from the coasts of Newfoundland and Labrador.—The Black G. (*U. grylle*) is a smaller species, about 14 inches long; the plumage entirely black in summer, except a large white patch on each wing; but in winter, the under parts are white: the young are mottled or spotted. It is not common on the southern coasts of Britain, but breeds on many of the Scottish islands. It is plentiful in the arctic regions, and is as common in America as in the Old World. It has been called the Greenland Dove. It lays three eggs, often on the bare rock; but if the situation is damp, it piles up for them a curious nest of pebbles.—Other species are enumerated among British birds, but are rare. Several species are peculiar to the northern parts of the Pacific Ocean.



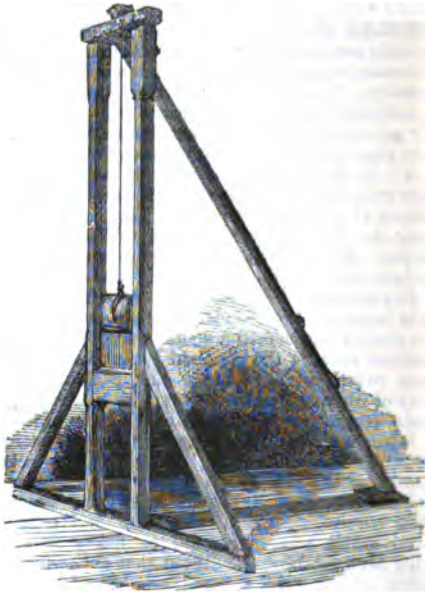
Common Guillemot (*Uria troile*).



Guilloche.

GUILLOCHE, an architectural ornament of Greek origin. It consists of two or more bands or ribbons, crossing and recrossing one another in a regularly repeating pattern. Some of these are simple (see fig.), and some very complicated.

GUI'LLOTINE, the instrument of decapitation introduced during the French Revolution by the Convention, and named after its supposed inventor, Josephe Ignace Guillotin, a physician (born 1738—died May 26, 1814), who, however, it is ascertained, was only the person who first proposed its adoption. It is composed of two upright posts, grooved on the inside, and connected at the top by a cross beam. In these grooves, a sharp iron blade, placed obliquely, descends by its own weight on the neck of the victim, who is bound to a board laid below. The speed and certainty with which this machine separates the head from the trunk, gives it a great superiority over the axe or sword. The invention of machines of this kind is ascribed to the Persians. In Italy, from the 13th c., it was the privilege of the nobles to be put to death by a machine of this kind, which was called *Mannaia*. Conradin of Swabia was executed by such a machine at Naples, in 1268. An instrument resembling the guillotine was likewise employed in Germany during the middle ages. During the 16th, and till late in the 17th c., a machine called the *Maiden*, which differed but slightly from the guillotine, was employed in Scotland for the purpose of decapitation. That such an apparatus was known and used in France at an earlier period, is proved by the execution of the Duc de Montmorency, who is described as having been executed by a falling axe at Toulouse, in 1632. The Dutch, too, in the 18th c., employed a decapitating machine in executing slaves in their colonies.



The Maiden.

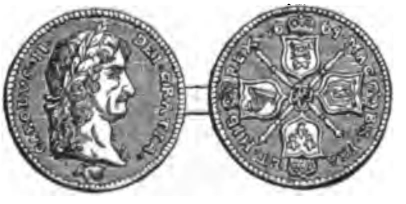
GUILTY is the form of verdict given by a jury in criminal cases when the crime charged has been found proved. In England, there are only two verdicts which can be given in such cases—viz., guilty or not guilty; but in Scotland there is an intermediate verdict, called 'not proven,' which, though in reality a verdict of 'not guilty' (and it is so entered in England), yet is allowed to be given by juries when they are not satisfied that sufficient legal evidence has been given, but nevertheless consider there was some foundation for the charge, or at least some ground for suspicion. It has been objected to this verdict that it leaves a stigma on the party; nevertheless, it is firmly adopted in the law and practice of Scotland.

GUIMARÃES, one of the most ancient, picturesque, memorable, and beautifully situated towns of Portugal, in the province of Entre Douro e Minho, stands within an amphitheatre of hills covered with the most luxuriant foliage, between the D'Ave and the Arezilla, 12 miles south-east of Braga. Its narrow streets, its broad red balconies and verandas, its walls, part of which are now in the centre of the town, and are surmounted by pointed parapets, and its remains of ancient architecture seen here and there, render the appearance of the town exceedingly striking. G. was the cradle of the Portuguese monarchy, the residence of Count Henriques, and the birthplace, in 1109, of Alfonso Henriques, his son, and the first king of Portugal. Among the most interesting buildings are the cathedral, founded in 1385; the castle, a Flamboyant structure, surrounded by square towers; and the Dominican convent, with beautiful cloisters of the 14th century. From every elevation in or near the town, magnificent views are obtained. In the vicinity are the Caldas (hot springs) das Taipas, and the Caldas de San Miguel, both finely situated, and well appointed. These springs, which were well known to the Romans, are used chiefly for bathing purposes. They range in temperature from 91° to 120°, are sulphureous, and are said to be very effective in cases of gout and cutaneous disease. G. is celebrated for its curriers and its paper manufacture; it also exports great quantities of dried plums and figs to England. Pop. 6000.

GUI′NEA, the name of a maritime section of Western Africa. It extends from the neighbourhood of the Senegal to the vicinity of Cape Negro, the stream being in lat. 16° N. and long. 16° 33′ W., and the headland in lat. 15° 41′ S. and about long. 11° 40′ E.; and by the equator, which thus intersects it, it is divided into Upper or Northern, and Lower or Southern Guinea. This vast region forms the coasts of the Mandingoes, Ashanti, Dahomey, Benin, Biafra, Loango, Congo, Angola, and Benguela, connecting with the Atlantic even more distant territories by means of its rivers, more especially by the Senegal, the Gambia, the Niger, the Old Calabar, the Zaire or Congo, and the Coanza. G. was first visited in 1364 by some French merchant adventurers of Rouen and Dieppe, and first colonised by the Portuguese in 1481, who have retained nominal possession of the whole of Lower G., the chief states of which are Loango (q. v.), Congo (q. v.), Angola (q. v.), and Benguela (q. v.). The Dutch, French, English, Danes, and even the Germans, also established various settlements, or rather factories, particularly in Upper G., the coast of which is now divided into Grain Coast, Ivory Coast, Gold Coast, and Slave Coast. Besides the articles thus designated, the soil yields indigo, pepper, cotton, sugar, and palm-oil. The factories were chiefly established to secure the slave-trade, and after its suppression their commercial importance ceased. Great Britain is the only European power that tried to make a humane or Christian use of its acquisitions. While keeping a naval squadron off the West African shores to intercept the slavers, it was needful to provide for the liberated cargoes of black men and women. The Sierra Leone (see Free Town and Sierra Leone) and Gambia settlements were created for this purpose, and here the Wesleyans have many chapels and schools for the natives. For the American settlement, see Liberia and Monrovia. In 1872, the Dutch gave up to England all their possessions on the Gold Coast. In return for this cession, England consented to annul the treaties prohibiting Dutch conquests in Sumatra on the Straits of Malacca. But the king of Ashanti (q. v.) immediately laid claim to Elmina, the capital of the former Dutch possessions, and after a series of intrigues and diplomatic complications, invaded (April 1873) the territory now under the English protectorate. He was at first successful; but the arrival of Sir Garnet Wolseley (October 1873), followed by some British regiments, soon changed the aspect of affairs, and the Ashanti king was forced to retire into his own country, and after numerous defeats, had to suffer the humiliation of seeing his capital, Coomassie (q. v.), reduced to ashes, 6th February 1874. By the treaty which followed his submission, the king of Ashanti renounced all claim either of tribute or homage from any of the tribes within the limits of the Gold Coast.

GUINEA, Gulf of, a portion of the Atlantic Ocean, washes that remarkable bend of Western Africa, which, reckoning from the north, runs first nearly on a parallel, and then nearly in a meridian. It may be regarded as stretching from Cape Palmas, in lat. 4° 22′ N., and long. 7° 44′ W., to Cape Lopez, about lat. 1° S., and in long. 8° 35′ E. At its north-east extremity is the delta of the Niger, between the Bight of Benin on the north-west, and the Bight of Biafra on the south-east. Off its east shore, reckoning from the north, are the islands of Fernando Po, Prince, and St Thomas.

GUINEA, a gold coin formerly current in Britain, derived its name from the fact that the gold from which the first specimens were coined was brought from the Guinea coast in West Africa, and, for the same reason, it originally bore the impression of an elephant. It was first coined during the reign of Charles II., in 1664, and continued in common use till 1817, when it was superseded by the *Sovereign* (q. v.). Its value varied considerably at different periods, but was latterly fixed at twenty-one shillings. It is still customary in Great Britain to estimate professional fees, honoraria of all kinds, complimentary subscriptions, prices of pictures, &c. in guineas; to give a physician three sovereigns and three shillings, rather than three sovereigns alone, or even three sovereigns and five shillings, is supposed to make the transaction differ from a mere mercantile one, and thus veils the sordidness which is fancied to attach to pounds, shillings, and pence.



Guinea of Charles II.

GUINEA CORN, a name sometimes given to Durra (q. v.); sometimes to another cereal grass, *Penicillaria spicata* or *Pennisetum typhoideum*, very extensively cultivated in Central Africa, and to some extent also in India, where it is called *Bajree*. It is of the tribe *Paniceæ*, and may be regarded as one of the millets. It is a grass with a spike-like cylindrical panicle.

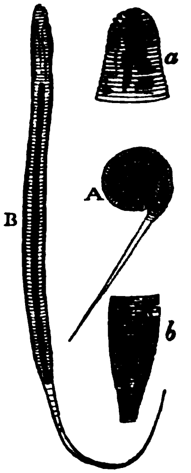
GUINEA FOWL, or **PINTADO** (*Numida*), a genus of gallinaceous birds of the family *Phasianidæ*, having a short, strong bill, the upper mandible vaulted, a warty membrane at the base of the bill, and a wattle hanging down on each side, the head and upper part of the neck generally naked, the forehead surmounted either with a callous or a feathery crest; the back much elevated and arched, the tail short. The species are all natives of Africa and Madagascar. The best known is the common G. F., or Pintado (*N. Meleagris*), with naked head, hard callous casque, and slate-coloured plumage, everywhere speckled with round white spots of various sizes. It is common in Guinea, and apparently through all the regions thence to the neighbourhood of the Cape of Good Hope; it is found also in more northern parts of Africa, and was known to the ancient Romans, by whom it was called *Meleagris* and *Gallina Numidica.* Its flesh was highly prized by them. In a wild state, the G. F. is generally seen in large flocks. It is not so polygamous as many of the gallinaceous birds, and even in a state of domestication, exhibits the inclination to pair. It is now common in the poultry-yards of most parts of Europe, although it is more adapted to warm than to cold climates, and in Jamaica, has been completely naturalised, so as to be destructive to crops, and to be shot like other game. In Britain, the young are rather troublesome to rear, but the high price borne in the market both by the birds and their eggs, compensates those who keep guinea fowls for profit. The eggs are small, and have a thick strong shell, but are particularly esteemed. Guinea fowls, however, are troublesome in a poultry-yard, from the disposition of the males to attack and tyrannise over other poultry. The G. F. has a peculiar harsh and querulous cry, which it emits with great frequency. There is a white variety of Guinea fowl.

Guinea Fowl (*Numida Meleagris*).

GUINEA GRASS (*Panicum maximum*), a grass of the same genus with MILLET (q. v.), a native of the west of Africa, but now naturalised, and extensively cultivated in the West Indies and southern states of America. It does not perish even in the winters of Britain, but is not luxuriant and productive, as in warmer climates. Its height, in favourable moist situations, is from 5 to 10 feet; in dry grounds, it is smaller; it has a much-branched and spreading panicle, long flat leaves, and a somewhat creeping root. In countries favourable to its growth, it is very valuable as food for cattle.—Other species of the same genus are among the most useful pasture and forage grasses of tropical countries.

GUINEA PEPPER, a name which has been variously applied to the seeds or dried fruit of several very different plants, agreeing in their peppery character, and in being the produce of the west of Africa. The name MALAGUETTA (Malagheta, Meleguetta, &c.) PEPPER is generally to be regarded as equivalent with Guinea Pepper, and is at present a frequent designation of *Grains of Paradise* (q. v.); but the capsules or dry berries of *Capsicum frutescens* (see CAPSICUM) are commonly sold by druggists under the name Guinea Pepper; whilst both the names Guinea Pepper and Malagueta Pepper have been applied to the dried fruit of *Cubeba Clusii* (see CUBEBS), and to the seeds of *Habzelia* (or *Xylopia*) *Æthiopica*, a shrub of the natural order *Anonaceæ.* This last was at one time a considerable article of export from Guinea, and was sometimes called ETHIOPIAN PEPPER. It is now seldom even heard of. It is an aromatic and not extremely pungent condiment.—There is great difficulty in determining which of these kinds is meant in many instances in which the term Guinea Pepper or Malagueta Pepper is employed by the older writers; yet, from the importance of the trade in this article, the name *Grain Coast* was given to a great tract of land in the Bight of Benin, and to it the establishment of the settlements of Grand Bassa and Cape Palmas is due. Up to the close of the 18th c., Guinea Pepper continued in request, when the peppers of the East drove it from the market.

GUINEA-PIG. See CAVY.



Young Filaria Medinensis: A, individual coiled up, as seen in the body of its parent; B, the same uncoiled in a drop of water: *a*, the head; *b*, the commencement of the tail and the anus. (From Moquin-Tandon's *Medical Zoology*: the magnifying power not given.)

GUINEA-WORM, known also as *Filaria Medinensis*, or *F. Dracunculus*, is a parasitic animal that seems to have been known from the earliest times. Plutarch, in his *Symposiacon* (Table-talk), quotes a passage from the geographer and philosopher Agatharchides of Cnidus, who lived in the second century before our era, which seems clearly to refer to this worm; and it has been argued with great plausibility that the 'fiery serpents' which attacked the Israelites in the desert were in reality Guinea or Medina worms. This view of the 'fiery serpents' was propounded by Bartholin in his Commentary, and Küchenmeister, one of our highest authorities on parasitic animals, adduces the following arguments in its support. The Hebrew words which in our version are translated 'fiery serpents' are *Nechaschim Seraphim;* the former word is correctly translated 'serpents;' while *seraphim*, derived from the word *saraph*, can signify nothing more than *is qui comburit;* and it is clear that a species of animal is referred to which is distinguished by the inflammability of its bite, or generally by the inflammation which its presence causes. 'That in ancient times the Filaria [or Guinea-worm] was reckoned amongst the serpents on account of its snake-like form, is proved at once by the Greek name *drakontion* (Lat. *dracunculus*), a species of snake which had something fabulous and inexplicable about it. The inflammatory pain and swelling which occurred with the breaking out of the worm are certainly very well expressed by *seraphim;* while the mortality amongst the Israelites is easily explained by their ignorance of the treatment, and the dangerous symptoms occurring in consequence of the breaking of the worm, which, according to some authors, may be immediately fatal. Only in the last portion of the way through the desert of Zin towards Mount Hor, but especially on the way from Hor towards Oboth, for which journey they required several months, did the Israelites come into the true district of the Medina-worm—namely, the central and eastern portion of Arabia Petræa. This entire march they would undoubtedly have passed over within the period of incubation of this worm (two months to one year). Here the *Filariæ* (or Guinea-worms) first broke up, with violent inflammatory pains. Thus, then, the Israelites contracted these worms, which are still indigenous in Arabia Petræa; and this worm-province may consequently be of importance and interest to geographers in the determination of the course of travel in the fortieth year of the Israelites' wanderings.' (*On Parasites*, vol. i. pp. 392—393.)

Our knowledge of the natural history of this worm is still very deficient, and we are at present only acquainted with the female. The body of this animal is slender, cylindrical, and somewhat compressed, and is of the thickness of pack-thread, except at the posterior extremity, where it is somewhat attenuated. It is opaque, of a milk-white colour; on each side there is a longitudinal line; and when examined by the microscope, it is seen to be marked with numerous transverse striæ. The anterior extremity is obtuse, and the mouth circular, and beset with four acute spines (but the number, nature, arrangement, and even existence of these spines are points on which helminthologists differ). The length of the worm varies from less than half a foot to three yards. On examining an adult specimen, extracted by Malgaigne in Paris in 1854, Robin found no trace of intestine, or of any organ except a very thin sheath (a uterus or oviduct), which was filled with young animals rolled up in coils, with the tail occasionally projecting outwards (see A in the figure). In these young animals, we can trace the course of the intestinal canal, which apparently becomes subsequently obliterated by the excessive development of the generative organs and the eggs.

This worm is indigenous only in certain hot countries, and its geographical distribution is regulated by laws into which we have no insight. Küchenmeister mentions the following places as especially notorious for its occurrence: Senegal, Gaboon, the banks of the Ganges, Bombay, the peninsula of India, Persia, Arabia Petræa, the south coast of the Red Sea, the region round the Caspian Sea, Upper Egypt, Abyssinia, certain districts of Nubia, and Guinea. It has been introduced into certain parts of America by negro slaves.

The disorder occasioned by these worms frequently becomes an epidemic in years of heavy rain, and especially in marshy districts. It appears also to be connected with the season, being especially prevalent in the East Indies during the rainy season, and in Upper Egypt shortly after the regular inundation of the Nile.

The mode of production of this parasite in the human body is not known with certainty. The probability is, that the young animals, while still very minute, penetrate the skin, although by what mechanism they can effect their lodgment, we do not know. Carter relates a case which strongly supports this view. Fifty children in a school at Bombay went to bathe in a pond, and 21 of them were attacked by the Guinea-worm; some of them having four or five worms. Moreover, it is well known that negroes, who are in the habit of entering the water more frequently than the whites, and generally have their feet naked, are far more liable to be attacked than Europeans. The part of the body in which the worm usually manifests itself also accords with this view. M'Gregor states that, in 172 cases, it occurred 124 times in the feet, 33 times in the legs, 11 times in the thighs, twice in the hands, and twice elsewhere.

Having gained an entrance into the body, the Guinea-worm takes a considerable time to be developed. This period varies from two months to a year or even two years. The presence of the worm often produces no annoyance for a considerable time after it has been detected; at other times, it gives rise to emaciation, and possibly even death from exhaustion. As a general rule, the vesicles caused by the inflammation excited by the presence of the worm open spontaneously in a few days, and two or three inches of the anterior end of the animal come forth. This end is gently pulled, and coiled round a little roll of linen or a small stick, and this is fastened over the wound with sticking-plaster and a compress. The extraction is repeated twice a day by rotating the substance round which the worm is twisted, and the operation is often not completed in less than two, three, or more months. From the most ancient times, the tearing of the worm has been regarded as a very dangerous accident. It undoubtedly gives rise to violent swelling, fever, and sleeplessness; and if we are to trust the statements of some of the older observers, shortening and deformities of the legs, lingering fistula, mortification, and death (sometimes even sudden death) must be reckoned amongst the probable consequences of breaking the worm.

Although the ordinary seat of this worm is the subcutaneous cellular tissue, it has been found in the tongue, in the layers of the mesentery behind the liver, and under the conjunctiva of the eye. Small *Filariæ* of a different species have occasionally been found in the lens of the human eye.

GUINEGATE, Battle of, or, more familiarly, the *Battle of the Spurs*, was fought at Guinegate, not far from Tournai, in the province of Hainault, Belgium, 16th August 1513, between the English, under Henry VIII., assisted by a considerable body of troops headed by the Emperor Maximilian, and the French, under the Duc de Longueville. The latter were defeated. The battle received its familiar designation from the circumstance of the French knights having made better use of their *spurs* than their *swords*.

GUINGAMP, a town of France, in the department of Côtes-du-Nord, is situated in an extensive plain, on the Trieux, in the midst of pleasing scenery, 20 miles west-north-west of St Brieuc. It was formerly the capital of the duchy of Penthièvre, and was surrounded by walls, part of which still remain. The site of the castle of the dukes of Penthièvre is now planted with trees, and serves as a promenade. G. has a college, a thread-factory, and several tanneries. Pop. (1872) 6545.

GUIPU'SCOA, the smallest, but the most densely peopled of the Basque Provinces (q. v.).

GUISCARD, Robert, Duke of Apulia and Calabria, the sixth in order of seniority of the twelve sons of Tancred de Hauteville, was born in the year 1015. Tancred's estates in Lower Normandy being insufficient to support such a numerous family, his three eldest sons, William, Dagobert, and Humphrey, determined to seek their fortunes in the wars of Italy. By good-fortune, courage, and wiles, William gained possession of Apulia; and Robert, desirous of sharing his brothers' fortunes, followed them to Italy with a small band of adventurers. Here he distinguished himself so highly in various battles, that, after the death of William and Humphrey, he was proclaimed Count of Apulia. G. next conquered Calabria, in the possession of which he was confirmed by Pope Nicholas II., who, but a short time before, had excommunicated him on account of his many acts of violence. G., from motives of gratitude, bound himself to pay an annual tribute to the Roman see. The feudal superiority still claimed by the papal see over Naples dates from this period. G. now despatched his youngest brother Roger, at the head of 300 warriors, to conquer Sicily, the possession of which had been promised to him by the pope. Roger, in 1060, took Messina, and in the following year the two brothers defeated the Saracens at Enna. Roger eventually conquered the whole island, and became first Count of Sicily. Meanwhile, Robert gradually gained possession of the towns that still remained in the hands of the Saracens, among others, Salerno and Bari, and thus established what was till 1860 the kingdom of Naples. He would have carried his victorious standard in other directions, had he not been excommunicated by Gregory VII., on account of his inroad into Beneventum. Having become involved in the affairs of Greece by the marriage of his daughter Helena with Constantine Ducas, son and heir of Michael VII., he despatched his son Bohemond to undertake the conquest of Corfu, while he himself hastened to Durazzo, and before the walls of that city gained a brilliant victory over the Greek emperor, Alexius Comnenus. He now marched through Epirus to Thessalonica, and had nearly reached Constantinople, when he received information that the Emperor Henry IV. had made an inroad into Italy. He immediately hastened back, after intrusting the chief command to Bohemond, compelled Henry to retreat, and liberated the pope, who was besieged in the castle of St Angelo. He then returned to Epirus, defeated the Greeks in several engagements, took possession of some islands in the Archipelago, and was on the point of advancing a second time to Constantinople, when he died at Cephalonia, 17th July 1085. His remains were buried at Venusa; his sons Bohemond and Roger inherited his possessions: the former received Tarentum; the latter, Apulia. G. was not only a hero and a conqueror, but a patron of the arts and sciences.—Compare Gualtier d'Arc, *Histoire des Conquêtes des Normands en Italie, en Sicile, et en Grèce* (Paris, 1830).

GUISE, the name of a branch of the ducal family of Lorraine, distinguished in the history of France and Europe during two centuries. It derives its name from the little town of Guise, in the department of Aisne (situated on the Oise). The following are its most remarkable members:

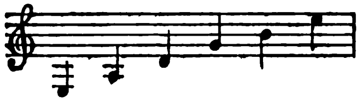
Claude of Lorraine, first Duke of Guise, Peer of France, Grand Huntsman, Count d'Aumale, Marquis of Mayenne and Elbeuf, Baron of Joinville, &c., was the fifth son of René II., Duke of Lorraine, and was born at the château of Condé, October 20, 1496. He left Lorraine on account of a quarrel with his elder brother, accompanied Francis I. to Italy, and received twenty-two wounds at the battle of Marignan, 1515. Eight years later, he drove the Germans from Champagne. In 1542 he fought in Flanders under the Duke of Orleans. He was favoured by the king, for his valour and talent. He married Antoinette of Bourbon, by whom he had twelve children, of whom eight were sons. His daughter Mary was the wife of James V. of Scotland, and mother of Mary, Queen of Scots. He is reported to have died of poison, April 1550.

François of Lorraine, second Duke of G., son of the preceding, was born February 17, 1519. As a general, he acquired European renown. He distinguished himself at Montmedy (1542), Landrecies (1543), St Dizier (1544), Boulogne (1545), and attracted the attention of France by his defence of Metz, besieged for two months by Charles V., who, after firing 11,000 balls, and losing 30,000 men, was obliged to raise the siege (1553). He added to his reputation at Renti (1554), and in 1556 took command of the expedition against Naples. This expedition failed through treachery; but the duke, having been made lieutenant-general of France, retrieved his reputation by taking Calais, Guines, and Ham, which were in possession of the English, and were considered impregnable. His military successes were ended by the peace of 1559. His niece, Mary Stuart, being the wife of Francis II., he became the highest power in the state, and the head of the Catholic party. The death of the king, and a strong party against him, drove him from the court, but he was soon recalled, to take the command against the Huguenots, who had taken several important towns, and were committing great ravages. He retook Rouen, and conquered at Dreux (1562). The Maréchal St Andre was killed, the Prince of Condé and the Constable taken prisoners. G., the greatest of his name, was assassinated before Orleans, February 24, 1563. He had a taste for literature, and his memoirs, written by himself, have much historic interest.

Henri I. of Lorraine, third Duke of G., was born December 31, 1550. The death of his father placed him at the head of the Catholic party. Ambition and vengeance both stimulated him to action. At the age of 16, he distinguished himself in fighting against the Turks in Hungary. Three years later, he fought with the Huguenots at Jarnac (March 1569) and Moncontour (October 1569), and in the same year forced Coligny to raise the siege of Poitiers. He aspired to the hand of Marguerite of Valois, but, to appease the anger of the king, married Catherine of Clèves, 1570. Disgusted with the favours granted to Protestants at the court, he retired, but returned, and was engaged in the massacre of St Bartholomew, August 24, 1572, in which he saw the dead body of Coligny thrown from a window into the courtyard at his feet. In 1575, fighting with the Huguenots, he was wounded in the face, whence he received the name of *Balafré* (scarred), a designation borne also by his father from a similar circumstance. He formed the famous League—ostensibly for the defence of the church, really to raise himself to the throne of Charlemagne. The king coquetted with both parties. G. conquered Henri of Navarre, but the king refused him entrance to Paris. The people rose in his' favour, and he might have been king, but he negotiated. He was promised all the powers which he demanded, but the king caused him to be massacred in the palace, and is said to have kicked his lifeless body. His brother the cardinal was also killed. Their bodies were burned, and the ashes scattered to the winds, December 23, 1588.

Henri II. of Lorraine, fifth Duke of G., was born April 4, 1614. He was destined for the church, and at the age of twelve possessed nine abbeys; at fifteen, he was Archbishop of Reims, but on the death of his elder brother he quitted a calling he detested, and succeeded to the dukedom. Handsome, chivalric, brave, he was a true specimen of the ancient paladin, and celebrated for his numerous gallantries. Loved by Anne de Gonzague, princess of Mantua, he capriciously abandoned her, joined the party of the Comte de Soissons, and married the widow of the Comte de Bossut. Having joined the league against Richelieu, he was condemned by the parliament of Paris to capital punishment, but took refuge in Germany. On the death of Louis XIII., he returned to France, disgusted with his wife, whose fortune he had spent, and proposed to marry Mademoiselle de Pons, one of the queen's maids of honour. He fought in the campaigns of 1644 and 1645 as a volunteer, and then repaired to Rome to get a divorce, but failed. Hearing of the revolt of Naples against Spain, under Massaniello, he set off for that city, in the true spirit of knight-errantry, to conquer a kingdom with his sword for the bride he still hoped to gain. Passing in a felucca through the Spanish fleet, G. entered Naples in December 1647, and was received with the utmost enthusiasm; but his gallantries, the envy of the nobles, and jealousy of France, caused him to be betrayed, in April 1648, to the Spaniards, and he was carried a prisoner to Spain. Demanded by Condé, he was set at liberty in 1652, and joined, with Condé, the enemies of the court and of Mazarin at Bordeaux. Two months later, he had betrayed his allies, and was at Paris with the king, but misfortune still followed him, and he found that his mistress, for whom he had endured so much, was false, and that with his own esquire. Finding himself an object of ridicule at Paris, he attempted to return to Naples, but failed; returned to Paris, was made grand chamberlain, there directed the magnificent fêtes of Louis XIV., and died without children in 1664.

GUITA'R, a musical stringed instrument, somewhat like the lute, particularly well adapted for accompanying the human voice, and much esteemed in Spain and Italy. It has six strings, tuned as follows:



and the sound is produced by the fingers of the right hand twitching the strings, while the fingers of the left hand make the notes of the music on the finger-board, which has frets across it like the lyre. The three highest strings of the guitar are always of gut, and the three lowest are of silk spun over with silvered wire. The greatest virtuosi on the guitar were Guiliani, Sor, Zoechi, Stoll, and Horetzsky.

Guitar.

GUIZOT, François Pierre Guillaume, a French statesman and historian, was born at Nîmes, October 4, 1787. His parents were Protestants; his father, who was an advocate, perished on the scaffold, April 8, 1794, and his mother soon afterwards went, with her two sons, to Geneva, where G. received his education. In 1805, he went to Paris, and devoted himself to literature. His first work, the *Nouveau Dictionnaire Universel des Synonymes de la Langue Françaises* (2 vols.; 4th ed. Paris 1848), appeared in 1809; the introduction reveals a very methodical mind. The next seven years were spent in laborious literary activity. After the second Restoration, he became general secretary to the Ministry of the Interior, afterwards to the Ministry of Justice. On the retirement of Barbé-Marbois, G. tendered his resignation, and was first appointed *maître des requêtes*, afterwards councillor of state. G. contributed to the dissolution of the *Chambre Introuvable*, by writing a memorial which was placed in the hands of Louis XVIII. by Decazes. The latter committed to him the general direction of the administration of the *communes* and *departements* (1819). His writings from 1820 to 1822 are entitled *Du Gouvernement de la France depuis la Restauration et du Ministère Actuel* (1821), *Histoire des Origines du Gouvernement Représentatif*, containing his lectures at the Sorbonne (where he held the position of lecturer on history) of 1820—1822 (new ed. 1852). Government forbade his lectures in 1824, and G. again betook himself to literature. In conjunction with several other men of letters, he published the important *Collection des Mémoires Relatifs à l'Histoire de France, depuis la Fondation de la Monarchie jusqu'au 13me Siècle* (31 vols., Paris 1823—1833); and the *Collection des Mémoires Relatifs à l'Histoire de la Révolution d'Angleterre* (26 vols., Paris 1823). He likewise edited several works of other authors, with introductions, annotations, and additions, such as Letourneur's translation of Shakspeare (12 vols., Paris 1821), Hallam's *History of England*, and Mably's *Observations sur l'Histoire de France*, followed by the *Essais sur l'Histoire de France*. In addition to all these, he published his *Histoire de la Révolution d'Angleterre* (2 vols., Paris, 1826; 4th ed. 1845), and edited the *Encyclopédie Progressive*, and the *Revue Françaises*. In the following year, the Martignac ministry granted him permission to resume his course of lectures on history. These were attended by a large and enthusiastic audience, and gave rise to several historical works of great value, published under the collective title of *Cours d'Histoire Moderne* (1828—1830); among others, the *Histoire de la Civilisation en France depuis la Chute de l'Empire Romain jusqu'à la Révolution Française* (5 vols., Paris, 1828—1830; 5th ed. 1845), and the *Histoire Générale de la Civilisation en Europe*, &c., which serves as an introduction to the former work. On the 1st March 1829 he again took his place in the council of state, and in January 1830 was elected by the town of Lisieux, which he continued to represent in the chamber.

After the July revolution, G. became successively Minister of Public Instruction and Minister of the Interior, an office which he held, with two interruptions, till 1836. In this capacity he did much for the improvement of educational institutions, particularly the primary schools. On the breaking out of the Eastern disturbances in the beginning of the year 1840, under Soult's administration, G. was sent as ambassador to London. After Soult's retirement, in September 1847, he became the official leader of the cabinet, which maintained its ground, as the organ of Louis Philippe's policy, till the February revolution of 1848, and by its conduct both in home and foreign affairs, did much to bring constitutional government into disrepute, and to hasten the overthrow of the Orleans monarchy. As a statesman, G. in carrying out his systematic and repressive line of policy, proved himself stiff, one-sided, and latterly obdurate; from these qualities, as well as from his cold and disagreeable manner, he was always unpopular to the last degree with the nation. As a man of rectitude and austere morals, he never enriched himself at the public cost; but nevertheless, from political motives, he allowed others to do so during his administration, in the most flagrant manner. After having effected his escape from Paris, he retired to London, where he was received with great respect. In April 1849, he published a circular *Guizot à ses Amis*, in which he offered his services to the electors of France, but ineffectually. In the following November, he returned to Paris, where he continued to labour in conjunction with the heads of the monarchical parties. After a short visit to Louis Philippe in England in June 1850, he came forward in Paris as the main promoter of the fusion, and wrote likewise in the *Assemblée Nationale*. The *coup d'état* of the 2d December 1851 put an end to this career; and G. returned to England. By founding the *Comités Historiques*, by bringing about the publication of important historical documents, and by his own writings and lectures, he did much to extend a taste for historical studies in France. In 1837, he was intrusted by the government of the United States with the task of writing a history of Washington. His work, published under the title *Vie, Correspondance, et Écrits de Washington* (2 vols., Paris, 1839—1840), procured him the honour of having his portrait placed in the Chamber of Representatives at Washington. After the February Revolution, G. published several political treatises, more or less important, some of which at least are very interesting to Englishmen, such as *Revolution d'Angleterre*, and *Monk, Chute de la Republique*. He likewise wrote *Méditations et Etudes Morales sur la Religion, la Philosophie, &c.* (1852); *Corneille et son Temps* (1852); *Shakspeare et son Temps* (1852). In 1858, appeared his *Mémoires pour servir à l'Histoire de mon Temps*. His publication, in 1861, defending the temporal power of the pope, was a strange one for a Protestant. Among the most important of his later works are *Méditations sur l'Etat Actuel de la Religion Chrétienne* (1865); *Mélanges Biographiques et Littéraires* (1868); *Mélanges Politiques et Historiques* (1869), &c. G. was thrice married; his first two wives were accomplished women, and not unknown in literature. He died Sept. 12, 1874. At the time of his death, he was engaged in writing a history of France.—His son, Maurice Guillaume, has shewn by his *Ménandre, Etude Historique sur la Comédie et la Société Grecques* (1855), that he is not destitute of his father's genius.

GUIZOTIA. See Ram-til.

GUJERAT, or **GUZERAT**, a walled town of the Punjab, in lat. 32° 35′ N. and long. 74° E., stands on the right side of the Chenab, about 8 miles from the stream. It is a place of some military and political importance, being on the great route between Attock and Lahore. Here, on 21st February 1849, a Sikh army of 60,000 men was utterly defeated by a British force, decidedly inferior in point of numbers.

GULDEN. See Florin.

GULES (Fr. *gueules*, the mouth and throat, hence red. Other origins are given, such as the Persian *ghul*, a rose or rose colour, which seems more probable than the Hebrew *gulude*, a piece of red cloth, from which Mackenzie derives it; it being scarcely likely that it came from a Semitic source), the term by which the colour red is known in heraldry. In engraving, it is marked by perpendicular lines traced from the top of the shield to the bottom. See Heraldry. It is supposed to indicate valour, magnanimity, and the like, and is regarded as the most honourable heraldic colour.

GULF STREAM and OCEAN-CURRENTS. The most important and best known of the great ocean-currents derives its name from the Gulf of Mexico, out of which it flows, between the coast of Florida on the one side, and Cuba and the Bahama Islands and shoals on the other. With a breadth of about 50 miles in its narrowest portion, it has a velocity at times of five miles an hour, pouring along like an immense torrent. This great ocean-river flows in a north-easterly direction along the American coast, gradually widening its current and diminishing in velocity, until it reaches the island and Banks of Newfoundland, when it sweeps across the Atlantic, and divides into two portions, one of which turns eastward toward the Azores and coast of Marocco, while the other laves the shores of the British Islands and Norway, and can be perceived on the southern borders of Iceland and Spitzbergen, nearly as far east as Nova Zembla.

The waters of the Gulf Stream are of a deep indigo blue, with boundaries sharply defined against the light green of the seas through which it passes in its early course. It abounds with masses of sea-weed, torn from the coral rocks of the strait through which it passes when it has its greatest power and velocity; while in its warm current may be seen myriads of fish and of animalculæ. As this great stream pours out of the Gulf of Mexico, it has a warmth of 84° in summer, being 4° higher than that of the ocean at the equator. In mid-Atlantic, opposite Nova Scotia, it has fallen at all seasons only about 14°; while the British Islands and north-western coasts of Europe, at a distance of 4000 miles from the Gulf, are bathed with waters heated under a tropical sun, and have their temperatures raised in winter about 30° above the normal temperature of the latitudes. In mid-winter, off the inclement coasts of America, between Cape Hatteras and Newfoundland, ships beaten back from their harbours by fierce north-westers, until loaded down with ice and in danger of foundering, turn their prows to the east, and seek relief and comfort in the Gulf Stream. A bank of fog rising like a wall, caused by the condensation of warm vapours meeting a colder atmosphere, marks the edge of the stream. The water suddenly changes from green to blue, the climate from winter to summer; and this change is so sudden, that when a ship is crossing the line, a difference of 30° of temperature has been marked between the bow and the stern.

The great differences of temperature between the western shores of Europe and the eastern shores of America have been attributed, too largely, perhaps, to the influence of the Gulf Stream. There is no doubt that such an immense body of heated water in the North-eastern Atlantic must raise the temperature of the atmosphere, and that to this importation of the effects of tropical sunshine by sea is due, to a certain extent, Ireland's perpetual green, the soft moist climate of England and Scotland, and the fact that the harbours of the western and northern coasts of Norway, as far east as Varanger Fjord, remain open, when the Baltic, much further south, is a sheet of ice. England, clothed in perennial verdure, and Scotland, where the grass grows during eleven months of the year, are in the same latitude as the frozen and horrible coast of Labrador. Norway is opposite Greenland; and Lisbon, where frost is scarcely known, is in the same latitude as Washington, where the Potomac river, a mile in breadth, sometimes freezes over in a single night. This difference is to be ascribed, not to the Gulf Stream alone, but to that in conjunction with the prevailing south-westerly winds. The Mediterranean, exposed to no cold currents from the arctic regions, bearing bergs and fields of ice, is a constant receiver and distributer of heat, and modifies the temperature of adjacent regions. North America, on the contrary, is exposed along its eastern shore to a great current from the Polar Seas, running inside and counter to the Gulf Stream, and coming loaded with ice from the northern regions; and while the continent narrows toward the tropics, it grows broad in the polar regions, from which come the cold north-westers, the prevailing winds during the wintry season.

The effect of the Gulf Stream upon temperature has been nowhere more strikingly observed than in high northern latitudes. Where the warm stream from the south-west meets the Arctic current in the lat. of Iceland, a difference of 17° has been observed.

In treating of the cause or causes of the Gulf Stream, we must take a general view of ocean-currents. Taken altogether, they form a connected system which has been aptly compared to the circulation of the blood. The two prime movers are differences of temperature and prevalent winds. Sea-water of average saltness does not freeze until it is cooled down to about 28°; and, unlike fresh water, it continues to grow heavier down to that point. The effect of the intense cold of the polar regions is thus to cause a constant sinking down of the surface-water, and to establish a current of ice-cold water along the bottom towards the equator; while to supply the place of what sinks down, an indraught or northward flow takes place on the surface, which brings the warm water of the temperate and tropical regions toward the poles. This is the general theory of the *vertical* circulation of the ocean—a circulation which might almost be assumed from the well-known laws of the flow of liquids, and which recent observations have established as a fact. The general prevalence of cold currents along the bed of the ocean from the poles to the equator is now beyond dispute. The soundings taken recently by H.M.S *Challenger* shew the temperature of the bottom water between Sombrero in the West Indies and Teneriffe to vary from 34°·4 to 35°·5; while at the equator it is in some places still lower, being only 32°·4. This is held to prove that the Antarctic bottom current extends to the equator and beyond it. Motion once thus begun, however, is differently modified in each locality by the shape of the coasts, by prevalent winds, and other circumstances. But one cause which modifies all currents that tend either north or south, is the daily rotation of the earth. In the very same way that the rotation of the earth gives the trade-winds their peculiar directions (see WINDS), it causes the cold currents coming from the poles to turn towards the south-west, and the surface-currents from the south to take a north-east direction. At the equator, any spot on the surface is moving eastward at the rate of 1000 miles an hour; at 60° north latitude, the velocity is only one half. Thus, the water of a current starting from the equator northward, is constantly coming to places where the bottom under it has less and less eastward velocity. But, by the law of inertia, the water tends to retain the same velocity eastward with which it started, and thus it moves to the east of north—shooting ahead, as it were, of the bottom over which it is flowing, as a rider does whose horse slackens his pace. The contrary happens to a stream flowing from north to south. In this case, the eastward motion or motal inertia of the water is too slow for the parts of the bottom to which it successively comes; the bottom slips in a manner from under it, and it falls to west of south. This, in combination with the action of opposing coasts, accounts for the circular sweep which many of the currents make, returning partly into themselves.

Different in origin from this vertical circulation, though partly mixed up with it, is the *horizontal* circulation caused by prevalent winds. The best example of this is the Equatorial Current, which sets from the west coast of Africa to the east coast of Brazil, and which is owing to the action of the trade-winds. Currents caused by winds are called 'drift-currents,' in opposition to the deeper seated 'stream-currents.' In order to feed this westerly equatorial current, there spring up two *in-draught* currents, which also follow the prevailing winds of their respective regions—the one from the north along the west coast of Portugal and Morocco, the other from the Cape of Good Hope along the west coast of Africa, as far as the Gulf of Guinea. When the equatorial current reaches the coast of Brazil, it divides into two branches. One proceeds southwards, turning gradually eastwards across the Atlantic until it falls in with the northern in-draught from the Cape of Good Hope. The other branch is deflected northwards into the Caribbean Sea and the Gulf of Mexico. The water thus driven into this pent-up sea now rushes with accumulated momentum through the strait or gulf between Florida and the Bahamas, and forms the famous Gulf Stream.

It has usually been held that the Gulf Stream extends across the Atlantic to the shores of Northern Europe, and is the cause of the mild and moist climate enjoyed by the western parts of that continent. The opinion, however, is beginning to prevail that, as a distinct current, the Gulf Stream ceases in the middle of the North Atlantic, its waters being by this time thinned out to a mere film, and its initial velocity and distinctive heat having been dissipated. That warm waters from tropical seas are brought to the coasts of Britain, and even into the polar seas beyond, is proved by drift-wood, seeds, and fruits from the West Indies being frequently cast ashore on the Hebrides, the north of Norway, and Spitzbergen. But this is accounted for by the general flow of the surface-water towards the poles, forming part of the vertical oceanic circulation; a flow which receives an eastward deflection as it proceeds northwards, in the way above explained. This general set of the surface-water is further promoted by the prevalence of south-westerly winds, which maintain a pretty constant north-east *drift* over the whole surface of the north-eastern portion of the Atlantic. In this way, although the Gulf Stream may have lost its original impetus, a large portion of the superheated water which it brings into the centre of the Atlantic is carried to the shores of Europe and into the Arctic Sea.

The Pacific Ocean has also its great equatorial or trade-wind current, but there is no great basin like the Gulf of Mexico to gather the waters of another Gulf Stream. A portion of the equatorial current passes northward along the shores of China and Japan; a portion passes through the narrow channels of the Indian seas, and another portion turns southward toward Australia and New Zealand, affecting, doubtless, the isothermal lines in those latitudes, and returning in counter-currents to Cape Horn, and even passing around it into the Atlantic. While thus a portion of the great counter or Polar current of the South Pacific sweeps around Cape Horn, another portion passes up the western coast of South America across the equator to 5° N. lat.; and its coolness is sensibly felt, and was carefully observed by Baron Humboldt on the coast of Peru. The currents in the waters between the Pacific and Indian Oceans are also variously affected by the monsoons, and in some places run six months in one direction, and six months in the opposite, clearly proving that they are mainly dependent upon the direction and force of the winds. A chart of ocean currents was published by the Admiralty in 1872, which proves beyond a doubt that it is almost wholly to the prevailing winds we must look for an explanation of ocean currents.

At first sight, it appears incredible that a current of water should force its way through the ocean with sharply defined boundaries, and a peculiar colour, temperature, and inhabitants, like a great river flowing between its banks, for thousands of miles, and against the force of counter-currents, which even cross its course, passing under by their superior density, until it loses its momentum on the shores of distant continents, or spreads out its warm flood on the bosom of northern seas. But a closer observation will satisfy us that all this is in accordance with the laws of hydrodynamics. At the confluence of the clear waters of the Mississippi with the turbid current of the Missouri, the two rivers do not at once unite, but run side by side with a sharply defined boundary between them for many a league. So great rivers running into the ocean, are rivers still, far out at sea. The current of the Rio de la Plata, which drains the southern portion of South America, can be perceived 200 miles from land; and the Amazon sweeps far into the Atlantic, though gradually bent northwardly by the great trade-wind current, and then carried along the coast, to help, with the Orinoco, to swell the waters of the Gulf of Mexico; so that the waters of the Amazon, the Orinoco, the Rio Grande, and the Mississippi, all join to swell the Gulf Stream.

The channel of the Gulf Stream in its narrower portion is of great depth. From observations made by the *Challenger* in 1873, in that part of the stream between Bermuda and New York, it is seen the Gulf Stream is there about 100 fathoms deep, and 80 miles in width. The probability of its having hollowed out for itself a well-defined channel like the bed of a river, is shewn by a sudden increase of depth at its border, where deep-sea soundings have been made; but so little can be known of the effect of currents upon a line of 20,000 feet in length, and which requires several hours to run off the reel, that we cannot place implicit reliance on such observations.

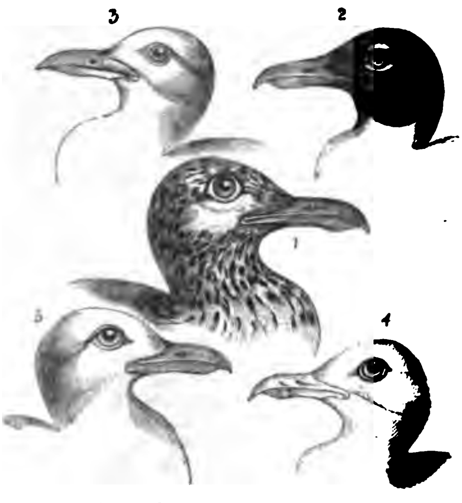
More important observations on the courses and influence of these currents have been lately undertaken by dropping bottles containing the date, latitude, and longitude, in all parts of the ocean. These bottles, when found upon a coast thousands of miles distant, give some indication of the direction and velocity of the currents that have brought them; but such testimony is not infallible. The bottle may be impeded by contrary winds, blown into counter-currents, or whirled about for months in eddies. A bottle thrown overboard in the Indian Ocean might reach the island of Spitzbergen, *viâ* the Gulf of Mexico; but there are many chances that it would be thrown out of the regular current, and be picked up on the shores of New Zealand or the coast of Peru. See Dr Franklin's *Maritime Observations*, Pownall's *Hydraulic and Nautical Observations*, Humboldt's *Atlas Geographique et Physique*, Johnston's *Physical Atlas*, Maury's *Physical Geography of the Seas, and Wind and Current Charts*, and Admiralty wind and current charts for Pacific, Atlantic, and Indian Oceans.

GULFWEED (*Sargassum*), a genus of sea-weeds (*Algæ*) of the sub-order *Fucaceæ*, of which two species (*S. vulgare* and *S. bacciferum*) are found floating in immense quantities in some parts of the Atlantic, Pacific, and Indian Oceans. They are tropical plants, although sometimes carried by winds and currents to the British coasts. The frond is very long, and is furnished with distinct, stalked, nerved leaves, and simple axillary stalked air-vessels. The receptacles are linear, in small axillary clusters or racemes. The trivial name *bacciferum* applied to one of the species, is derived from the berry-like appearance of the air-vessels. The G. has only been found floating, but there is reason to think that it is at first attached to the bottom of comparatively shallow parts of the sea. It floats in large fields, or more frequently in long yellow lines in the direction of the wind. In crossing the Atlantic, its presence is regarded as a sure indication of the Gulf Stream, by which it is wafted northward and eastward. Where the Gulf Stream is deflected from the banks of Newfoundland eastward, and sends off its more southern branch towards the Azores, is situated the *Sargasso Sea*, 'that great bank of weeds, which so vividly occupied the imagination of Christopher Columbus, and which Oviedo calls the sea-weed meadows' (*Humboldt*). The quantity of floating sea-weed is often such as to impede the progress of ships. Multitudes of small marine animals accompany it, with fishes ready to prey on them.—The G. is eaten in China; and in other parts of the East also, it is used in salads and as a pickle.

GULIE'LMA, a genus of South American palms, with pinnate leaves (entire in young plants), natives of the lower mountain-ranges of Peru and New Granada. One species, *G. speciosa*, is much planted by the Indians of the Amazon district and of Guiana and Venezuela, near their villages, and supplies them with food and other necessaries. It is often 60 feet high, having an erect slender stem, encircled with many rings of needle-like spines, and numerous drooping leaves forming a nearly spherical crown. It is variously called *Papunha*, *Paripou*, &c., and sometimes *Peach Palm*.

Gulielma Speciosa.

GULL (*Larus*), a genus of web-footed birds, of the family *Laridæ* (q. v.), inhabitants of the sea-coasts of all parts of the world. The formation of the head and bill of several species is given in the accompanying illustration. The feet have three toes in front completely united by a web, and a small hind-toe not included in the web, and sometimes altogether wanting. The wings are long and pointed. Gulls have great power of wing, and fly apparently with ease against a storm, during the continuance of which they generally fly low, whether over sea or land, but in fine weather soar higher in the air, in which they seem to delight in performing the most varied and beautiful evolutions. They descend with great rapidity to seize prey from the surface of the water or at a small depth; but they are not good divers, and the fishes which they catch are chiefly those which, like the herring and others of the same family, swim near the surface. They are very voracious. Their food consists of almost anything animal. Many of them are wholly or partially migratory, breeding in colder regions than those which they inhabit in winter. In general, they lay only two or three eggs, which are large for the size of the bird.



Heads of Various Species of Gulls:
1, Great Black-backed (young); 2, Black-headed; 3, Kittiwake; 4, Lesser Black-backed; 5, Herring Gull.

Many of the gulls are frequent visitors of inland districts, ascending rivers, and hovering over them in quest of prey as over the sea. Some of them are also often to be seen in meadows and ploughed fields, seeking for worms and other such food. It is a common notion in Britain that the appearance of gulls in inland districts betokens stormy weather. But in America, the migrations of some of the species between the northern seas and the Gulf of Mexico are performed, not only along the Atlantic coast, but by the great lakes and the valleys of the Ohio and the Mississippi, and a few occasionally remain and breed near these inland waters. Large flocks of a species of gull (*L. serranus*) frequent the lakes of the high table-lands of Peru.

Some at least of the larger gulls break the shells of molluscs by taking them up to a sufficient height in the air, and dropping them on a rock. This interesting fact is attested by Audubon, the American ornithologist, as having come under his own observation, and he mentions an instance in which a gull, finding the shell not broken by the fall, carried it up a second and a third time, and each time higher than the former.

The flesh of gulls is rather coarse, but that of the young is in request on many northern coasts as an article of food, and is salted for winter use. The eggs of certain species, such as the Black-headed Gull, are said to be very palatable, and are collected in great quantities in some places where these birds breed in large numbers.

The plumage of gulls is generally in great part white, variously mixed with gray, slate-colour, brown, and black. The white, in some species, assumes a rosy tint in the breeding season; and the head of some becomes black. The differences of plumage, according to age and season and sex, are very considerable, and have led to many errors as to species.

One of the most common British species is the Black-headed Gull (*L. ridibundus*), the whole length of which is about 16 inches; another is the Common Gull or Sea-mew (*L. canus*), mostly of a gray colour above, and white below, fully 18 inches long; the Herring Gull (*L. argentatus*), a still larger species, is common on rocky coasts; the Kittiwake (*L. tridactylus* or *L. rissa*), rather smaller than the first-named species, gray and white, destitute of hind-toe, is plentiful where the coast is girt with rocky precipices, on the narrow ledges of which it makes its nest; its young and eggs are among the chief objects of pursuit of the rock-fowlers; the Lesser Black-backed Gull (*L. fuscus*), about 23 inches long, is pretty common, at least in the north; the Great Black-backed Gull or Wagel (*L. marinus*), nearly 30 inches long, is not rare; and the Glaucous Gull or Burgomaster (*L. glaucus*), scarcely inferior to it in size, though by some supposed to be identical with the Great Black-backed species, of a pale bluish-gray colour above, and white below, is a winter visitant from the arctic regions. This species seems to have acquired its name of Burgomaster from the superiority which, in virtue of its size and strength, it asserts over most of the smaller birds of the northern seas, compelling them to relinquish prey at its approach. Some of the British species of gull are also common in North America, as the Herring Gull, the Great Black-backed Gull, and the Kittiwake; but the Common American Gull (*L. zonorhynchus*) is not found on the eastern shores of the Atlantic.

GULLET. See Œsophagus.

GUM, a general term applied to certain exudations from trees and plants, which are very different in their chemical characters and their general properties. In its strictest sense, gum is a substance which dissolves in water, forming a transparent mucilage; it is insoluble in ether, alcohol, and oils, either fixed or volatile, and is convertible into oxalic acid by the action of sulphuric acid. The gums belonging to this class are:

1. *Gum Arabic*, which is gathered from the stems of *Acacia Arabica* and *Acacia vera*, two leguminous trees found in Northern Africa, and in some parts of Asia. It varies in colour from a light straw to a garnet red, and is more or less transparent: the lightest is always the best. It is imported from Barbary and Turkey.

2. *Barbary Gum*, a dark-coloured variety, also imported from the Marocco coast. It has some qualities which render it particularly valuable to confectioners, in the manufacture of lozenges, &c. It is the produce of another species of acacia, *A. gummifera*.

3. *Gum Gedda*, an inferior quality of Barbary gum.

4. *Gum Senegal* is in fine large, round tears, generally larger than the finest Gum Arabic; it is, however, darker in colour, being a sherry brown, with sometimes a slight pinkish tint perceptible on the surface of the drops or tears. It is found generally in the tropical parts of the western coast of Africa, and is yielded by two species of acacia, viz., *A. Senegal* and *A. Seyal*. It is much valued for dressing various textile fabrics, such as muslins and silks, and is also used by confectioners for the finest kinds of lozenges, &c. The *Acacia Arabica* is also found in the East Indies, and is supposed to yield, with other species, the following gums known in commerce.

5. *Gum Gattie*, which is imported very largely, and is produced in the Deccan, Concan, and in Gujerat.

6. *Gum Babool*, an inferior gum, imported from Bengal.

7. *East Indian Gum*, a tolerably good variety, imported from Bombay.

8. *Gum Oomrawuttee*, an inferior variety, from the province of Oomrawuttee.

These East Indian gums are all dark coloured, and are much inferior to those produced in Africa; they are, however, extensively imported into the ports of London and Liverpool; over 200 tons are annually received into those ports.

The gums above described principally consist of a material which chemists have called *Arabin*, from its being the chief constituent of Gum Arabic. We now come to another class of gums, in which another material, called *Bassorin*, from its being first noticed in an analysis of *Gum Bassora*, is more or less present. These are:

1. *Gum Tragacanth*, or Dragon, yielded by the leguminous shrub *Astragalus tragacantha;* it was known to the ancient Greeks under the name of *tragakantha*. The finest pieces are in flakes, from an inch to an inch and a half in length, and from half an inch to an inch in width. This gum is more or less white, and nearly opaque, that which is whitest and most opaque being the best. It is only partly soluble in water, forming a white paste, instead of a transparent solution; with vinegar or dilute acetic acid, it also forms a similar paste, and is a valuable cement, holding light materials with great tenacity. It is used as a stiffening material for various textile fabrics, and is much valued for this purpose, where it is not desired to give gloss to the material. We receive it chiefly from Smyrna and Constantinople. It is mostly produced in Northern Persia and Asia Minor.

2. *Gum Kuteera*, yielded by *Sterculia urens* on the Coromandel coast. It is now only an occasional import, though formerly a considerable quantity was brought to this country.

3. *Gum Bassora*.—This is imported from Bassora; hence its name; but although long known in commerce, it has not been satisfactorily determined what plant produces it. Only a very small quantity reaches this country from time to time.

4. *African or Sierra Leone Tragacanth*.—This is occasionally imported in small quantities from Western Africa, and is produced by *Sterculia tragacantha*.

Besides the true gums, there are the GUM-RESINS, which are much more mixed in their chemical constituents; in general terms, however, they may be said to consist of certain resins soluble in alcohol, and of the true gum, so that it requires both water and alcohol to dissolve them entirely. They are chiefly used in medicine and perfumery, and may be said to form a connecting-link between the true gums and the true resins, commercially speaking. The principal are:

1. *Gum Asafœtida*. See ASAFŒTIDA. 2. *Gum Benzoin* or *Benjamin*. See BENZOIN. 3. *Gum Styrax* or *Storax* is another sweet-scented gum-resin, produced by *Styrax officinalis* in Turkey in Asia. It is usually liquid, of the consistence of treacle, and a blackish or dark-gray colour. It is also used in perfumery. 4. *Gum Sagapenum*, another medicinal gum with unpleasant garlic-like odour, dark-brown colour, and a soft consistency. It is not known what plant produces it, but it is generally supposed to be obtained from a *Ferula*. 5. *Gum Galbanum*. See GALBANUM. 6. *Gum Opopanax* is yielded by the roots of another umbelliferous plant, *Opopanax chironium*. It comes from the Levant in reddish-yellow lumps of a disagreeable smell. Its only use is in medicine, chiefly for plasters. 7. *Gum Ammoniacum*. See AMMONAICUM. 8. *Gum Myrrh* is a very sweet-smelling gum resin, which exudes from the stems of an Abyssinian shrub, the *Balsamodendron myrrha*. Two distinct kinds are known in commerce, the Turkish and the East Indian; the former is the better. They are both in irregular-shaped small lumps, rarely exceeding the size of a walnut, of a reddish-brown colour, rather lighter in the Turkish sort. Considerable quantities are used in medicine, and in perfumery for dentifrices, washes for the teeth, &c., in consequence of its being supposed to possess considerable antiseptic properties, and for the agreeable odour it imparts to the breath. From 15 to 20 tons are imported annually. 9. *Gum Scammony*.—This is obtained from incisions made purposely in the crown of the great tap-root of the *Convolvulus scammonia*, which is bored for the purpose. It is of a dark sap-green colour, inclining to greenish-gray, in large and small cakes, and in irregular fragments. Its use is extensive as a mild and safe purgative for children, but scarcely any drug has been so uncertain in its operation, owing to the excessive adulteration practised upon it by the Turks previous to its shipment. This has now been obviated by importing the root itself, and extracting the gum in this country.

There are many other gums known, but these are the ones to be had in shops, and for which uses are found in the arts, manufactures, and in medicine. Many also of the true resins, as copal animi, &c., are called gums, but they are strictly *resins*. See RESINS.

Gum-substitutes are manufactured from wheat-starch, farina or potato-starch, sago-flour, and other feculas, by baking or roasting, so as to convert the starch into Dextrine (q. v.). This is now an important manufacture, in which a large amount of capital is engaged. They are made on a very extensive scale by the Messrs Laing of Manchester and others, and are largely employed in dressing calicoes and other fabrics, also as a substitute for the more expensive gums in gumming paper, as in the case of postage and receipt stamps, which are made adhesive by dextrine. For this and some other purposes, the *gum* substitutes are superior to the real gums, as they are easily dissolved, and can be spread more equally over a smooth surface. Very large quantities of the starch of potatoes, called farina or potato-flour, are made in this country, and are also imported from the continent to be used in this manufacture.

GUMBI'NNEN, a thriving town of Prussia, in the province of Prussia, is situated on both banks of the Pissa, one of the affluents of the Pregel, 68 miles east-south-east of Königsberg. It was first regularly laid out in 1724, and owes its rise and prosperity in great measure to the settlement here of many Protestants, chiefly from Salzburg, who were driven from their homes by religious persecution. Among other institutions, the town has a gymnasium, a public library, three Protestant churches, and two hospitals. Woollen-cloth weaving, brewing, and distilling, are the branches of manufacture. Pop. (1871) 9085.

GUM-BOIL, an Abscess (q. v.) near the root of a tooth, and discharging itself towards the mucous membrane of the gum; usually superficial, but sometimes more deeply seated in connection with the bone, and causing considerable deformity, with risk of Caries (q. v.) or Necrosis (q. v.). Gum-boil should be treated, in the first instance, by simple protection against cold and external injury; but as soon as the presence of matter can be ascertained, it is usually good practice to give vent to it by a pretty free incision.

GUM TREE. See EUCALYPTUS and TUPELO.

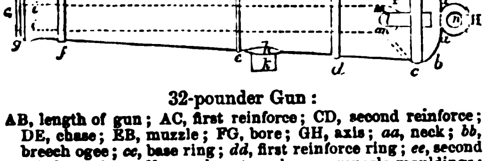
GU'MMEL, a town of Africa, in the state of Bornu, in lat. 12° 38′ N., and long. 9° 21′ E. In 1851, on the occasion of Dr Barth's first visit to G., he found it a flourishing town, the great entrepôt for the natron-trade, with a weekly market, at which were 300 stalls, offering for sale all sorts of clothing, tools, pottery, victuals, cattle, horses, &c., and with a pop. of 10,000; but in 1854, on visiting it on his return-journey, he found that, during the interval, it had suffered severely from civil wars, and was then in a state of at least temporary decay.

GUMMING, a disease analogous to *Canker* (q. v.), and like it, very destructive to fruit-trees, but confined to those the sap of which readily produces much gum; as the cherry, plum, peach, apricot, and almond. It is supposed sometimes to originate in wounds, in which a morbid exudation of gum takes place; but it appears to be more frequently occasioned by severe frosts, and to be very much dependent upon causes which induce a general unhealthiness. It very generally terminates in the destruction, not merely of the branch in which it originated, but of the whole tree, although trees in which it is in sure progress sometimes live for years, and meanwhile produce large crops of fruit. A small fungus (*Nœmaspora crocea*), which has been supposed to be the cause of gumming, more probably appears in consequence of it.

GU'MRI, an old town of Russian Armenia, on the site of which the important city and fortress of Alexandrapol—pop. (1867) 17,272—have been built. The site is on the high-road to Erivan, and is 60 miles north-west of that town. Alexandrapol is built at an elevation of 5860 feet above sea-level, and here the cold is so intense that men are often frozen to death in the fields.

GU'MTI, a river of India, remarkable, as its name is meant to express, for its windings, rises in a small lake in lat. 28° 35′ N., and long. 80° 10′ E., and after a south-eastern course of 482 miles, enters the Ganges from the left in lat. 25° 29′ N., and long. 83° 15′ E. It is navigable for inland craft as far up as Lucknow, which is fully more than 300 miles above its confluence with the Ganges. At Jaunpore, about 56 miles from the Ganges, it is spanned by a bridge of 16 arches.

GUN, a term applied in its most general application to firearms of any description, but in the more restricted and technical sense to Cannon (q. v.). A gun is a frustum of a right cone, with a cylinder excavated round the axis, to serve as a bore. Close home to the end of this cylinder, the powder is driven, and outside it is the ball to be expelled. The several parts are shewn in the figure below.



32-pounder Gun:

AB, length of gun; **AC**, first reinforce; **CD**, second reinforce; **DE**, chase; **EB**, muzzle; **FG**, bore; **GH**, axis; *aa*, neck; *bb*, breech ogee; *cc*, base ring; *dd*, first reinforce ring; *ee*, second reinforce ring; *ff*, muzzle astragal; *g*, *g*, muzzle mouldings; *h*, *h*, shoulder of trunnions; *ii*, diameter of bore, or calibre; *k*, *k*, trunnions; *l*, vent; *m*, breech; *n*, button.

The trunnions are cast in one mass with the piece, and are placed in the second reinforce in such a position that the breech-end of the gun outweighs the muzzle. Their axis is generally about half their diameter below the axis of the piece. This locality has several conveniences; but for the maximum of steadiness in the recoil, it has been shewn that the axes of the trunnions and of the gun should exactly intersect. The use of the trunnions is to suspend the cannon on its carriage in such a manner that it may be readily depressed or elevated, but so that it shall have no horizontal motion which is not shared by the whole carriage.

The vent or touch-hole, the channel through which the charge is fired, is a small cylindrical orifice leading at an angle from the breech of the bore towards the base ring. The explosion within reacts with great force on the lower portion of the vent, and in case of rapid or long-continued firing, soon honeycombs the iron or brass, often dislodging considerable fragments. This, besides diminishing the regularity of the action of the powder on the projectile, would involve danger of bursting if permitted to any great extent. The gun so affected is therefore *bouched*, that is, has a new vent constructed. The process consists of drilling a female screw, of larger than the required diameter, in the metal of the gun. Into this matrix, a bar of pure copper is screwed (copper being the metal least liable to fuse under the intense heat of ignited gunpowder), and the vent is then drilled through the copper. Sir A. Dickson devised the following simple mode: he rammed a cartridge of sand firmly into the breech, then filled the vent and all the interstices with molten copper, and had only to bore a hole through the latter to complete the operation. In cases of great urgency, even this simple procedure may be shortened by the insertion of the stem of a tobacco-pipe during the filling; the pipe, when removed, leaves a perfect vent.

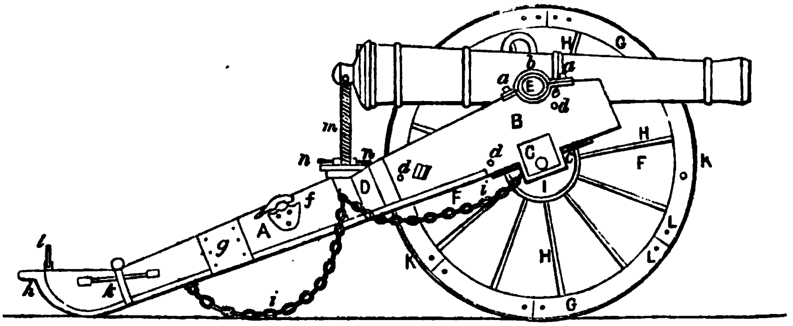
With reference to Rifled Cannon, some particulars have already been given under ARMSTRONG GUN, and fuller details will be given under RIFLED FIREARMS. See also WAR-SERVICES in SUPP., Vol. X.

GUN-BOAT, a small boat or vessel armed with one or more guns of heavy calibre. From its small dimensions, it is capable of running close inshore or up rivers, and from the same cause it has little chance of being hit by a larger vessel at the long range which the carrying power of its guns enables it to maintain. On the outbreak of the Russian war (1854—1856), as the British navy was without a single gun-boat, a large squadron of them was hastily constructed in 1855 and 1856, but too late

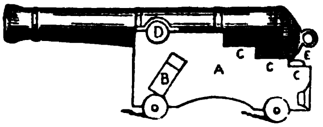
Gun-Boat.

for that special war. From the haste with which they were put together, most of those vessels proved defective. However, by aid of repairs and new construction, Great Britain has at this time about 70 steam gun-vessels in a very efficient condition. Their tonnage is small; their horse-power ranges from 20 to 60 horses, and their very heavy armament usually consists of one 8-inch gun, and one 100-pounder Armstrong gun. A gun-boat is attached in most cases to some larger vessel, and constitutes a lieutenant's command. In the last two wars with China, gun-boats performed excellent service, having penetrated nearly to Peking, and far up the Yang-tze-kiang.

GUN-CARRIAGE is a very important element in the equipment of each piece of ordnance. It requires to be of great strength, and at the same time of considerable weight, in order that the whole apparatus—gun and carriage together—may not be driven backward by the recoil in firing. Field-gun carriages have, besides, to bear an enormous strain in passing at a rapid pace over broken, uneven, or rocky ground. To provide for this severe wear and tear, every part is fitted with the utmost precision, made of well-seasoned material, and on strict mechanical principles. A large department, fitted with splendid machinery, in the Royal Arsenal at Woolwich, called the Royal Carriage Department, is charged with this branch of manufacture for the British service. Carriages are of various kinds, according to the service for which they may be required; but the leading kinds—viz., those for field-service, and those for garrison or ship duty—are represented in the following figures, in which the names of the principal parts are also given. When the field-gun is to be moved, the trail-plate is hooked to the LIMBER (q. v.), which converts the gun-carriage and limber into a four-wheeled vehicle, capable of conveying the gun, its tools and ammunition, and several of its gunners. Information relative to certain species of gun-carriages will likewise be found under TRAVERSING PLATFORM. Among modern inventions of war is the Moncrieff or elevating gun-carriage, in which the gun is poised at the end of a lever pivoted on the carriage, and balanced by a heavy counter-weight. Before firing, the gun is raised by mechanism; when fired, its own recoil drives it down upon the carriage. This arrangement enables gun and gunners to lie concealed behind a parapet until the moment of discharge.



Field Gun and its Carriage:
A, block or trail; B, cheeks or brackets; C, axle-tree; D, ogee; E, trunnion-holes; F, wheel; G, felly; H, spokes; I, nave; K, tire or streak; L, rivets; *a*, eye or capsquare bolts; *b*, capsquare; *c*, axle-tree bands; *d*, heads of transom bolts; *e*, trunnion plates; *f*, portfire clipper; *g*, locking plate; *h*, trail plate; *i*, locking chain; *k*, trail handle; *l*, handspike ring; *m*, elevating screw; *n*, handles of elevating screw.



Ship, or Garrison Gun and Carriage:
A, side or bracket; B, transom; C, steps; D, trunnion hole; E, quoin.

GUN-COTTON, a detonating substance invented by Schönbein in 1846, and obtained in the following manner. One part of finely carded cotton is immersed in 15 parts of a mixture of equal measures of strong nitric acid (sp. gr. 1·5) and sulphuric acid (sp. gr. 1·845). The cotton must be completely immersed in the mixture, otherwise it becomes so hot as to undergo immediate decomposition. After a few minutes' immersion, it must be plunged into a large volume of cold water, and then washed till the moist mass ceases to shew any acid reaction when placed on litmus paper. It is then to be carefully dried at a temperature not exceeding 170°.

Any substance containing cellulose, such as tow, linen, saw-dust, paper, &c., may be employed instead of cotton, and the change that takes place in the formation of the explosive compound seems, from the researches of Hadow, to be as follows: the composition of cellulose is represented by the formula $C_{36}H_{30}O_{30}$. In the formation of gun-cotton or *pyroxylin* (derived from *pyr*, fire, and *xylon*, wood), nine equivalents of the hydrogen are replaced by an equal number of equivalents of peroxide of nitrogen (NO_4), so that the formula for the new compound is $C_{36}H_{21}9NO_4,O_{30}$. The fibre, in undergoing this change, increases about 70 per cent. in weight, and acquires perfectly new properties. Although scarcely differing in appearance from unchanged cotton, it may be distinguished from it by its harshness, by the crepitating sound which it yields when pressed by the hand, by its having lost the property of depolarisation which ordinary cotton possesses, and by its electric condition. Iodine dissolved in a solution of iodide of potassium affords a certain means of distinguishing explosive from ordinary cotton. If the former is moistened with this iodine solution, and a little dilute sulphuric acid is subsequently added (one part of the acid to four of water), a yellow colour is evolved; while ordinary cotton wool, when similarly treated, assumes a blue colour. Its most remarkable property is, however, the facility with which it takes fire, and its rapid and complete combustion. The results of General von Lenk's improvements in the manufacture of gun-cotton, which, however, did not lead to its superseding gunpowder in any one direction, are given in the SUPP., Vol. X. The more recent experiments of Professor Abel, which have been carried on for the last ten years at the Woolwich Arsenal, and are still being continued, have resulted in further improving the manufacture, and also in determining more accurately the properties of gun-cotton. Abel's process consists in steeping cotton-waste in strong nitric and sulphuric acids at a low temperature, and afterwards washing it thoroughly. It is next reduced to a pulp in a common rag-engine (see PAPER), and then in the pulpy condition it is washed again in a large quantity of water to remove every trace of free acid. After that, it is pressed at a low power, and subsequently in a powerful hydraulic press, out of which it comes in so wet a state as to be uninflammable. Gun-cotton can thus be compressed into masses of any shape, as cylinders or cubes, and of any required density or hardness. It can also be converted into the form of paper, or into gun-cotton grains for sporting purposes.

Gun-cotton can now be manufactured so as to keep, there is every reason to believe, with perfect safety in a wet state, and be as good as ever when dried again. The results of some experiments carried on a year or two ago by a government committee at Chatham shewed that when gun-cotton is firmly confined, it exerts a destructive effect equal to about five times that of gunpowder.

Professor Abel has proved that the more thoroughly gun-cotton is compressed, the more perfectly can its action be controlled, and it is now generally used in compact discs for mining purposes; that it is sympathetic, so that, if gently ignited by a spark, in the form of yarn, it smoulders slowly away; if by a flame, it burns up rapidly; and if fired in the compressed state by a detonating fuse, it explodes with great violence, even when unconfined. The most recent and striking discovery regarding it, however, is, that although, as a rule, non-inflammable and non-explosive in the wet state, yet, when fired in this condition with the detonating substance fulminate of mercury, and a little dry gun-cotton or gunpowder, it explodes with as much violence as when it is dry.

While gunpowder does not explode at a lower temperature than 600° F., gun-cotton has been known to do so at 277° F., and cannot be heated to 400° F. without explosion. Gun-cotton produces neither smoke nor fouling when fired, and does not heat the gun so much as gunpowder, though, by the rapidity of its explosion, it strains the barrel more.

GUN FACTORIES, ROYAL, are government establishments at Woolwich for the construction of great guns for the use of the British army and navy. For a very long period there had been at Woolwich a small factory for the manufacture of brass cannon, but guns of cast iron were obtained from private foundries by contract. At last it was determined that government should become in part its own gun-founder, and extensive workshops were erected in 1855—1856. The adoption of the Armstrong wrought-iron gun into general use in the service, in 1859, arrested the further making of cast-iron guns, and occasioned again a great expenditure in the erection of shops and costly machinery, which have since been adapted to the other systems of wrought-iron ordnance adopted into the service under the name of 'Woolwich.' At this time (1874), the factories may be counted as among the most remarkable sights in the kingdom. In each department, whatever the process, it is repeated over and over again, till long parallel lines of similar mills are seen, each busily fashioning a separate gun. Iron at red-heat is first wound round a solid core (representing the bore of the future gun), as tape might be round a pencil; and then by the action of successive blows from a steam-hammer (there is one of 100 tons), the strips are welded into a compact cylinder of wrought iron of extreme density. This cylinder, after undergoing several heatings and poundings with the steam-hammer, is encompassed with wrought-iron rings of immense strength, which are shrunk on, and then transmitted to the boring-mill. Here the proper calibre is imparted to it; in another department, the bore is rifled; in another, the outside of the gun is carefully turned; and in yet another, the whole is polished and browned. A gun is several weeks in its passage through these many processes. By the ingenuity of Sir William Armstrong, the superintendent, and Dr John Anderson, his able assistant, every part of the difficult manufacture has been reduced to a question of machinery. Many thousand guns have to this time been turned out complete, of which upwards of 7000 are now available for military or naval use. The cost of the guns as now (1874) made is, on an average, as follows: 12-pounder, £82; 20-pounder, £124; 40-pounder, £206; 70-pounder, £375; 35-ton gun, £2156. The royal gun-factory at Woolwich was estimated to cost for 1874—1875 the sum of £198,081, of which £7524 were for management; £70,187 for the wages of artificers and labourers; £22,947 for buildings and machinery; and £97,423 for stores to be consumed in the manufacture of guns.

Much of the machinery now used in the manufacture of guns was originally developed at the engineering and founding establishment of Sir William Armstrong and Co., at Elswick, which was for some time used as an auxiliary and supplement to the gun-factory in Woolwich arsenal, the guns being turned out at a contract price, payable after they had passed a rigid inspection. The connection between the government and the Elswick firm ceased in 1863.

GUNDAMU'K, a village of Afghanistan, claims notice merely in connection with the fatal retreat from Cabul in 1842. It was here that the last remnant of the British force, when within 28 miles of the shelter of Jellalabad, was massacred, to the number of 100 soldiers and 300 camp-followers, only one man effecting his escape.

GUNDU'K, a river of India, joins the Ganges from the left or north side, opposite to Patna, after a south-east course of about 400 miles. It is supposed to rise beyond the Himalaya, in lat. 29° 40′ N., and long. 83° 14′ E., while its remotest source within that range is said to be at the foot of Dhwalagiri. After a course of 200 miles, it becomes practicable for boats of considerable burden. Near this point, the river touches the British territory, dividing it for 15 miles from Nepaul.

GUNDULITSCH, IWAN, the most celebrated Serbian poet of earlier times, was the son of Francis Gundulitsch the historian, and was born 8th August 1588, in the town of Ragusa. After he had completed his primary education and philosophic studies under the Jesuits, he betook himself, at the age of 21, to the science of jurisprudence, in which he made such rapid advances, that in spite of his youth, he was intrusted with the first offices of the Ragusan republic. He died in 1638. On the 20th December 1838, the bicentenary anniversary of his death, a grand requiem was sung in memory of the poet, in the Academic Church of Agram.—G.'s poetical works, lyrical, dramatic, and epical, are a faithful mirror of the stirring time in which they were composed. He was the earliest dramatic writer of the

Slavic race, and the theatre of Ragusa, on which his pieces were performed, was the first Slavic theatre. His greatest and most celebrated work is an epic, *The Osmanli*, in 20 cantos, in which he sings the deeds of Osman II., and the fame of the Poles and their king, Wladislaw IV., in the campaign of 1621. This work was first published at Ragusa in 1626; the latest edition is that of Gaj (Agram, 1844). Of his dramas, may be mentioned *Ariadne*, *The Rape of Proserpina*, *Galatea*, *Diana*, *Armida*, *The Sacrifice of Love*, *Ceres*, *Cleopatra*, *Adonis*, and *The Coral;* of his other poems, *Hymn on the Greatness of God*, and *The Tears of the Afflicted Son*. G. also made several translations from the Italian poets.

GUNMAKING, GUN-TRADE. Athough the terms gunnery and gun relate chiefly to great guns or cannon, the word gunmaking is always applied to the manufacture of small-arms, comprising muskets, rifles, pistols, and carbines. In England, the great seat of this trade was formerly London, whose workmen stood unrivalled throughout Europe for the excellence of their production; but of late years the gunmakers of Birmingham have succeeded, from local advantages, in turning out barrels of proved power, at such a price as to defy competition. Since then, the London makers have confined themselves to 'finishing,' or putting together, an art requiring the utmost nicety; and even in this, the skilled labour of Dublin and Edinburgh has now nearly equalled them. There are, therefore, several centres now in the United Kingdom whence first-rate arms are to be obtained. America and the leading continental nations are great manufacturers also, and each has its particular excellences. The chief continental gun-factories are at St Etienne, Liege, Vienna, and Suhl.

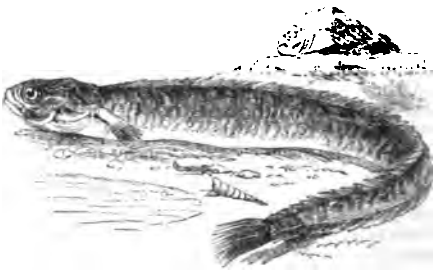
Machinery has been comparatively slow in being applied to the manufacture of small-arms, but during the last few years it has made giant strides; and now the government manufactory at Enfield, in which numerous ingenious machines have been introduced from the United States, is fitted with every mechanical appliance, and can turn out many thousand arms per annum, each of which so exactly corresponds to pattern, that all the constituent pieces are interchangeable. Barrels, instead of being forged by the hand-hammer, are rolled at once with a uniform pressure, and then welded at one heat. In the United States, barrels are at present made of cast steel, first formed in the solid, and then bored by a succession of borers of increasing diameter. These cast-steel barrels are rapidly superseding all others —at least for sporting purposes—in Great Britain, France, and America. Another favourite modern material for barrels is 'laminated steel.' See BARREL. Barrels well constructed of laminated steel, resist a bursting pressure of 82,000 lbs. on the square inch one-eighth of an inch thick, whereas common 'twist' barrels will only withstand about 34,000 lbs.

When the barrel is finished, however made, it is proofed, under very heavy charges of powder. All non-government barrels made in England must be proofed at the proofing-houses of London or Birmingham; government arms are tested at Enfield.

The portions of the lock (q. v.) are made some of iron and some of steel, either forged by hand, or, as in the great manufactories, stamped out by a powerful machine. The stock is turned by machinery from strong light wood. On all accounts taken together, it is found that no wood is so well adapted as Italian walnut. The finishing or putting together of guns is an art in itself; the utmost attention having to be devoted to everything that will secure solidity, lightness, and the most minute accuracy of fitting. Skilled artificers in the gun-trade command excellent wages; rarely less than 40*s*., and often as much as £4 a week.

In fitting and finishing, London is generally admitted to stand unequalled; Paris, however, making a good and near second. For barrels, Birmingham, St Etienne, and Liège have the most repute. In all respects, Toledo, once famed for its blades, holds a high character in regard to its guns, both for sporting and military purposes. In the United States, Windsor and Hartford are the leading manufactories, with Harper's Ferry for government arms; but the quality of American workmanship is too often sacrificed to cheapness in the article turned out. The British export trade in small-arms is very great, the return for the year 1872 shewing an exportation of 386,944 stand of all kinds, of the value of £478,577.

GUNNEL (*Gunnellus*, or *Murænoides*), a genus of fishes of the Blenny (q. v.) family, of more elongated form than the true blennies. The species are pretty numerous, but only one is British, the COMMON or SPOTTED G. or BUTTERFISH (*G. vulgaris*), often to be found in tide-pools on the sea-shore; seldom more than six or seven inches long; of a deep olive colour, with a row of dark spots on the back, remarkable for the quantity and thickness of the mucous secretion with which it is covered. It is seldom used in Britain except for bait.



Gunnel or Butterfish (*Gunnellus vulgaris*).

GUNNER, in the British army, is the private soldier of the corps of artillery; he receives pay at the rate of 1*s*. 2½*d*. per diem: his uniform consists of blue with red facings, and red stripes on the trousers; and his arms consist of a carbine and sword-bayonet.

At the present time, when artillery is used with the utmost skill and science, the training a gunner must undergo, to become thoroughly efficient, is long and arduous. His eye must be sufficiently acute to estimate distances instantly and proximately; and withal, he must possess physical strength capable of sustaining the exertions necessary for the service of heavy guns and the removal of shot and ponderous artillery stores.

Master-gunners are pensioned sergeants of artillery, who are placed in charge of the stores in small towers or forts; they are divided into three classes, of which those in the first class receive 5*s*., in the second, 3*s*. 6*d*., and in the third, 3*s*. a day. Master-gunners are now borne in the Coast Brigade of Royal Artillery, but the office has much degenerated in importance since it was first created, at least as early as the time of Henry VIII.

In the navy, the *gunner* ranks first among the warrant-officers, and next in order to the navigating sub-lieutenant in regard to taking command of a ship. His pay varies from 9*s*. a day for chief gunners to 5*s*. 6*d*. a day for gunners of the 2d class. His uniform consists of a blue coat, blue cap, and officer's sword. A gunner rises from before the mast by steadiness, sobriety, and intelligence. On appointment, he must satisfy examiners appointed by the Admiralty that he is in all respects qualified. His duties are highly important: he has charge of all powder and artillery stores on board, and is bound to see that the guns are always fully equipped for action. In exercising with the guns, the gunner is instructor of the sailors, and, under the captain, is responsible for their efficiency. The *gunner's-mate* is assistant to the gunner, and stands second among the petty-officers. To be confirmed in his rank, he must pass an examination in gunnery on board H.M.S. *Excellent*, at Portsmouth. His pay varies from £39, 10*s.* 10*d.* a year to £34, 19*s.* 7*d.* *Seamen-gunners* are continuous-service sailors, who are trained in gunnery and great-gun exercise. One has the direction of each gun, with ordinary seamen under him to perform the heavy part of working it. A seaman-gunner, if in the 1st class, receives 4*d.* a day beyond his pay as seaman, and 2*d.* a day if in the 2d class.

GUNNERY. Ignorance of the laws of gravity and of other physical circumstances affecting the flight of projectiles, prevented any correct theory of gunnery being arrived at in the earliest ages of artillery. The first author professedly treating on the flight of cannon-shot was Nicolas Tartaglia, a distinguished Italian mathematician, who, in 1537, published his work, *La Nuova Scientia.* He had no practical acquaintance with his subject, but his guesses were shrewd and often marvellously near the truth. Among other things he ascertained that no portion of the track described by a ball is a right line, and as a practical aid to artillerists, he devised the gunner's *Quadrant* (q. v.). After Tartaglia, many philosophers, especially of Italy, theorised on the question, and various tables of ranges, elevations, charges, &c., had been published, all more or less fallacious, when a nearer approach to accuracy appeared in Galileo's *Dialogues on Motion*, printed in 1638. The officers who had charge of artillery in actual use were too little gifted with scientific education to deduce theory from practice; and up to the time of Robins, who wrote in 1742, but four working-gunners—Collado, Browne, Eldred, and Alderson, of whom the three last were Englishmen—have left treatises of any value on the use of their weapons.

Galileo, in his contributions to physics, had shewn that cannon-shot, or any other projectiles, being affected by the downward force of gravity, would travel in the curve of a parabola, unless affected by the resistance of the air. The philosopher pointed out modes by which the disturbances caused by this resisting medium might be ascertained; but subsequent writers, with the exception of Newton and Bernouilli, till the time of Robins, chose to assume that the atmospherical resistance was but nominal, and boldly asserted that all shot described parabolas in their course. In 1742, Mr Benjamin Robins, who must be considered the real founder of the science, published his *New Principles of Gunnery*, a work the result of long and almost exhaustive experiments. He treated of the atmospheric resistance, of the force of gunpowder, of the effects of varying length and weight in guns, and of almost everything which in any way related to the motion of projectiles, carrying the theory of gunnery nearly to perfection. As one result of his experiments, Robins established the law that common shot encountered a resistance from the air during their passage, which increased as the square of the velocity, or very nearly so; and that their courses differed widely from parabolas. By means of the Ballistic Pendulum (q. v.), he measured the speed of balls at the very cannon's mouth. Euler, in the latter part of the 18th c., added much to the knowledge of the subject by his commentaries on the work of Robins; as did also the mathematician Hutton.

The theory of gunnery, so far as it can be deduced from the universal laws of motion, without regard to the resistance of the air, falls under the more general head of Projectiles (q. v.). But except in firing bombs, which from their low velocity are not so much affected by the resistance of the air, the mere mathematical theory is of little service. All the real practical rules have been deduced from experiment. The following are a few of the more important results thus arrived at.

For a given charge and weight of projectile, there is a certain length of bore that gives the greatest velocity; the cause being, that with a less length some of the powder is discharged undecomposed, and with a greater, the combustion is finished before the ball leaves the muzzle, so that it has to contend with the friction of the gun without receiving additional impulses. Increase of length, accompanied by proportionate increase of charge, gives increased velocity; but the greater velocity is only in proportion to the cube root of the increased length.

The resistance of the air does not arise merely from the projectile having to displace its own bulk of it as it advances; for in the case of a body moving with great velocity, the air becomes condensed in front of it, while that behind is highly rarified. The displaced air behind does not return freely to fill up the vacuum, until the speed of the ball is reduced to 1400 feet per second; the maximum profitable velocity is calculated to be 1600 feet, and that, or any higher speed, is believed to be reduced to 1400 feet after a course of 400 feet.

The resistance offered to bodies by the air is as their surfaces, i. e., in the case of round or cylindrical shot, as the squares of the diameters; whilst the power of the bodies themselves to overcome resistance is as their weights, or as the cubes of their diameters. Of course balls of like size but different density will produce widely different results. Hence the greater range of solid as compared to hollow shot. Solid shot fired with equal velocities and elevations, range as their weight, the heavier overcoming atmospheric resistance better than the lighter. Shot of equal weight and diameter will range according to their velocities; but not in direct proportion, for the retarding power varies as the square of the velocity. Velocities of shot of equal diameter are as the square roots of the charges.

The diminution in speed caused by atmospheric resistance may be judged of from the following table of the speed of a 32-pounder at different parts of its course; it being premised that a body in vacuo, once started, should move ad infinitum, without decrease of velocity:

Initial velocity,		. . .	1600	feet per second.
Velocity	500	yards from gun,	1126	"
"	1000	"	1000	"
"	1500	"	608	"
"	2000	"	465	"
"	2500	"	367	"

Action and reaction being always equal and in opposite directions, the explosion of the gunpowder acts with equal force upon the ball and upon the cannon from which it is discharged, the former demonstrating this in its range, and the latter by its recoil. This recoil has to be guarded against as much as possible, either by the weight of the gun itself, or by its secure attachment to a ponderous carriage. The momentum of the recoil, being the product of the shot's weight and the velocity, is readily calculated. The common charge of a

24-pounder gun, being one-third the weight of the shot, or eight pounds, the momentum of both shot and gun, will be 1600 (the initial velocity) × 24 = 38,400, which, divided by 5600, or the gun's weight in pounds, gives about seven feet as the velocity per second; if the gun is attached to a carriage, the weight of the carriage must be added to that of the gun for a divisor.

The following table exhibits the effects of varying charge and elevation on different kinds of guns. It will be readily understood by reference to the accompanying diagrams. The line of sight of a gun is an imaginary line drawn through the back-sight on the breech and the fore-sight, a notch in the muzzle ring, or on the first re-inforce (see fig. 1, where ABC is the line of sight). The fore-sight B is immovable, but the back-sight A is so constructed that the notch shall be at a greater or less height above the axis of the gun. When the line ABC is parallel to the axis and horizontal, the discharge is 'point-blank;' but when the back-sight is raised, the direction of the axis of the gun will be to a point more elevated than that to which the line of sight is directed, as in fig. 2, where the original impulse received by the shot is towards D. Consequently, by raising the back-sight, a greater elevation, and, ordinarily, a greater range, is given to the piece. In regard to point-blank discharge, Tartaglia established the fundamental proposition that the time occupied by the ball in describing the whole trajectory or path is the same as it would require to fall by gravity from the muzzle to the ground.

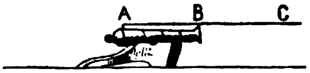


Fig. 1.

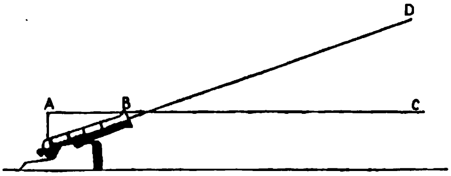


Fig. 2.

Nature.	Elevation.	Charge.	Range in Yards.
12-pounder iron gun, .	Point-blank,	4 lbs.	300
	1 degree,	"	700
	3 degrees,	"	1200
	6 "	"	1800
12-pounder Armstrong, .	Point-blank,	1 lb. 8 oz.	330
	1 degree,	"	700
	3 degrees,	"	1425
	6 "	"	2440
	10 "	"	3590
32-pounder iron gun, .	Point-blank,	10 lbs.	390
	1 degree,	"	790
	3 degrees,	"	1500
	6 "	"	2220
	12 "	"	3060
40-pounder Armstrong, .	Point-blank,	5 lbs.	360
	1 degree,	"	730
	3 degrees,	"	1455
	6 "	"	2505
	12 "	"	4470
68-pounder iron gun, .	Point-blank,	20 lbs.	400
	1 degree,	"	950
	3 degrees,	"	1715
	6 "	"	2465
	12 "	"	3400
110-pounder Armstrong, .	Point-blank,	12 lbs.	345
	1 degree,	"	680
	3 degrees,	"	1335
	6 "	"	2280
	12 "	"	4035

As regards penetration, it was found by experiments against a martello tower at Eastbourne, with a range of 1832 yards, that solid shot from the 40-pounder Armstrong penetrated into good masonry from 47 to 65 inches, and from an 80-pounder Armstrong 51 to 90 inches. For other particulars relative to the art of gunnery, the reader is referred to LOADING, PROJECTILES, WINDAGE, &c. The important point of the rotation of a ball or bolt will be considered under RIFLED FIREARMS.

GUNNY BAGS are bags made of a coarse kind of cloth or sacking, manufactured in India, and chiefly in Bengal, from which they are largely exported to other parts of the world. The fibre of which the cloth is made is chiefly that of the same species of *Corchorus*, which yield the jute (q. v.) of commerce. The cotton of America is mostly packed in gunny bags, of which the number exported to America from Bengal has increased from thousands in the year 1796 to millions in 1874. Great quantities are also exported to China, Australia, and other countries. They are partly made up into bags in Bengal, partly exported as Gunny *chats* or *chuttees*, pieces of size suitable for being immediately made into bags. The manufacture of these is the great domestic industry of all the populous eastern districts of Lower Bengal. It pervades all classes, and gives occupation to men, women, and children. Boatmen employ themselves in it in their spare moments, husbandmen, palanquin-carriers, and domestic servants, being Hindus, for Mohammedans spin cotton only. It 'forms the never-failing resource of that most humble, patient, and despised of created beings, the Hindu widow, saved by law from the pile, but condemned by opinion and custom for the remainder of her days, literally to sackcloth and ashes, and the lowest domestic drudgery in the very household where once, perhaps, her will was law.' (Royle's *Fibrous Plants of India*.) Hence the very low prices at which gunny bags are sold. There are few articles of commerce so widely diffused over the globe as the Indian gunny bag.

GUNPOWDER, a well-known explosive mixture composed of sulphur, nitre, and charcoal. Of use in several trades, its principal employment is in the discharge, for war or sport, of projectiles from fire-arms, and in the processes of blasting during mining or quarrying. The history of gunpowder has been already given under FIREARMS (q. v.), and it will therefore be only necessary now to consider the chemical action which takes place when powder is ignited, and then to proceed to a short description of the manufacture.

Extreme care is requisite in securing the purity of the ingredients entering into the composition of gunpowder. The principal impurity of nitre or saltpetre is chloride of sodium, or common salt, which, in consequence of its tendency to absorb moisture from the atmosphere, would have a very injurious action on gunpowder by weakening its power. The details of the process of purification of the nitre would be out of place in this article. The sulphur may be purified either by fusion (when the heavier impurities sink, and the lighter ones may be removed by skimming) or by distillation. The preparation of the charcoal is a most important point. It should be light and porous, should yield a very small amount of ash, especially of carbonate of potash and other deliquescent salts, and should contain little moisture. The woods yielding the best charcoal for gunpowder are black alder, poplar, spindle-tree, willow, and dogwood, the last named giving off the largest volume of gas when ignited with a given weight of nitre, and being on that account especially used for rifle powder.

A vast number of experiments have been made at different times, and by different nations, to discover the proportions of nitre, sulphur, and charcoal best adapted for the production of different kinds of gunpowder; and upon the whole there has been great uniformity in the results, as may be seen from the following table of the percentage composition of the powder of different nations:

Kind of Powder.	Charcoal.	Sulphur.	Nitre.	Authority.
Austrian war powder, .	13·1	11·3	75·6	Linck.
English (Waltham Abbey) war powder,	13·7	10·1	76·2	Ure.
Russian war powder, . .	17·7	11·7	70·6	Meyer.
Italian sporting powder, .	18·2	8·6	73·2	Prechtl.
Chinese gunpowder, . .	23·1	15·4	61·5	Prechtl.

The chemical processes which occur in the ignition of gunpowder are commonly described as follows: When the powder is ignited, the oxygen of the nitre combines with the charcoal or carbon to form carbonic acid, the potassium combines with the sulphur to form sulphide (or sulphuret) of potassium, and the nitrogen is liberated; the reaction being shewn in the equation $KO,NO_5 + S + 3C = 3CO_2 + N + KS$. Powder consisting of one equivalent each of nitre and sulphur, and three equivalents of carbon, would contain 74·8 per cent. of nitre, 11·9 per cent. of sulphur, and 13·3 per cent. of carbon or charcoal, which approximates very closely to the Austrian powder in the above table. It is easily shewn that one volume of such powder would yield 296 volumes of mixed carbonic acid and nitrogen gases, after the ordinary reduction for temperature and pressure, although from the intense heat developed at the moment of explosion the actual dilatation amounts to at least 1500 times the volume of the powder employed. The only solid residue, supposing the above equation to represent the true reaction, is sulphide of potassium (KS), and part of this is volatilised by the heat of the explosion, causing a whitish smoke by its combustion, while the part that is not burned gives the peculiar odour to the washings of the gun-barrel.

If a larger proportion of charcoal is added, more or less carbonic oxide gas is generated as a product of combustion. Blasting powder is so composed that, theoretically, it should yield on explosion a mixture of carbonic oxide and carbonic acid gases, and leave a residue of bisulphide of potassium; the reaction being expressed by the equation $KO,NO_5 + 2S + 4C = 2CO + 2CO_2 + N + KS_2$. A powder composed according to this formula would contain 64·4 per cent. of nitre, 20·4 per cent. of sulphur, and 15·2 per cent. of carbon; and the proportions actually employed are 65, 20, and 15, respectively.

Recent investigations of Bunsen and Schischkoff (Poggendorff's *Annalen*, Bd. 102, p. 321) shew that in reality the chemical reactions are very far from being as simple as those given in the preceding paragraphs; the solid residue consisting of various compounds of potassium (sulphate of potash being in greatest quantity), with portions of nitre and carbon.

The ignition of gunpowder must be distinguished from its combustion. The powder is ignited when a portion of it begins to develop light and heat; this in granulated gunpowder communicates from grain to grain with the utmost rapidity; but still, it is important to bear in mind, by successive ignitions. Combustion means the final and total decomposition of each grain separately, and the complete liberation of its component gases. In gunpowder these phenomena follow each other so rapidly, that, unless the mass is spread over a considerable space, they *appear* simultaneous. The heat spread around by each grain during its combustion suffices to ignite all other grains within a sphere of six times its own diameter. This serves to account for the almost instantaneous communication of the flame throughout the whole quantity exposed. The granulation of gunpowder has a great influence on the rapidity of its ignition; the larger the grain, the more rapid is the ignition, but the slower the combustion. On the other hand, small-grained powder ignites more slowly, and burns with greater speed. When mealed or finely powdered gunpowder is employed, it readily inflames, from the presence of the ordinary ingredients; but there being no interstices, the conflagration spreads but slowly, and therefore the decomposition is proportionately retarded. It thus happens that mealed powder exhibits less explosive power and less rapidity of combustion the closer it is pressed together, a circumstance taken into account in the manufacture of fireworks.

In rifled guns and muskets, where it is desired that the projectile should expand to the shape of the grooves, it is obviously best to have a powder which, by very rapid ignition, creates the utmost sudden expansion, and which, by continued combustion, maintains an increasing degree of heat, which shall further augment the explosive force of the gases evolved up to the period of time at which the projectile is driven from the muzzle of the weapon. With this object, large-grained powder is clearly the most suitable, although a contrary view has been long accepted; and that to so great an extent, that some among the recent inventors of rifled arms have had to complain that the only gunpowder they could obtain has been far *too good* for their purposes.

Process of Manufacture.—The three ingredients being taken to separate mills, are reduced by successive grindings to impalpable powder. The several materials are then taken to the *mixing-house*, where they are weighed out into their respective proportions. The charcoal is spread in a trough, and the sulphur and nitre being sifted upon it, the whole are incorporated, though imperfectly, by the hands. The next process is in the *powder-mill*, where the mixture is ground between millstones, and thoroughly incorporated in a wet state. So dangerous is this part of the manufacture, that makers are forbidden to grind more than 42 lbs. in the same house at one time: all the bearings of the machinery are of copper, lest heat should be generated by the friction. According to the quality intended is the time during which this trituration is continued, from one hour to six being that usually employed, and three hours the period in the government factory. The powder, completely pulverised and caked by the moisture and the pressure, leaves the mill in small lumps, called *mill-cake*. This mill-cake is then spread between copper-plates in layers about 3 inches thick, and is subjected to an immense pressure either by a screw-capstan or by a hydraulic engine.

The next operation is graining, a process to which, as already explained, gunpowder owes its rapidity of ignition, and its consequent explosive power. This is performed by forcing the mill-cake through minute holes in a circular parchment sieve, the sieve being kept by mechanism in rapid revolution. The grains thus formed are, however, of very various sizes; and that the gunpowder should be homogeneous, it is necessary that they should be sorted into the several sizes. This is done by the intervention of a series of sieves of different degrees of fineness.

Since the introduction of the immense modern cannon, it has been found necessary to make powder with very large grain, even larger than hazel nuts, this is called *pebble powder*, and is now in general use.

The last processes are drying, glazing, and freeing from dust. The first is effected by heating the powder to a point sufficient to drive off moisture; the second, by the friction of the grains together in a revolving cylinder; the third, by the centrifugal action caused by the powder being twisted round at great speed in a gauze cylinder, when the dust (formed in the polishing) flies off through the gauze, and the bright grains remain as finished gunpowder.

This is the modern system—a system involving considerable personal risk at every stage; for the fine dust becomes so diffused through the atmosphere in the mills, that the slightest spark would blow the whole into the air in a moment. The early process of manufacture was, however, even more dangerous. What with the stirring, and pounding, and spirit (which our forefathers used instead of water, in the idea that a strong fluid would impart strength to the mixture), it was probably to the impurity alone of the materials that the operators were indebted for not being blown to pieces.

The following are the chief properties of gunpowder. Good powder should be perfectly uniform in texture, and should not present any light specks or glittering points. The grains should be sufficiently hard not to be easily crushed by the fingers, or to soil them, or a piece of paper, by mere contact. If inflamed on white paper, it should blacken it but slightly, should on no account set fire to it, and should leave only a very slight residue. The temperature at which it explodes has been carefully studied by Violette, who obtained the following results:

	Angular Grains.	Pulverised.
1. Blasting powder explodes at . .	518°	509°
2. War powder explodes at . . .	528°·5	510°·5
3. Sporting powder, fine, explodes at .	536°	514°·8
4. Do. extra fine, explodes at	603°	518°

The most combustible of these powders was the one containing the largest amount of sulphur, which is the ingredient most ready to enter into ignition. When gunpowder is exposed to a heat of 500°, the whole of its moisture is expelled, and the nitre and sulphur are reduced to the fluid form. On cooling, such powder is found to be intensely black, and the grain has become indurated, and is no longer able to imbibe moisture. Powder is inflamed by any burning substance, by red-hot metal, by the electric spark, or by the violent concussion even of comparatively soft bodies, if it be sufficiently powerful. For example, powder placed upon lead, or even on wood, may be ignited by the shock of a leaden bullet fired at it. Its specific gravity is about 1·8.

The nature of the residue which is left after the ignition of the powder has been already explained. The *fouling* caused by this residue is avoided to some extent by the lubrication of the barrel with a little fatty matter.

The manufacture of gunpowder is carried on to a great extent in Great Britain; the exports in 1872 were 19,889,628 lbs., shipped principally to the colonies, and to Western Africa and South America.

GUNPOWDER, Laws Relating to. In order to guard against the frightful consequences to the public likely to arise from carelessness in the preparation, preservation, or conveyance of this most dangerous article, the legislature in 1875 made stringent rules upon the subject. By 38 and 39 Vict. c. 17—an act which applies also to Scotland and Ireland—it is provided that no gunpowder shall be manufactured except at a factory lawfully existing or licensed under the act, and it shall not be kept except in the factory where it is made, or in a magazine or store duly licensed, or in registered premises. The license is obtained from the local authority (usually justices), and approved by the Home Secretary. General rules are imposed for regulating factories and magazines. There must be a lightning-conductor. No charcoal or oiled rags must be taken into the building except for immediate use. No smoking is allowed. Tools are to be made of wood or soft material. Working-men's clothes are to be without pockets. Carriages and boats for conveying gunpowder must have in their interior no iron or steel exposed. Each building is to have affixed, so as to be easily read, the quantity of gunpowder allowed in each. Retail dealers must be registered, and must keep their powder in a separate house or in a fire-proof safe, not exceeding 200 lbs.; but if kept inside the dwelling-house 50 lbs., or if in a safe inside, 100 lbs. The building or safe is to have no exposed iron or steel in the interior. A breach of precautions against fire or explosion is visited with heavy penalties. The local authorities must keep registers of licensed persons, and all ratepayers can demand a copy thereof. Retail dealers, if using less than 5 lbs. for cartridges at a time, are exempted from taking out a factory license. No powder must be sold to a child under 13. All powder exceeding 1 lb. weight must be sold in a canister or case securely fitted, and with the word 'gunpowder' visible. Also, powder must be closely and securely packed and labelled for conveyance, if exceeding 5 lbs., and the amount carried is not to exceed 100 lbs. All railway and canal companies are to make rules and have special times and places for loading and unloading powder. Firework factories, if making and keeping less than 500 lbs. of fireworks, need only a license from the local authority; but exceeding that quantity, one from the Home Secretary. To let off a firework in a street or highway subjects the offender to £5 penalty. A government inspector may at any hour of day or night enter and inspect any factory, magazine, or registered premises, and may require the occupier, under a heavy penalty, to make alterations, or take certain precautions. Search-warrants are also readily granted, and in urgent cases are dispensed with.

GUNPOWDER FACTORY, Royal, at Waltham Abbey, an establishment in which much of the gunpowder required for the British army and navy is made. It is built on all the newest and most approved principles to insure safety, economy, and efficiency; but even here accidents occasionally happen in this dangerous manufacture, and roofs and sides, purposely left loose so as to offer but little resistance, are scattered to the winds. Between the different mills mud-banks are raised, and groves of trees thickly planted, to lessen the concussion, and, as far as possible, limit the catastrophe when one house is unfortunately exploded. A series of raised canals, at the same time, is ready to flood the whole place, or to afford a precarious shelter to the men employed, if time be available to make use of it. The charge for this factory for 1874—1875 was £61,790, of which £21,371 were for management and wages, £5221 for buildings, and £35,198 for raw material. There are about 200 workmen. When the gunpowder is made, it is sent down the Lea navigation, to the magazines at Woolwich and Purfleet.

GUNPOWDER PLOT, The, was a fanatical project on the part of a few Roman Catholics to destroy the King, Lords, and Commons on the meeting of parliament on the 5th November 1605. James I. had succeeded Elizabeth two years before, and his government had exercised great severities against the Roman Catholics, not merely denying them religious toleration, but confiscating their property. A few ruined and exasperated men banded together to overthrow the government. The originator of the plot was Robert Catesby, a man of fortune, which he had impaired by youthful extravagance, and who communicated his idea to Thomas Winter, who was horrified at first, but after a time began to approve and further it. For this end he enlisted into the conspiracy Guy Fawkes, a soldier of fortune, of considerable military experience, and the most determined and fearless character. Catesby enlisted other two, by name Wright and Percy—the latter a relation of the Earl of Northumberland. They hired a house and garden contiguous to the parliament house, and commenced their mine, part working when the others slept, and the rubbish being buried during night. One day they were alarmed by a noise after they had with much labour pierced the wall three yards thick. Fawkes learned that this noise proceeded from a cellar under the House of Lords, which would soon be vacant. He hired it, and barrels of gunpowder were placed in it, and stones and billets of wood placed over them, for the double purpose of concealment and to act as destructive missiles when the gunpowder was fired. In the interval, a brother of Wright and a brother of Winter had been added to the conspirators, so they were now seven. But they wanted money; and to supply it, two others were induced to enter this fanatical copartnery, and these were Sir Everard Digby of Gatehurst, in Buckinghamshire, a young gentleman of large estates; and Francis Tresham, a follower of Essex, like Catesby and Percy, but, unlike them, a selfish unenthusiastic man—not a man at all suitable for conspiracy, except that he had two thousand pounds to contribute. Their plan was finally arranged for the reassembling of parliament, which was to take place on the 5th November. Guy Fawkes was to fire the mine (if the gunpowder in the cellar may be so called), and then flee to Flanders by a ship provided with Tresham's money, and waiting ready on the Thames. All the Roman Catholic peers and others whom it was expedient to preserve, were to be prevented from going to the parliament house by some pretended message or other, on the morning of the day. After all was ready, Lord Mounteagle was at supper at his country-house at Hoxton, where he very seldom was. As he sat, a page handed him a letter received from a stranger, advising him 'to devise some excuse to shift off your attendance at this parliament, for God and man hath concurred to punish the wickedness of this time.' That this letter was written by or for Tresham, who was Lord Mounteagle's brother-in-law, there can be little doubt. That he desired to save him was certainly one reason for writing it; that he desired to save the conspirators, or at least to allow them to escape, is very probable; and that they might have escaped, but for the fanatical hopes of Catesby, is all but certain. It is also probable that Lord Mounteagle had been fully informed of the whole matter by Tresham, and that the supper in the country and the letter were mere devices to conceal Tresham's treachery. When the letter was formally communicated to the king, he at once declared its meaning, and the most simple way of accounting for his power of divination is to suppose that, like Lord Mounteagle, he had been told beforehand. On the very evening of the 4th, the Lord Chamberlain and Lord Mounteagle visited the parliament house, and entering the cellar in a casual way, told Guy Fawkes, whom they found there, and who passed as Percy's servant, that his master had laid in plenty of fuel. Only fanaticism gone the length of fatuity could have made him persevere after this. But he did, though escape was still possible; and on the morning of the 5th, a little after midnight, he was arrested coming out of the cellar, dressed as for a journey. Three matches were found on him, a dark-lantern burning in a corner within, and a hogshead and thirty-six barrels of gunpowder. He was examined and tortured. He confessed his own guilt, but would not discover his associates. However, he and the chief of them were either killed on being captured, or died on the scaffold; except Tresham, who at first walked about openly, but at last was apprehended, and died of a natural disease in the Tower. The memory of this plot, invested by much fiction, has survived in England; and it was not more diabolical than hopeless and mad. It was in itself mysterious, and for purposes of state policy and Protestant zeal, a further mystery was thrown over it. No name in English history has been more detested than that of Guy Fawkes (q. v.).

GUNROOM, in British line-of-battle ships, is the common cabin of officers below the rank of lieutenant (with the exception of the assistant-surgeon, who sits in the wardroom). In frigates and smaller vessels, the gunroom is the common cabin of the lieutenants, master, surgeon, assistant-surgeon, paymaster, marine officers, chaplain, and chief engineer; the junior officers being in those cases consigned to the cockpit.

GÜNS (Magyar, *Köszegh*), a small town of Hungary, situated on a river of the same name, about 57 miles south-south-east of Vienna. It is inhabited almost wholly by Germans, who are the descendants of Bavaro-Frankish colonists that settled here in the 9th c., and who speak a dialect differing from any other German dialect. Fruit and wine are largely cultivated. Pop. (1869) 6915. G. made itself for ever famous by its noble defence for 28 days against the Turkish army under Solyman in 1542. This defence not only forced the Turks to retire, but afforded time for the Emperor Charles V. to assemble a force strong enough to oppose them.

GUNSHOT WOUNDS may vary in severity from a simple bruise to the tearing away of a whole limb. Single balls produce a cut, bruised or lacerated wound, according to the amount of their velocity when they strike the body. The effects of small-shot vary with the distance and power of the gun; when close, the charge enters with the pellets so close together as to make one wound like a single ball. Some years ago, it was commonly believed that the 'wind of a large shot' could produce serious injuries; this belief may have arisen from the circumstance that when a heavy ball, which has lost some of its force, strikes the body at a particular angle, the skin does not always give way, but the deeper structures, such as the muscles, or large organs, as the liver, may be completely crushed. If the wind of a shot could kill a man, it is not likely that soldiers should have had ears, noses, and lips shot off, and yet have experienced only the symptoms produced by those slight injuries.

When a bullet passes out of the body, there are two openings—that of 'entrance,' which is generally depressed, round, regular, and smaller than that of 'exit.' The modern conical ball makes a well-defined oblong wound, but it may shift its direction, so as to strike longitudinally, and cause a more extensive injury to the skin. When a bullet strikes the shaft of a bone, it cracks or splinters it, and either remains or passes through the cancellated ends. In its course, the ball may carry before it pieces of cloth, coins, or other foreign bodies, which increase the danger of the wound. Many persons who have been shot during the excitement of battle, describe the sensation as resembling the sharp stroke of a cane; but in most instances the wounded man soon begins to tremble, as if in an ague-fit, complains of cold, his face becomes pale, his pulse scarcely perceptible, and he appears as if about to die. This is the condition termed *shock;* and though death sometimes does ensue during this state of prostration, it is not so serious as it appears, and the patient will probably pass out of it in a few hours with the help of stimulants and rest. Although excessive bleeding is not so common after gunshot as other kinds of wounds, it may occur immediately to a fatal extent, if assistance be not afforded. This assistance any one can give: it consists simply in placing the fingers in the wound, and if the vessel can be reached, pressing them upon it, directed to the proper point by the warm gush of blood. Should the wound be too small to admit the finger, a handkerchief may be tied round the limb above the wound, and twisted tightly with a stick. It is well to examine the wound, to ascertain the extent of the injury done, and whether there are splinters of bone or portions of dress lying in it, which should be removed. But neither the examination nor the removal should be attempted if they seem likely to aggravate the injury. The treatment is similar to that of other wounds, and consists in protecting the part during the healing stages, moderating inflammation by cold-water dressings or soothing poultices, and hastening the last stages of cure by stimulating lotions. During his illness, the general treatment of the wounded man must depend upon so many different circumstances, that it would be out of place to enter upon them here.

GUNTER, Edmund, an English mathematician, was born in Hertfordshire, in the end of 1580 or the beginning of 1581. He was educated at Westminster School, and afterwards at Christchurch College, Oxford. While at Oxford, he gave his attention principally to the study of mathematics, and in 1606 invented the sector, with the lines known as Gunter's Scale. Subsequently, he took orders, became a preacher, and took the degree of B.D. But the bent of his mind being strongly towards mathematical studies, he obtained the professorship of astronomy in Gresham College on the 6th March 1619. He died 10th December 1626. The principal works of G. are the two following: *Canon Triangulorum* (Lond. 1620), a table of logarithmic sines, &c., to seven places of decimals, being the first table published in accordance with Briggs's system; in this work, we find for the first time the words '*cosine*,' '*cotangent*,' &c.; *Of the Sector, Cross-staff, and other Instruments* (1624). We also owe to G. the invention of the surveying-chain (see next article), and the first observation of the variation of the compass.

GUNTER'S CHAIN, GUNTER'S SCALE. *Gunter's chain*, so named after its inventor, is that commonly used by surveyors in measuring land. It is 66 feet long, and its convenience in practice turns on the fact, that ten square chains make one acre. The chain is divided into 100 links, and thus 100,000 square links make an acre.

The name of *Gunter's Scale*, or *Gunter's Lines*, is usually given to three lines to be seen on almost any sector, and marked N, S, T, meaning the lines of logarithmic *numbers*, of logarithmic *sines*, and of logarithmic *tangents*. To understand their construction and use requires a knowledge of logarithms; they are explained in every school-book of practical mathematics. The distances of the divisions marked 1, 2, 3, &c. on the line of log. numbers, represent the logarithms of those numbers—viz., 0, ·301, ·477, &c. —taken from a scale of equal parts. The other lines are constructed on an analogous plan. Calling to mind that multiplication of numbers is effected by the addition of the logarithms, division by their subtraction, involution by their multiplication, and evolution by their division, we are able to perceive with what ease many *rough* problems in areas, heights, cubic contents, and other matters may be performed through the agency of Gunter's Scale.

GUNTU'R, a town in the presidency of Madras, stands about 18 miles to the south of the Kistna or Krishna, and about 30 to the west of the Bay of Bengal, in lat. 16° 20′ N., and long. 80° 30′ E. It contains about 20,000 inhabitants; and though badly built and much overcrowded, it is yet understood to be a healthy place. The district of G. is now merged in the collectorate of Kistna or Krishna.

GUNWALE, a term used on shipboard, rather vaguely, to designate the upper portion of the side of a ship or boat.

GURGAO'N, a district of the Punjab, in the commissionership of Delhi, stretches in N. lat. from 27° 40′ to 28° 30′, and in E. long. from 76° 21′ to 77° 35′, containing 1981 sq. m., and (1868) 690,295 inhabitants. Its chief town, which bears the same name, stands at the height of 817 feet above the sea. Its monthly temperature ranges between 66° F., the average of December, and 104°, the average of May.

GURGES, or **GORGES**, a charge in Heraldry, meant to represent a whirlpool. It takes up the whole field, and when borne proper, is azure and argent.

Gurges.

GURGI'NA BALSAM, a name of the balsamic liquid, also called Wood Oil, obtained from the Gurjun Tree (*Dipterocarpus turbinatus*). See Dipteraceæ and Wood Oil.

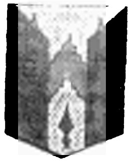
GURHWA'L, a district in the North-west Provinces, lies between the Dehra-Doon and South-west Tibet, extending in N. lat. from 30° 2′ to 31° 20′, and in E. long. from 77° 55′ to 79° 20′. It contains 5500 sq. m., and (1871) 310,282 inhabitants. Being on the southern slope of the Himalaya, G. is little more than a mass of stupendous mountains, whose elevation above the sea sometimes reaches 23,000 feet. It may be regarded as the cradle of both the Jumna and the Ganges, attracting, in spite of the length and ruggedness of the way, crowds of pilgrims to the peculiarly sacred localities of Jumnotri, Devaprayaga, and Gangotri.

GU'RNARD (*Trigla*), a genus of acanthopterous marine fishes of the family *Sclerogenidæ*, containing a considerable number of species, some of which are common on the British coasts. The head in the gurnards is angular, and wholly covered with bony plates; the body is elongated, nearly round, and tapering; there are two dorsal fins; the pectoral fins are large; the teeth are small and numerous. Many of the gurnards are distinguished by beauty of colour. They are supposed to have received the name G. from the sound which they sometimes emit, particularly when newly taken out of the water, and which has obtained for one or two species the local name of *Piper*. A recent observer, M. Dufossé, ascribes the sound to the vibration of muscles connected with the air-bladder, and has assigned to the notes produced by different species of gurnards their particular places in the musical scale. Most of the gurnards live generally near the bottom, and are caught either by the trawl-net or by hook and line, a shining piece of a sand-eel being a very captivating bait. Although not among the finest of fishes, they are good for the table. One of the most common British species is the **Red G.** (*T. cuculus* or *T. pini*); seldom more than 15 or 16 inches long; of a rose-red colour, the body marked on the upper part with fine transverse lateral ridges; another, larger and more valuable, being sometimes two feet long, is the **Sapphirine G.** (*T. Hirundo*), remarkable for the large size of its pectorals and the blue of their inner surface; and perhaps the most common of all is the **Gray G.** (*T. gurnardus*), generally of a gray colour, more or less clouded or spotted with brown, black, and yellowish-white. There are several other British species; those of the Mediterranean are more numerous. Gurnards are found also in the seas of the southern hemisphere.

Gurnard (*Trigla pini*).

GURNEY, Joseph John, a philanthropic Quaker, born at Earlham Hall, near Norwich, August 2, 1788, was educated privately at Oxford, and in 1818 became a minister of the Society of Friends. His life was devoted to the prosecution of benevolent enterprises. He died January 4, 1847. G. wrote a great number of works; among others—*Notes on Prison Discipline* (Lond. 1819); *Observations on the Religious Peculiarities of the Society of Friends* (1824); *A Winter in the West Indies described in Familiar Letters to Henry Clay of Kentucky* (1840).

GUSSET, a piece at first of chain, and afterwards of plate armour, intended as a protection to the vulnerable point where the defences of the arm and breast left a gap.—In Heraldry, the gusset is enumerated as one of the abatements or marks of disgrace for unknightly conduct. It is represented by a straight line extending diagonally from the dexter or sinister chief point one-third across the shield, and then descending perpendicularly to the base. Heralds tell us that a gusset dexter indicated adultery; a gusset sinister, drunkenness; and when both were borne (as in the annexed example), it was because the bearer was faulty in both respects. Cowardice was indicated by an abatement called the gore sinister (see Gore), which, though somewhat similar, we are told carefully to distinguish from the gusset, and which consists of two arched lines drawn, one from the sinister chief, the other from the middle base of the escutcheon, meeting in the fess point. A gore like a gusset represents a detached part of a garment; and according to Guillim, gores and gussets 'are things in use among women, especially semsters, and therefore are fit notes of cowards and womanish dispositions.'



Gusset.

GUSTAVIA, the chief town of the small Swedish island of St Bartholomew, in the West Indies, stands on its south-west coast, has a good harbour, and has a population of about 1000.

GUSTAVUS I., king of Sweden—known in history as Gustavus Vasa, but designated before his accession to power, by himself and others, Gustavus Ericsson—was born at Lindholm, in Sweden, on the 12th of May 1496, and died in 1560. As the descendant of an ancient Swedish family, which had given members to the national diet for nearly two hundred years, and which had been distinguished for hatred of, and opposition to Danish supremacy, G. was involved at an early age in the unfortunate quarrels and domestic wars which distracted Sweden at that period, and the first achievement of the future king was to take an active part in the defence made against Christian II. of Denmark, who, in 1517, in person commanded an assault upon Stockholm, the object of which was to compel the Swedish administrator, Svante Sture, and his senate to acknowledge him as king of Sweden. When famine compelled Christian to relinquish the siege, he had recourse to fraud; and having enticed a deputation from the senate, among whom was G., on board his ship, he set sail, and treacherously carried his captives to Denmark, where G. spent a year in confinement in the custody of his maternal relative, Erich Baner, Lord of Kalloe, in Jutland. While under confinement, G. heard such alarming rumours of the expedition which the king was preparing against Sweden, that, irritated beyond endurance, he broke his parole, and escaped in the disguise of a pilgrim, or, according to others, as a drover, and after encountering numerous dangers, reached Lubeck (September 1519), from which he was with difficulty conveyed to Sweden, where he landed, in May 1520, near Calmar, the only place of note, except Stockholm, that still held out against the Danes. G. with difficulty made his way into the castle of Calmar, which was defended by foreign mercenaries; but as his admonitions to the garrison to shew more zeal in their defence were met by threats of delivering him to the Danes, he left Calmar, and took refuge among his father's peasantry in Smaaland. The Smaalanders had, however, already taken the oaths of allegiance to the envoys who had been sent through the country by Christian II. to ascertain the sentiments of the people, and G. was soon compelled to retreat to Dalecarlia, where he wandered for several months, in poverty and disguise, with a price set on his head, and finally made his way, penniless and almost naked, to the house of his brother-in-law, Joachim Brahe, just as the latter was preparing to obey the summons of Christian II. to attend his coronation. Having failed to dissuade Brahe from attending this ceremony, which took place in November 1520, G. retired to his father's property of Räfsnäs, where he remained till he heard of the massacre known as the Blood-bath, which followed three days after the coronation, and in which, on the plea of their being the enemies of the true church, the greater number of the nobles and leaders of Sweden, including Brahe himself and G.'s father, Eric Johansson, were slaughtered in cold blood. G. next retreated to the less frequented parts of Dalecarlia, where for a time he earned his living as a field-labourer, and more than once owed his life and safety to the generosity of the peasant-women of the district. This period of his life has been so long made the subject of traditionary lore and romance, that it is difficult now to separate the true from the false; but the fame of his supposed adventures still lives in the minds of the people of Sweden, who cherish as sacred every spot associated with his wanderings and dangers. His appeals to the Dalecarlians met with no success, until his account of the tyranny of the Danes was corroborated by the testimony of several fugitives from Stockholm, when a reaction followed, the national enthusiasm was roused, and the men of Dalecarlia, having called together a diet at Mora, proclaimed him head of their own and other communes of Sweden.

This was the turning-point in his life, for the peasantry now flocked around him from every side; and before another year had passed, many of the strongest posts of the enemy had fallen into his hands, and he was able to enter upon the siege of Stockholm, which terminated in 1523, when Christian II. was compelled by his enraged subjects to resign the crown, and retire from Denmark. His forcible abdication brought the Scandinavian union to a sudden close, after it had existed for a period of 126 years; for when Frederick I., the successor of Christian, demanded his recognition in Sweden, conformably to the Union of Calmar, the Swedes declared at the diet of Strengnaes that they would have no other king but Gustavus Ericsson. But although G. was at once recognised as king, he was not crowned till two years later, in consequence of his unwillingness to receive the crown from the hands of the Romish bishops. The king early shewed his determination to favour the Lutheran doctrines, and to cripple the power of the Romish clergy, on whom he laid a large proportion of the heavy imposts raised to meet the expenses of the war; and although his opinions were for a long time not favourably received by the people, he finally succeeded in establishing the Reformation in Sweden.

The disaffection of the peasantry, who threatened to destroy the nobility, and the imprudence of the Lutheran clergy, who tried to force the people to adopt the reformed doctrines, combined to thwart many of G.'s schemes for the improvement of the country, while his latter years were disturbed and imbittered by the jealousy and dissensions of his sons, Eric and John. Yet, notwithstanding these sources of disquietude, G. effected more than any other Swedish monarch has ever done for the welfare of the people. He had found Sweden a wilderness, devoid of all cultivation, and a prey to the turbulence of the people and the rapacity of the nobles; and after forty years' rule, he left it a peaceful and civilised realm, with a full exchequer, and a well-organised army of 15,000 men, and a good fleet, which were both his creations. He promoted trade at home and abroad. Every profession and trade received his attention and fostering care, and schools and colleges owed their revival, after the decay of the older Roman Catholic institutions, to him. He made commercial treaties with foreign nations, and established fairs for foreign traders. In his reign, roads and bridges were made in every part of the country, and canals begun, one of which has only recently been brought to completion. In his relations with his subjects, G. was firm, and sometimes severe, but seldom unjust, except in his dealings towards the Romish clergy, whom he despoiled with something like rapacity of all their lands and funds. He did much, however, to promote the cause of Lutheranism, although he took care that the reformed clergy should be dependent on the crown, and enjoy only very moderate emoluments. To him the various tribes of Lapps were indebted for the diffusion of Christianity among them by Lutheran missionaries; while the Finns owed to him the first works of instruction, Bibles and hymn-books printed in their own language. G. was methodical, just, moral, and abstemious in his mode of life; an able administrator; and, with the exception of a tendency to avarice, possessed few qualities that are unworthy of esteem. He was three times married, and had ten children. The name of Vasa, which has been supposed to be an ancient patronymic in his family, but erroneously, since surnames were not in use among the Swedish nobility until a later date, was adopted by him subsequently to his accession, and is conjectured by the historian Gejer (q. v.) and others to have been probably derived from his arms, which bore originally a black fascine used in storming, and afterwards drawn like a vase, but changed by G. to yellow, from whence it came to be mistaken for a sheaf. By an act of the diet of 1544, at Westeraas, the crown was declared hereditary in the male descendants of G.; in conformity with which, his eldest son Eric (q. v.) succeeded to the throne on his death in 1560.

GUSTAVUS II. (ADOLPHUS) was born at Stockholm, December 9, 1594, and died in 1632 on the field of battle at Lützen. He was the grandson of Gustavus Vasa, by his youngest son, Charles IX., at whose death, in 1611, he succeeded to the throne of Sweden. G. had been strictly brought up in the Lutheran faith, and carefully trained in habits of business, and was one of the most accomplished princes of his age. He was acquainted with eight languages, five of which he spoke and wrote fluently, was well read in the classics and ancient history, a proficient in music, and excelled in all warlike and manly exercises. At his accession to power, he found the country involved in wars abroad, and disorders at home, arising from the disputed succession of his father, who had been elected king on the exclusion of his nephew, Sigismund, king of Poland, the direct heir, whose profession of the Roman Catholic religion made him obnoxious to the Swedish people, and virtually annulled his claims to the crown. The first act of G. was to secure the hearty co-operation of the nobles, whose privileges he confirmed, and made dependent upon the performance of military service to the crown, and thus laid the foundation of an essentially feudal or military form of government, in which the nobles held their lands directly, and the peasantry indirectly, under the crown. In addition to these two bodies, which had formerly constituted the national diet, G. for the first time admitted special delegates of the army into the assembly as assessors to the nobles. Having thus organised the internal government, and succeeded in levying heavy imposts and raising some companies of efficient troops, he inaugurated his military career by a war with Denmark, which at that time occupied the Baltic districts of the Swedish territories, and thus completely cut off the Swedes from direct communication with the continent of Eastern Europe. The war continued for a year, and terminated in a peace between the two countries, by which G. renounced his claims on the Lappish districts and other disputed territory, and recovered possession, under certain conditions, of Calmar, Oeland, Elfsborg, and the province of Gottenborg.

Having thus gained an outlet on the Baltic, secured a peaceful ally in the king of Denmark, and concluded an alliance with the Netherlands, G. turned his attention to the Russian war, which, after fluctuating success, was concluded in 1617, by the treaty of Stolbova, by which Sweden obtained supreme dominion over Ingermanland and Karelia, and part of Lifland, while Russia recovered Novogorod and all other conquests made by the Swedes. The boundary of the Swedish territory, which then included the site of the future St Petersburg, was marked, after the peace, by a stone which bore the three crowns of Sweden above a Latin inscription, recording that it marked the limits of the dominions of G. A., king of Sweden. The disputes with Poland still, however, remained undecided;

and in 1621, war was openly declared between the two countries, and was continued, with occasional intermissions, till 1629, when it terminated in a six years' truce, which was settled by a treaty that secured reciprocity of trade and freedom of religion to the natives of both countries, and left G. master of Elbing, Braunsberg, Pillau, and Memel.

This peace enabled the king to mature the plans he had long cherished in regard to Germany; and having made various administrative reforms, and availed himself of the short interval of peace to promote the material prosperity of the country, he remitted the charge of the government and the care of his infant daughter Christina to his chancellor Oxenstiern, and set sail, in the summer of 1630, with an army of about 15,000 men, to aid the Protestants of Germany in their hard struggle against the Catholic League, which was backed by the power of the empire.

Everything favoured the success of the Swedes, who drove the imperialists from Pomerania, and took Stettin. The childless Duke of Pomerania engaged, in return for Swedish aid, that the dukedom should, after his death, be given up to Sweden until the expenses of the war were fully repaid; whilst France, through hatred of the empire, agreed to furnish G. with a subsidy of 400,000 rix-dollars as long as he maintained an army of 36,000 men. Wallenstein had also retired from the service of the emperor. But while the Swedes were besieging Spandau and Küstrin, the city of Magdeburg, which had applied to G. for assistance, was taken in 1631 by the imperial general, Tilly, whose troops perpetrated the most terrible atrocities against the unfortunate inhabitants. Although G. could not save Magdeburg, he soon after its fall inflicted a defeat on the imperialists at Breitenfeld, which excited the respect and fear of the Catholics, who thenceforward ceased to despise the 'snow-king and his body-guard,' as they designated G. and his small army. The king now advanced into Franconia, and after allowing his army to recruit their strength in the rich bishoprics of Würzburg and Bamberg, took the Palatinate and Mainz, where he held a splendid court, surrounded by numerous princes and ambassadors. In the spring of 1632, the Swedes, in the face of Tilly's army, crossed the Danube, and gained a decisive victory at Ingolstadt, where Tilly was mortally wounded. From thence the march to Munich was one continued triumph, and wherever G. appeared he was received by the populace as their guardian angel. The road to Vienna was now open to him, and the fate of the emperor would have been sealed, had the latter not recalled his general, Wallenstein, who, having accepted office on his own terms, gathered together a large army, with which he advanced on Nürnberg; but after standing a desperate assault of the Swedes, he was obliged to retire into Thuringia. The unfavourable season and the bad roads hindered G. from attacking the imperialists at the time he intended, but on November 6, 1632, the two armies came finally face to face at Lützen. As usual, the Swedes began by singing Luther's hymn, *Eine feste Burg ist unser Gott*, and a hymn composed by the king. G. now made an address to the army, and swinging his sword above his head, he gave the word of command, and with the cry of 'Onwards!' he rushed forward, followed by the eager troops, who were commanded conjointly by himself and Bernhard of Saxe-Weimar. Victory was already on the side of the Swedes, when a strong reinforcement of imperialists appeared under the command of Pappenheim. G. seeing that his troops wavered under this fresh attack, rode hastily forward, when, having come too near a squadron of Croats, he received a shot in his arm, and, as he was turning aside, another in the back, which caused him to fall from his horse. The sight of the riderless animal spread dismay and fury among the Swedes; but before they could advance to his rescue, a party of Croats had thrown themselves between the king and his army; and it was not till after many hours' hard fighting, and when the field was strewn with 10,000 dead and wounded, that they recovered the body of the king, which had been plundered, stripped, and covered with wounds. The artillery of the enemy fell into the hands of the Swedes, who remained masters of the field, after having fought with an impetuosity that nothing could resist. A rumour long prevailed that the shot in the back which caused the king to fall was from the hand of Albert Duke of Saxe-Lauenburg, but it appears that there was no just ground for the suspicion.

Although G. was eminently a warlike king, he made many salutary changes in the internal administration of his country, and devoted his short intervals of peace to the promotion of commerce and manufactures. He was pre-eminently religious, and his success in battle is perhaps to be ascribed not only to a better mode of warfare, and the stricter discipline which he enforced, but also still more to the moral influence which his deep-seated piety and his personal character inspired among his soldiers. The spot where he fell on the field of Lützen was long marked by the *Schwedenstein*, or Swede's Stone, erected by his servant, Jacob Erichsson, on the night after the battle. Its place has now been taken by a noble monument erected to his memory by the German people on the occasion of the second centenary of the battle held in 1832.

GUSTAVUS III., king of Sweden, was born at Stockholm in 1746, and succeeded his father, Adolphus Frederick, in 1771, at a period when the country was distracted by the intrigues of the rival political parties of Horn and Gyllenborg, known as the 'Hats' and 'Caps.' Finding that the people, who were thoroughly wearied with the misrule of the nobles, were ready for any change, G. covertly fomented the general discontent, and having raised a fictitious rebellion, through the agency of his friend and adherent, Captain Hellichius, he collected together a large body of troops, on pretence of restoring order, and having arrested the council in a body, convoked the diet, and laid before it a newly framed constitution, to which the assembly was compelled to subscribe. A revolution was thus effected without the shedding of blood, and by a stroke of the pen G. recovered all the regal powers that had been gradually lost by his immediate predecessors. G. acted with great moderation after this successful *coup d'état;* and he might have long retained the advantages he had gained, if his love of display, and his wish to emulate the king of France in extravagance and magnificence, had not led him into profuse expenditure, which embarrassed the finances; at the same time, the introduction of the manners and usages of Versailles at his own court irritated the national party, while it undoubtedly tended to demoralise the upper classes, and through them the nation generally. In 1788 he engaged in war with Russia, at the moment that the empire was engaged in active hostilities against the Turks, but derived no advantages from the contest. On the breaking out of the French Revolution, he combined with the other monarchs against France, and applied to the diet for funds to assist the Bourbons. His repeated applications having been decisively rejected, the nobles, amongst whom he had many enemies, took advantage of his general unpopularity, and entered into a conspiracy against him, the leaders of which were Ribbing, Horn, and Pechlin. On the 16th March 1792, G. was mortally wounded by their agent, a Captain Ankarström (q. v.), at a masked ball in the opera-house which he had himself built. The pistol had been loaded with broken shot, which rendered the wound especially painful, and the king suffered the most dreadful agony for thirteen days before his death.

G. was a man of varied learning, and the author of several dramatic works and poems of considerable merit. His writings have been published in a collective form both in Swedish and French. In 1788, G. deposited certain papers in the library of Upsala, which excited much interest from the fact that they were not to be opened for fifty years after his death. Their publication, which was confided in 1842 to Gejer, disappointed the general expectation, as they were found to consist of historical notes and letters of little value.

GUSTAVUS IV., the son and successor of Gustavus III., was born November 1, 1778, proclaimed king March 29, 1792, and died in 1837. His uncle, Duke of Sudermania, acted as regent during his minority. The young king, on his accession to power, at once gave evidence of the high estimate at which he held the kingly power, and his first act was to join the third coalition against France, contrary to the wishes of his people. Hatred of Napoleon soon, however, became the guiding influence of his life. The result of his decided line of policy led to the occupation of Swedish Pomerania by French troops under Marshal Brune, who took Stralsund and Riga from the Swedes in 1807, and thus deprived them of the last of their German possessions. The king opened all his ports to English vessels, and thereby involved himself in a war with Russia. The scene of these hostilities was Finland, which the Swedes were obliged to give up to Russia at the close of 1808. Norway became next the scene of war, the Swedes being assisted by an English subsidy of 10,000 men, who, however, speedily returned to England when they found that G. intended to send them to Finland. The unfortunate war with Russia, which had been excited entirely through the folly of the king, gave rise to so much discontent in Sweden, that a conspiracy was set on foot by several officers and nobles, the object of which was to dethrone the unpopular monarch. The conspirators took forcible possession of the palace at Stockholm, and placed him under arrest; and after an ineffectual attempt at escape, he consented to abdicate the throne, 29th March 1809. After wandering for a time from place to place, he finally settled at St Gall, where he died, forgotten and in poverty, in 1837. His uncle, the Duke of Sudermania, after acting as regent of the kingdom, was finally proclaimed king, under the title of Charles XIII., at the diet which met in May 1809. By the consent of the diet, Charles XIV. (Bernadotte) paid over the value of the private estates of the family of Vasa for the benefit of Gustavus and his children; but as the dethroned king refused to receive any of this money directly, or to accept the pension which the Swedish government had settled upon him, he was often in pecuniary difficulties, from which he was clandestinely relieved by his divorced queen and children, who contrived, without his knowledge, to supply his wants.

GÜ'STROW, a town of Mecklenburg-Schwerin, and long the residence of the princes, is situated on the left bank of the Nebel, 27 miles south of Rostock. Among the principal buildings are the gymnasium, the old castle (now the workhouse), the fine Gothic cathedral, and the town-house. The former ramparts have been converted into pleasant gardens. G. carries on distillation and beer-brewing, and has several water-mills. Pop. (1871) 10,575.

GUT MANUFACTURE, an unpleasant though rather important branch of manufacture, the operations of which consist in preparing the membranes of animal intestines for various useful purposes. The French call it *boyawderie*, from *boyau*, intestine, and have placed it under stringent legal regulations, on account of its offensive and pestiferous character, especially when conducted in a populous quarter of a town, as at the Rue de la Boyawderie, in Paris. One branch of gut manufacture has been described under GOLDBEATERS' SKIN. *Cat-gut*, as it is called, is made from the intestines of sheep, which are first cleansed and freed from loose fat, then prepared by soaking and partial putrefaction, to loosen the different membranes of which the intestine is composed. These are then separated by scraping, then further soaked in clean water and scraped separately. After this, they are treated with a solution of potash, and drawn by women through a sort of thimble, and sorted for twisting into threads. They are then exposed to fumes of sulphurous acid, given off from burning sulphur, which deodorises them, and prevents subsequent putrefaction. The small intestines are used for cat-gut, the large intestines are simply scraped and salted, for the use of sausage-makers and by confectioners, and for tying over preserve and pickle jars, &c. The coarser kinds of cat-gut strings are used for pulley and lathe bands, strings for archery-bows, drill-bows, hatters-bows, and other purposes where a strong cord subject to friction is required; the finer kinds are twisted into whip-cord, and are used for fishing-tackle and the strings of musical instruments. For the latter purpose a very superior quality is required. The best, called *Roman strings*, are made chiefly at Milan. Our manufacturers have never been able to equal these, and this is attributed by some to the fact, that the Italian sheep are much leaner than ours, and the membranes of lean animals are tougher than those which are highly fattened and rapidly fed up to marketable size.

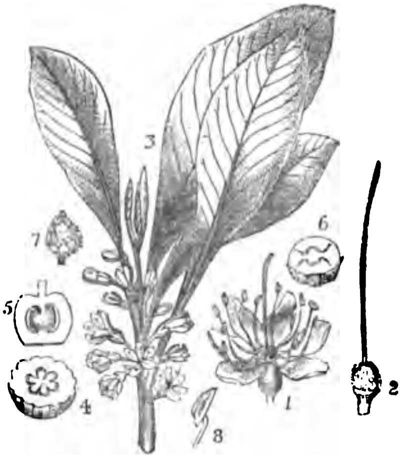
GUTENBERG, JOHANNES, or HENNE, whose proper name was GENSFLEISCH, or GÄNSFLEISCH, and who is regarded by the Germans as the inventor of the art of employing movable types in printing, was born near the close of the 14th c. at Mainz. He was sprung from a patrician family, which took the names of Gutenberg and Gensfleisch, from two estates in its possession. Of G.'s early life no particulars are known, but it seems probable that he devoted himself at an early age to mechanical arts. In the year 1434, he was living in Strasburg, and there, in 1436, made a contract with Andrew Dryzehn, or Dritzehn, and others, by which he bound himself to instruct them in all his 'secret and wonderful arts,' and to employ these for their common advantage. This undertaking, which comprehended the first steps in the art of printing, was frustrated by the death of Dryzehn, more particularly as George Dryzehn, a brother of the deceased, commenced a lawsuit with G., which was decided against the latter. When and where the first attempts in the art of printing were made, cannot with certainty be ascertained, as the works printed by G. bear neither name nor date; this much is, however, certain—namely, that movable wooden types were first employed by him about the year 1438. In 1443, he returned from Strasburg to Mainz, where, in 1449 or 1450, he entered into partnership with Johannes Faust, or Fust, a wealthy goldsmith. Faust furnished the money required to set up a printing-press, in which the Latin Bible was printed for the first time. This partnership was, however, dissolved after the lapse of a few years. Faust had made large advances, which G. was now to refund, but as he possessed neither the power nor the inclination, the matter was brought before a court of justice. The result was that Faust retained the printing concern, which he carried on and brought to perfection, in conjunction with Peter Schöffer of Gernsheim. By the assistance of Conrad Hummer, a councillor of Mainz, G. was again enabled to set up a press, from which, in all probability, proceeded *Hermanni de Saldis Speculum Sacerdotum*, printed in quarto without date or name. According to some, four editions of the *Donatus* were likewise printed by G., while others ascribe them to Faust and Schöffer. In 1457, appeared the Latin *Psalterium*, or rather a breviary containing psalms, with antiphones, collects, &c., and arranged for choruses for Sundays and holidays. This specimen of the art of printing, remarkable as being the first bearing the name of the printer and the locality, as well as the year and day of its completion, and valued by Dibdin at £10,000, was printed with an elegance which sufficiently proves the rapid progress that had been made in the newly invented art, and the diligence with which it had been prosecuted. G.'s printing establishment existed till 1465 in Mainz. He died, as is generally believed, 24th February 1468, in which year the archbishop, Elector of Mainz, appointed him one of his courtiers, and raised him to the rank of a noble, though others place his death at the close of the previous year. The evidence in favour of G.'s being the inventor of printing, is considered by his countrymen quite conclusive. They adduce the testimony of Ulrich Zell of Hanau, who first introduced the art into Cologne (1462), and who declares that 'this noble art was invented for the first time in Germany, at Mainz, upon the Rhine . . . . by a citizen of Mainz, named John Gutenberg.' Similarly speaks Wimpfeling, a learned Alsacian (born at Strasburg, 1451, and partly contemporaneous with Gutenberg). 'In the year 1440, under the reign of Frederick III., an almost divine benefit was conferred on mankind by John Gutenberg, who first discovered the art of printing.' So, too, Trithemus (born 1462, died 1516). 'At this epoch, this memorable art (viz., of printing) was devised and invented by Gutenberg, a citizen of Mainz;' while Johann Schöffer, son of Peter Schöffer (the partner of Faust), in his preface to a German translation of Livy (Mainz, 1505), expressly affirms that 'at Mainz originally the admirable art of printing was invented particularly by the ingenious Johann Gutenberg, 1450 A.D.,' and that it was 'subsequently improved and propagated to posterity by the wealth and labours of Johann Fust and Peter Schöffer.' That G. may have received the first hints of his invention from the Dutch xylography, is not denied. See COSTER. Ulrich Zell himself admits this; but the invention of typography, and beyond all doubt of the printing-press, must be ascribed to the German.—Compare Oberlin's *Essai d'Annales de la Vie de Gutenberg* (Strasburg, 1801); Née de la Rochelle's *Eloge Historique de J. Gutenberg* (Par. 1811); Gama's *Essai Historique de Gutenberg* (Par. 1857); and Lamartine's *Gutenberg, l'Inventeur de l'Imprimerie* (Par. 1853).

GUTHRIE, THOMAS, D.D., an eminent pulpit orator, philanthropist, and social reformer, was born in 1803 at Brechin, Forfarshire, where his father was a merchant and banker. He went through the curriculum of study prescribed by the Church of Scotland to candidates for the ministry at the university of Edinburgh, and devoted two additional winters to the study of chemistry, natural history, and anatomy. Meanwhile, he was licensed as a preacher by the presbytery of Brechin in 1825. He subsequently spent six months in Paris, studying comparative anatomy, chemistry, and natural philosophy. Returning to Scotland, he for two years conducted, on behalf of his family, the affairs of a bank agency in Brechin. In 1830, he became minister of Arbirlot, in his native county; and in 1837 was appointed one of the ministers of Old Greyfriars parish in Edinburgh. Here his eloquence, combined with devoted labours to reclaim the degraded population of one of the worst districts of the city, soon won for him a high place in public estimation. In 1843, G. joined the Free Church, and for a long series of years continued to minister to a large and influential congregation in Edinburgh. In 1845—1846, he performed a great service to the Free Church, in his advocacy throughout the country of its scheme for providing manses or residences for its ministers. G.'s zeal, however, was not diverted into mere denominational or sectarian channels. He came forward, in 1847, as the advocate of Ragged Schools (q. v.); and to him the rapid extension of the system over the kingdom is very much to be ascribed. He also earnestly exerted himself, in many ways, in opposition to intemperance and other prevailing vices. G. possessed great rhetorical talent; and his style was remarkable for the abundance and variety of the illustrations he used. Few public speakers have ever blended solemnity and deep pathos so intimately with the humorous, his tendency to which has more frequently than anything else been pointed out as his fault. G. always displayed a generous sympathy with all that tends to progress or improvement of any kind. He was moderator of the General Assembly of the Free Church of Scotland in May 1862. G.'s most important published works are—*The Gospel in Ezekiel, a series of Discourses* (A. and C. Black, Edin. 1855); *The Way to Life*, a volume of sermons (Edin. 1862); *A Plea for Drunkards and against Drunkenness*, a pamphlet (Edin. 1856); *A Plea for Ragged Schools*, a pamphlet (Edin. 1847), followed by a second and a third plea, the latter under the title of *Seed-time and Harvest of Ragged Schools* (Edin. 1862); *The City: its Sins and Sorrows* (Edin. 1857). Perhaps his *Pleas* furnish the best published specimens of Dr G.'s eloquence. For some years before his death he acted as editor of the *Sunday Magazine*, founded in 1864, in which year he retired from his regular ministrations. He died on the 24th of February 1873.

GUTHRIE, WILLIAM, a political, historical, and miscellaneous writer, was born at Brechin, in Forfarshire, in 1708, and educated at King's College, Aberdeen. At an early period, he removed to London, where he worked hard for forty years as a man of letters. He died March 1770. Among his various works are a *History of England* (3 vols. Lond. 1744—1750); and *A Historical and Geographical Grammar* (1st edition, 1770; 24th edition, 1827); a useful manual of information, which enjoyed immense popularity in its time.

GUTS MUTHS, JOH. CHRISTOPH. FRIEDR., a German instructor of youth, was born at Quedlinburg, in Prussian Saxony, 9th August 1759, studied at Halle, and subsequently became attached to Salzmann's institution at Schnepfenthal. There he gave himself specially to the elaboration, theoretical and practical, of Gymnastics (q. v.) as a branch of education; and from him it has passed into the curriculum of other German institutions. In 1793, G. published his *Gymnastik für die Jugend*, which has become a classic work on the subject, and the basis of all subsequent treatises. Besides several other works on his favourite subject, G. M. holds a distinguished place as a writer on geography. He died in 1839. His centennial anniversary was celebrated August 9, 1859, at Schnepfenthal.

GUTTA PE'RCHA (pronounced *pertsha*), a substance in many respects similar to caoutchouc, is the dried milky juice of a tree, *Isonandra Gutta*, which is found in the peninsula of Malacca and the Malayan Archipelago. The tree belongs to the natural order *Sapotaceæ*. It is a very large tree, the trunk being sometimes three feet in diameter, although it is of little use as a timber tree, the wood being spongy. The leaves are alternate, on long stalks, obovate-oblong, entire, somewhat leathery, green above, and of a golden colour beneath. The flowers are in little tufts in the axils of the leaves, small, each on a distinct stalk; the corolla having a short tube and six elliptical segments; they have twelve stamens and one pistil. The name Gutta Percha is Malayan, *gutta* signifying the concrete juice of a plant, and *percha* being the name of the particular tree from which it is obtained. The present mode of obtaining the gutta percha is a most destructive one. The finest trees are selected and cut down, and the bark stripped off; between the wood and bark, a milky juice is found, which is scraped up into little troughs made of plantain leaves. This is the gutta percha, which, as it hardens, is kneaded into cakes, and exported.



Gutta Percha:
1, a flower; 2, a pistil; 3, a branch with leaves and flowers; 4, transverse section of ovary; 5, vertical section of ovary; 6, transverse section of fruit; 7, fruit, scarcely mature; 8, anther.

Gutta percha was known in Europe long before its peculiar character and uses were made known. It was from time to time brought home by voyagers, in the form of drinking-bowls, which excited much curiosity on account of the material of which they were made. Some thought it a species of india-rubber, others asserted it to be a kind of wood, which they named *mazer-wood*, from its use in making these drinking-cups. But we are chiefly indebted to Dr William Montgomerie of the *Indian Medical Service*, whose introduction of it in 1843 was rewarded by the gold medal of the Society of Arts. He first noticed that the Malays used it for making handles to their knives, &c.; and it immediately occurred to him that it might be of great use in a variety of ways, especially in making handles for surgical instruments. Since that time, the importation of gutta percha has increased amazingly; in 1860, it exceeded 16,000 cwts. The years 1864, 1865, 1870, and 1871 were marked by large imports, varying from 25,966 cwts. to 35,636 cwts.; in the intermediate years, the imports varied from 15,134 cwts. to 23,535 cwts. It has been used for making a vast variety of ornamental and useful articles; but its most important application has been the coating of marine electric telegraph wires. In this application, as in most others, its inherent defect, arising from the readiness with which it becomes oxidised and decomposed, is unfortunately manifesting itself seriously, and a substitute having greater stability is anxiously looked for.

Its great value arises from the ease with which it can be worked, and its being so complete a non-conductor of electricity. It softens in warm water, and can be moulded into any form in that state; as when soft it is not sticky, and turns well out of moulds. It will always be of great value as a material in which to take casts, as it can in the soft state be made to take the sharpest forms most faithfully, and as it quickly becomes hard, and preserves its shape if not too thin, the range of its utility in this respect is very extensive. Golf balls are made of gutta percha.

It is imported in blocks and lumps of five to ten pounds weight, in various forms, chiefly like large cakes, or rounded into gourd-like lumps. It has a very light reddish-brown, or almost a flesh colour, is full of irregular pores elongated in the direction in which the mass has been kneaded. It has a cork-like appearance when cut, and a peculiar cheese-like odour. Before it can be used, it has to undergo some preparation. This consists in slicing the lumps into thin shavings, which are placed in a *devilling* or tearing machine revolving in a trough of hot water. This reduces the shavings to exceedingly small pieces, which, by the agitation of the tearing-teeth, are washed free from many impurities, especially fragments of the bark of the tree, which, if not separated, would interfere with the compactness of its texture, which is one of its most important qualities. The small fragments, when sufficiently cleansed, are kneaded into masses which are rolled several times between heated cylinders, which press out any air or water, and render the mass uniform in texture. It is then rolled between heated steel rollers into sheets of various thickness for use, or is formed into rods, pipes for water, or speaking-tubes, and an endless number of other articles.

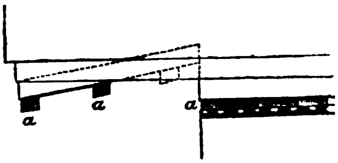
Gutta percha differs very materially from caoutchouc or india-rubber in being non-elastic, or elastic only in a very small degree. Notwithstanding this very striking character of caoutchouc, the two articles are very often confounded in the public mind, probably from the similarity of their applications. It is most probable that india-rubber will eventually displace gutta percha in some of its most important applications, and especially in the coating of telegraph wires, to which purpose it has been successfully applied in America. There are two or three kinds of gutta percha known in commerce, and it is more than probable these are yielded by different species: that from Singapore is esteemed the best, and is distinguished by the Malay traders as *Gutta Taban* or *Tuban*; that of Borneo is of less value —this is called *Gutta Percha* by the traders, and has given the general name to all; and another kind goes by the name of *Gutta Girek*. The first two are those generally known in our markets.

Gutta percha is turned by surgeons to various uses, chiefly for splints and covering moist applications to retard evaporation. A splint of gutta percha is made by taking a rigid board of the substance cut to the desired shape, soaking it in hot water, and then bandaging it to the limb. In a few minutes the gutta percha is found hard, and modelled to the shape of the parts. The cloth of gutta percha is sometimes used instead of oiled silk, as it is about half the price; it is, however, apt to tear, does not stand much heat, and is less flexible. Gutta percha being readily soluble in chloroform, such a solution is sometimes used for covering raw surfaces, as when the chloroform evaporates it leaves a pellicle of solid gutta percha. It has also been used for stopping hollow teeth.

GUTTA RO'SEA, a kind of cutaneous eruption on the face, popularly called 'brandy blossoms,' from its frequent occurrence in dissipated persons advanced in life. It is an affection very difficult of cure, and to be treated chiefly by a careful regimen.

GUTTA SERE'NA, an old name for Amaurosis (q. v.).

GUTTÆ, pendent ornaments attached to the underside of the Mutules (q. v.), and under the triglyphs of the Doric order (see fig. under Column). They are generally in the form of the frustum of a cone, but are sometimes cylindrical. It is not clear what their origin may have been, whether, as the name indicates, they represent drops of water or icicles. Alberti calls them nails; and it does seem likely that as many other parts of Greek architecture have been shewn to be derived from structural conditions (see Entablature), so these also should owe their origin to a similar cause. They have most probably been derived from the wooden pins or plugs, which were no doubt much more commonly used than iron nails, and of which it is still common to leave the ends projecting in any large wooden structure, such as the centering of a bridge. Whatever their origin, they were modified by the Greeks into a graceful ornament.



a, a, a, Guttæ:
From Cornice of Parthenon.

GUT'TÉ, or **GUTTY**, from the Latin *gutta*, a drop, is said in heraldry of a field, or any particular charge on the field, covered with drops. When the drops are red, they are supposed to represent drops of blood, and the bearing is said to be *gutté de sang*. In this case, some great suffering or labour, such as fighting for the recovery of the Holy Land, is indicated. Where they are blue, again, they represent tears, and the bearing is said to be *gutté de larmes*. When white, they are called drops of water, and the bearing is described as *gutté de l'eau;* but Nisbet is of opinion that tears are intended in this case also, and that repentance or penitence is signified by both.

GUTTER, an open channel for conveying water from buildings, roads, &c. Gutters are necessary for the preservation of such structures, and have thus been in use in all ages. The Greeks, who constructed their roofs with a simple span, used gutters at the eaves of their buildings, hollowed out of the stone which formed the cornice. These gutters discharged their contents on the ground at intervals through small Gargoyles (q. v.), usually in the shape of lions' heads. The Romans followed this example, and also formed gutters with tiles laid in cement.

In the middle ages, the eaves seem to have been left without gutters, until, owing to the castles being frequently built on dry rocky sites, it was found desirable to collect the rain-water and preserve it in cisterns. Stone or wooden eaves, gutters, and pipes were used for this purpose. In ecclesiastical architecture, when the construction became complicated, it was necessary to convey the water from the roofs with great care, so as to prevent damage to the building. It was collected at the eaves of the central roof, and by means of well-projected gargoyles, thrown along channels formed in the crest of the buttresses, and so carried beyond the walls of the building, and thrown off through gargoyles in a number of small streams, which dispersed the water before it reached the ground. This acted well in calm weather, but during storms the water was blown back all over the building, which, in case of its being of a porous stone, softened and became liable to decay. This led to the use of lead pipes, which carried the water directly to the ground, and discharged it into open gutters. At first, the pipes were used for conveying the water from the main roof to the roof of the side-chapels, whence it was discharged by gargoyles. Pipes conveying the water to the base of the building were first employed in England, where they seem to have come into use during the 14th century. They were formed with great taste, and had ornamental cups or cisterns at top to receive the water from the mouth of the gargoyle. They were then, with considerable foresight, made *square* in form, not circular, as they usually now are. The advantage of the former section is, that in case of the water in the pipe being frozen, there is room for the expanding ice to swell out by slightly changing the form of the square.

Pipes for conducting rain-water have the great advantage of saving foot-passengers the annoyance they meet with from the discharge of the water from gargoyles; but the latter have the advantage of being more easily inspected and kept in good order. Whenever a gargoyle is choked, it shews the accident by its awkward spouting; but a lead pipe frequently bursts, and does much damage before the leak is discovered. See Sewage.

GUTTI'FERÆ, or **CLUSIA'CEÆ**, a natural order of exogenous plants, consisting of trees and shrubs, natives of tropical countries, very generally secreting an acrid yellow resinous juice. A few are epiphytes. The leaves are opposite, destitute of stipules, leathery, and entire. In botanical characters, this order is allied to *Hypericinæ*. It contains about 150 known species, the greater part of them South American, although all tropical countries produce some. The resinous secretions of some are valuable, particularly of those trees which yield Gamboge (q. v.) and Tacamahaca (q. v.). See also Clusia.—A few species afford valuable timber. See Calophyllum.—The flowers of some are very fragrant; those of *Mesua ferrea* are found in a dried state in every bazaar in India, and are used as a perfume.—The fruit of some is very highly esteemed; the Mangosteen (q. v.) has been described as the finest fruit in the world. The Mammee Apple (q. v.) is another of the most celebrated fruits of this order.

GUTZLAFF, Karl, a missionary, was born at Pyritz, in Pomerania, 8th July 1803. At an early age he was apprenticed to a belt-maker in Stettin. Here he composed a poem, in which he expressed his earnest wish to become a missionary to the heathen, and in 1821, presented it to the king of Prussia. The king caused him to be placed in the missionary institution at Berlin. At the expiration of two years, he was removed to the Dutch missionary society at Rotterdam, and in August 1826 was sent to Sumatra. Being detained at Java, he fixed his residence at Batavia, where he devoted himself to the study of Chinese. At the end of two years, having acquired a considerable knowledge of the language, and familiarised himself with the habits of the Chinese residents in Batavia, he determined to give up his connection with the Dutch society, and devote himself to the conversion of the Chinese. He joined Tomlin, the English missionary, and, in the summer of 1828, accompanied him to Siam. They settled at Bankok, the capital, partly for the purpose of preaching the gospel, partly to render themselves thoroughly acquainted with the Siamese language, and to perfect themselves in Chinese. For the sake of his health, he now, by the advice of a Chinese friend, undertook a voyage to China; and from this time, Macao became his principal station, and here he formed an intimate friendship with Robert Morrison. In conjunction with Medhurst and two other friends, G. began a new translation of the Bible into Chinese. With the assistance of Morrison, he founded a society for the diffusion of useful knowledge in China, published a Chinese monthly magazine, and preached at Macao and elsewhere. Compare his *Journal of Three Voyages along the Coast of China in* 1831, 1832, *and* 1833, *with Notice of Siam, Corea, and the Loo-choo Islands.* After the death of the elder Morrison, G. was appointed chief interpreter to the British supervisional government in China, with a salary of £800. In this capacity, he attempted, in May 1835, to penetrate into the interior of the province of Fo-kien, but without success. At the same time, the printing of Christian books in the Chinese language, and even the distribution of Christian writings among the inhabitants of Canton, were prohibited. Thus restricted in his missionary career, G. joined the British during the war with the Chinese, and his thorough acquaintance with the Chinese rendered his services of great value. He likewise contributed to bring about the peace in 1842. Finally, in 1844, he founded a Chinese society, for the purpose of diffusing the gospel, by means of native Christians, in the interior of the country. To promote the objects of the mission, he, in 1849, returned to Europe, and visited England, Germany, and other countries. He returned to China, landing at Hongkong in January 1851, but died there, 9th August of the same year. G. published various works, in different languages, some of which are extremely valuable; the principal are *Geschichte des Chines. Reichs* (Stuttg. 1847), and *The Life of Taokuang* (Lond. 1851).

GUY, Thomas, founder of Guy's Hospital, Southwark, London, was born at Horseleydown in 1644. He began business as a bookseller with a stock of about £200, dealing extensively in the importation of English Bibles from Holland (those printed at home being executed very badly); and, on this being stopped, contracted with the university of Oxford for the privilege of printing Bibles, which he continued to do for many years. His principal gains, however, arose from the not very creditable practice of purchasing, during Queen Anne's wars, the prize-tickets of seamen at a large discount, and subsequently investing them in South Sea Company's stock, by which means he amassed a fortune of nearly half a million sterling. In 1707, he built and furnished three wards of St Thomas's Hospital. In building and endowing the hospital in Southwark which bears his name, he set apart £238,295, 16*s*. He was also a liberal benefactor to the Stationers' Company, and built and endowed almshouses and a library at Tamworth. Besides making bequests to Christ's Hospital, and various other charities, he left £80,000 to be divided among those who could prove any degree of relationship to him. He was of mean appearance, with a melancholy expression of countenance, and during his whole lifetime had no other reputation than that of an intensely selfish and avaricious man. He died December 27, 1724, aged 80.

GUY'S HOSPITAL, founded by the preceding Thomas Guy leased from the governors of St Thomas's Hospital, a large piece of ground, for a term of 999 years, at a ground-rent of £30 a year. The space being cleared, the first stone of the building was laid in 1722, and the hospital admitted its first patient in 1725, a few days after the death of its founder. The whole expense was £18,796, 16*s*., great part of which Guy expended in his lifetime, and he bequeathed £219,499 to endow it. Soon after his death, an act of parliament was obtained, regulating the management of the institution. The number of patients at first amounted to 402; the present yearly average is 3000; out-patients relieved, upwards of 50,000. In 1829, Mr Hunt bequeathed to the hospital £196,115, for accommodation for 100 additional inmates. Annual income, between £25,000 and £30,000, chiefly from estates in the counties of Essex, Hereford, and Lincoln. The usual number of governors is 60, who are self-elective. Students enter the hospital for study, attending chemical practice, lectures, &c., and paying annual fees. The building consists of two quadrangles, united by a cross structure or arcade, besides two wings extending from the front to the street—west wing built with elegance and uniformity, and whole edifice handsome and regular. New wards, with tall towers for ventilation, were built in 1852, from the designs of Mr Hawkins. In the chapel is a fine marble statue of Guy, by Bacon, which cost £1000. Sir Astley Cooper, the eminent surgeon, is buried in the chapel. The South-Eastern and Brighton Railways, which swept away St Thomas's Hospital, now abut closely upon Guy's.

GUYON, Richard Debaufre, a general in the Hungarian army during 1848—1849, was born at Walcott, near Bath, in England in 1813. After having fought against Dom Miguel in Portugal, G. entered the Austrian service in 1832; and on being attached as aide-de-camp to Baron Splényi, married the daughter of that general in 1838. From that time till the outbreak of the revolution, G. led the life of a country gentleman on his estates near Comorn, but was one among the first to offer his services to the national government, and acted a prominent part in the struggle for independence. During the retreat of Görgei's army, G. carried the mountain-pass of Branyiszko, and by that daring feat of his re-established the communication with the government at Debreczin, as also with the several other Hungarian army corps. When, in April 1849, the garrison of the besieged fortress Comorn was to be apprised of the victorious approach of the national army, G., with a detachment of hussars, cut his way through the enemy's lines, and announced the approaching relief. The bloody affair of Szöreg allowed Dembinski, protected by the self-sacrificing ten battalions of G., to retire to Temesvár, where the last battle of the Hungarians was fought and lost on the 9th of August. G. escaped to Turkey, and entered the service of the sultan, without being obliged to turn Mohammedan. Under the name of Kourshid Pasha, he, as a general of division, was governor of Damascus, and at the beginning of the Crimean war, did much to organise the army of Kars. He died at Constantinople in 1856. Indomitable courage, and an incessant care for the comfort of the troops under his command, were the chief features in G.'s character.

GUYON, Jeanne Bouvier de la Mothe, well known in connection with the Quietist controversy, (see Quietism), was born at Montargis, in France, 13th April 1648. She had destined herself for the cloister, but at the earnest solicitation of her family married, at the age of 14, M. Guyon, the son of a rich contractor of public works. Being left a widow at 25, and still retaining her early religious leanings, she transferred her three children to the care of guardians, settling on them almost all her property. Being thus entirely withdrawn from secular affairs, she attracted much notice by the high tone of spirituality which her conversation breathed, and was invited by M. d'Arenthon, Bishop of Geneva, to settle in his diocese, where she formed the acquaintance of a Barnabite, Père Lacombe, then in much repute as a director of souls. The mystic doctrines which she learned from this ecclesiastic, and which involved such a degree of self-abnegation as to suppose that the truly Christian soul must become indifferent not only to life and death, but even to its own salvation or perdition, having come to the knowledge of the bishop, he withdrew his protection from Madame Guyon. In consequence she left Geneva, and accompanied by Père Lacombe, went to various cities of Italy and France, and eventually to Paris, where they drew about them a number of followers. The reputed extravagances of Madame G. led to her being shut up by a royal order in the convent of the Visitation, from which, however, she was set free, at the instance of Madame de Maintenon, and through this lady obtained entrance into the highest circles of Paris and Versailles. It was now that she formed the acquaintance of Fenelon, who was completely won by her evidently sincere piety, and captivated by the earnestness and lofty spirituality of her views. He failed to see the evil consequences which they involved; and the confiding zeal with which he defended her not only against the misrepresentations with which she was assailed, but even against the too well founded imputations which her principles had drawn upon her, was the cause of his unhappy rupture with Bossuet. See Fenelon. Madame G. having submitted her writings to Bossuet and other members of a royal commission, subscribed 34 articles which were drawn up by them, and promised to abstain from all further speculation on these subjects. But she failed to keep her promise, and not only drew again upon herself the hostility of the court, but also became the object of much scandal on account of her intimacy with Père Lacombe. That the latter imputation was a calumny, it is impossible to doubt; but Madame G. was again put under arrest, and imprisoned first at Vincennes and Vaugirard, and ultimately in the Bastile. She was liberated in 1702, and henceforward lived in comparative privacy till her death, which took place at Blois in 1717. She is the author of several works, the chief of which are *Torrents Spirituels*, *Moyen Court de Faire Oraison*, and *Le Cantique des Cantiques interpreté selon le sens mystique*, together with an Autobiography and Letters, as also some spiritual poetry.

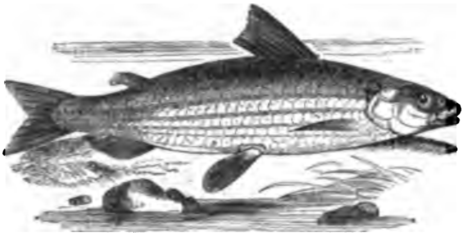
GUZEL-HISSAR. See Aidin.

GU'ZERAT, a geographical division of India, stretches in N. lat. from 20° to 24° 45′, and in E. long. from 69° to 74° 20′, containing about 42,000 square miles and about 3,000,000 inhabitants. Its most important section, perhaps, is the peninsula of Kattywar, which projects into the Arabian Sea between the Gulf of Cutch on the north-west and the Gulf of Cambay on the south-east. Of the mainland, a considerable portion is shut out from the sea by the British districts of Broach and Surat, so that the peninsula comprises nearly the whole of the coast-line and most of the available harbours. With regard, however, to internal communications, the mainland has the advantage of the peninsula, being traversed, to say nothing of streams of inferior magnitude, by the Nerbudda and the Tapti. To the south of the last-mentioned river, G. presents the northern extremity of the Western Ghauts. Politically, the country belongs chiefly to the Guicowar, a protected prince under the presidency of Bombay. The agricultural productions are rice, wheat, barley, sugar, tobacco, castor-oil, maize, opium, cotton, and fruits. The cubbeer-bar, or great banian-tree, stands on an island in the Nerbudda, covering, with its secondary trunks, several acres. Iron is found in Kattywar.

GWA'LIOR, the capital of the state of the same name in Central India, stands on a tributary of the Chumbul, towards the north-east of its singularly straggling territory, in lat. 26° 13′ N., and long. 78° 15′ E. Its nucleus is a completely isolated rock of about 300 feet in height, perpendicular, either naturally or artificially, on all sides; and as it measures 1¾ mile by 300 yards, it can accommodate a garrison of 15,000 men. It is thus virtually impregnable against any native force. The spot is understood to have been occupied as a stronghold for more than a thousand years, and the summit has been provided, from time to time, with several spacious tanks. Along the eastern base of this eminence lies the town of G., containing little worthy of notice but a beautiful mausoleum of white sandstone; and to the south-west there extends for several miles the Lashkar, or camp of the Maharajah's own army, while to the north-east is the Moorar, or cantonment of the protecting contingent. During the troubles of 1857 and 1858, the place attained an unenviable notoriety as a centre of rebellion, having, notwithstanding the fidelity of the Maharajah himself, been, for rather more than a year, in the power of the insurgents.

GWALIOR, the state above mentioned, with a remarkably irregular outline, and an area of only 33,119 square miles, stretches in N. lat. from 21° 8′ to 26° 50′, and in E. long. from 74° 45′ to 79° 21′. Lying partly in the basin of the Jumna and partly in the basins of the Nerbudda and the Tapti, it divides its drainage between the Bay of Bengal and the Arabian Sea. It has been roughly estimated to contain about 3¼ millions of inhabitants. Though G. is a Mahratta principality, being, in fact, the principal fragment of the great empire of the Peishwa, yet it is only to the south of the Nerbudda that the Mahrattas form any considerable proportion of the people. Under such circumstances, therefore, the dominant race can maintain its supremacy by force alone. Since 1803, the country has been under British protection. The existing relations of the two parties, however, date only from 1844. In 1843, the death of the sovereign, by producing universal anarchy, led to the forcible interposition of the British government; and by the treaty of the following January, in addition to a large contingent under British authority, the native government was permitted to have 9000 troops of its own. During the troubles of 1857, the new Maharajah, not more than 22 years old, remained faithful to the English, notwithstanding the almost entire defection of both divisions of the military force.

GWY'NIAD (*Coregonus Pennanti*), one of the British species of *Coregonus* (q. v.) which, from their form, the large size of their scales, and their silvery appearance, are sometimes called *Freshwater Herring*, and are vulgarly identified with the herring. The general similarity is in this case very great. The G., when full grown, is about ten or twelve inches in length; the first dorsal fin is high; the snout is a little produced; the mouth is small, the jaws without teeth, a few minute teeth on the tongue only. It is found in some of the lakes of Wales and Cumberland. G. is a Welsh name. At Ullswater, the fish is called *Schelly*. It occurs in that lake in great shoals, so that many hundreds are sometimes taken at a single draught of the net. It is rather an insipid fish, and cannot be kept long after being taken out of the water, unless salted, which it often is by the poor. The Freshwater Herring of Loch Lomond is not the G., but the Powan. Many of the species of this genus, however, very nearly resemble each other, and are not easily distinguished by mere description.



Gwyniad (*Coregonus Pennanti*).

GYBING, or JIBING, in sailing with fore-and-aft sails, the act of shifting over the boom, when the wind is astern or at any point abaft the beam, so that the wind may be brought to bear on the sail on the reverse side of the vessel to that in which it was felt previously to the operation. With a change of wind or course, the boom and its sail are *gybed* to the other side of the vessel.

GY'GES, a Lydian, about whose early life little is known. Nyssia, wife of Candaules, king of Lydia, having been grievously affronted by her husband in presence of G., ordered the latter, who was in high favour with his sovereign, either to slay Candaules or to prepare for his own fate. (Compare the history of Rosamund, wife of Alboin, king of the Lombards; Gibbon, vol. v. p. 339, Murray's ed.) G. accordingly put his master to death, married Nyssia, and assumed the supreme power, about 716 B.C. The Lydians, however, refused to acknowledge his authority, until the oracle of Delphi declared in his favour. In return for this service, he made immense presents to the sacred shrine. He is said to have reigned 38 years, and to have amassed enormous wealth, so as to give origin to the proverb, 'the riches of Gyges.' The successors of G. were Ardys, Sadyattes, Alyattes, and Crœsus, who was defeated by Cyrus the Great in 546 B.C. (or 548). The Lydian empire was thus overthrown. Plato has a fable, in which G. is represented as a shepherd of Candaules; but having miraculously obtained possession of a golden ring of great virtue, he was enabled by means of it to make himself invisible when he chose, and thus took occasion to murder his sovereign, and usurp the supreme power. The ring of G. is frequently mentioned in the middle ages.—GYGES is also the name of the hundred-handed giant, son of Cœlus and Terra, who with his brothers made war on the gods, and after his overthrow, was subjected to everlasting punishment in Tartarus.

GYMNA'SIUM. This word (from *gymnos*, naked) was applied to those public places or buildings where the Greek youths exercised themselves. In Athens alone there were seven resorts of this kind. Philosophers also gave instruction in these *gymnasia*, hence the transference of the name to public buildings erected for the mental disciplining and instruction of youth. The German gymnasium corresponds roughly to the grammar and public schools of England, and the grammar and high schools of Scotland. All three had their origin in the cathedral and monastery schools of the pre-reformation period. The widening circle of human knowledge in the 17th and 18th centuries made itself felt in these educational seminaries, as in the universities. Their curriculum became gradually extended, and with the further increase and development of universities, their aims became higher. In Germany, as in this country, the classical tongues formed and continue to form the great instrument of mental discipline in schools of this higher class, though other subjects have been added from time to time. The subjects of instruction which were first added to the classical tongues were geography and history. The natural sciences and mathematics, the pursuit of which has formed a characteristic feature of this century, gradually found a place in the schoolroom; and the study of the mother-tongue and of modern languages was also admitted. For a time, these subjects held a co-ordinate place with Latin and Greek. Departmental studies were taught with ardour, and educators were sanguine of the results which would flow from early initiation into the results and processes of the various sciences. These anticipations having been somewhat disappointed, there has for some time been a steady movement towards the restoration of classical or humanistic studies to be the main instrument of education, while retaining other subjects as a subordinate portion of the curriculum. The idea, however, of the gymnasium as specially a preparatory school for the university, and therefore not suited to all classes indiscriminately, has been more steadily kept in view in Germany than in Great Britain, and the consequence has been the breaking up of the middle school or gymnasium into two—the gymnasium proper, where those are taught who propose to enter the universities, or who desire a partial classical training; and real-schools, where elementary science, foreign languages, and mathematics form the principal subjects of instruction. In this respect, the middle-school education of Germany affords a favourable contrast to that of England. It is not to be supposed, however, that in England the grammar and public schools are less efficient in their classical training; the contrary is probably the fact, so far as our principal schools, such as Eton, Harrow, and Rugby, are concerned; but the methodised system of examinations, and the more rigorous methods of Germany, seem to turn out a larger *proportion* of well-instructed boys from each school, while the influence of central authority secures greater uniformity of processes and results throughout the country. The boys attend, as in England, till they reach the age of 18, when, after a special examination (the abiturient or maturity examination), they are transferred to the university. The German gymnasiums differ from English public schools for the middle and higher classes in being day-schools, and not the centre of great boarding establishments. In this respect they resemble the Scotch grammar and high schools.

GYMNA'STICS (see GYMNASIUM), a term, in its more restricted and proper sense, applied to those exercises, not amounting in intricacy to games, by which particular limbs, either singly or in combination, are rendered more pliant or stronger:

these exercises are arranged in a due progression, and the entire series becomes a system under the name gymnastics. Swimming (q. v.), Boating, and games like Golf (q. v.), Cricket (q. v.), &c., are among the most efficient gymnastic exercises; but in this article attention will be confined to exercises whose primary and direct aim is muscular development and health.

Gymnastic games are so old as to be pre-historic; they are alluded to in the 2d and 23d books of the *Iliad*. Before the time of Hippocrates, gymnastic exercises had been adopted in Greece as part of the course of medicine intended to counteract increasing luxury and indolence. The various exercises were speedily combined into a system, and gymnasia, where they should be carried out, were formed first by the Lacedæmonians, and subsequently at Athens. See GYMNASIUM. The Romans adopted the system, and constructed gymnasia on a magnificent scale. Many of their buildings, having had extensive baths attached, were known as *Thermæ*. The exercises in the gymnasia consisted of running, leaping, dancing, wrestling, boxing, hurling, &c.; and in those days, when all men bore arms, and when, in close combat, victory went generally with the strongest man, these games were doubtless of great value. In subsequent ages of knightly prowess, similar exercises were probably practised, though less publicly; but with the introduction of gunpowder, and through its means, the gradual substitution of fighting at a distance—in which science and skill were the main requisites—for personal encounters where strength and muscle went far to carry the day, the attention paid to gymnastics decreased, and finally vanished altogether. To make infantry soldiers perfect in the drilled movements of masses, cavalry good horsemen and fair swordsmen, and to have gunners who could take an accurate aim, became the utmost sought by the possessors of great armies; while the science of gymnastics, having gone out of repute for the military, was speedily neglected in merely civil life. It is only from the earlier portion of the present century that the science has at all revived.

The revival commenced in Prussia, where, about 1806, gymnasia were opened by Basedow and Salzmann, that of the latter being under the superintendence of the celebrated gymnastic pedagogue Guts Muths (q. v.); Jahn followed in the same line, and rendered the science so popular, that it speedily attracted the attention of the youth throughout the kingdom, and to the training thus obtained must be attributed, in no small degree, the vigour which succeeded in driving out the French army of the first empire. Sweden soon imitated Prussia, and from that time gymnastics has formed a prominent feature in the Scandinavian course of education. In Prussia, the gymnasia began to be the scenes of political gatherings, too liberal in tendency to please its semi-military government; and in 1818, they were all closed. The troops were, however, continued in gymnastic exercises, and shewed so clearly the advantages of the training they experienced, that, about 1844, Louis Philippe adopted and improved the system in the French army. From that time, gymnasia have been constructed for almost all continental armies, and, with more or less success, for the civil population. England, last ordinarily in public improvements, only moved in the matter a few years ago by establishing instruction in the science at Aldershot and other camps; in private life, however, there have long been many excellent gymnasia.

Different instructors adopt various systems of instruction. The course passed through in the French army is, however, one among the best, as its fruits evince, in the remarkable activity and readiness for emergency displayed by the soldiers who have undergone it. The equipment consists of a broad belt, to be strapped tightly round the waist above the hips, as a support to the body in the arduous motions to ensue, braces being of course discarded. The implements most commonly required are an iron ball in a rope-sling, with a loop for the hand to pass through; wrestling-handles, consisting of two wooden bars, each about 18 inches long, connected by stout cordage; a club; leaping-bars, to be leaped over; and leaping-poles wherewith to leap.

The system of instruction is divided into a number of 'courses' regularly graduated, beginning with elementary and special movements, with a view to render every part of the body supple, and to develop the several muscles and give complete command over all their motions (*elementary gymnastics*); and proceeding to exercises of leaping, suspension, standing and walking on beams, walking on stilts, climbing, swinging, vaulting, &c. (*applied gymnastics*).

The theory of the advantage derivable from gymnastics is simple enough. An admirable law of nature provides that—within certain limits—parts of the human frame increase in strength, aptitude, and size, in proportion to the use made of them. In gymnastics, this law is brought to bear successively on every part, and finally on the whole system in combined action. If the exertion be not carried so far as to induce excessive fatigue, all other parts of the body sympathise with the improving condition of that which is mainly exerted; the circulation, excited from time to time by the exercise, acquires fresh vigour, and blood being driven with unwonted force into all parts of the system, every function is carried on with increased activity; an improvement in the general health becomes soon manifest, and the mind—if simultaneously cultivated with judgment—increases in power and endurance.

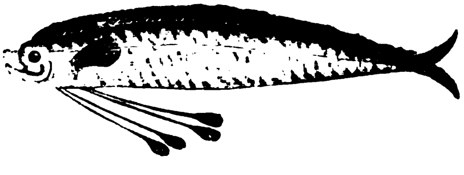
Gymnastic exercises require, however, to be practised with many precautions, and always with moderation and due regard to the strength of the individual. The whole benefit may be counteracted by excess; the muscles may be overstrained, and ruptures and other serious accidents ensue. The danger of such evils from gymnastic exercises has perhaps been exaggerated, and it has no doubt hindered their more extensive introduction into schools. But it is to be remembered that hardihood can in no way be obtained without risk; for cricket, fencing, boating, and other manly sports, are attended with at least as much danger as a well-regulated course of gymnastics.

A short account of Gymnastics and Out-of-door Recreations is given in *Chambers's Information for the People*, vol. ii. Other works on the subject are—Captain Chiasso's *Gymnastics and Calisthenics;* G. Roland's *Gymnastics;* Walker's *British Manly Exercises;* and MacLaren's *Training, in Theory and Practice;* and *Physical Education, Theoretical and Practical* (1868). The books written in German on Gymnastics (Turnkunst) would form a small library.

GYMNE'MA. See COW PLANT.

GYMNE'TRUS, a genus of acanthopterous fishes of the Ribbon-fish (q. v.) family, having the body much elongated, and at the same time attenuated and compressed, the dorsal fin extending the whole length of the back, the ventral fins consisting only of a single long ray, often dilated at the end; the mouth small. The fishes of this genus are inhabitants of great depths, and are rarely taken or thrown ashore. *G. remicepe* is a native of northern seas; *G. Hawkenii* has occurred on the coast of Britain;

other species are tropical. It has been supposed that large fishes of this genus may have given rise to some of the stories of the Great Sea Serpent. One was lately captured at the Bermudas, apparently an immature fish, but more than 16 feet in length, and with a row of long flexile filaments on the back of the head and anterior part of the back, which might well represent the mane often ascribed to the Sea Serpent. A specimen of *G. Hawkenii*, caught on the coast of Northumberland, was exhibited in London at the time when the subject of the Great Sea Serpent excited greatest interest, and was by many supposed to explain the accounts of it.



Gymnetrus Hawkenii.

GYMNO'CLADUS, a genus of trees of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*.—*G. Canadensis* is a North American tree, found both in Canada and over a great part of the United States, attaining a height of 50—60 feet, with branches remarkable for their upright direction, and an exceedingly rough bark which comes off in slips. The leaves of young trees are very large, three feet long, bipinnate. The flowers are white in short spikes. The pods are five inches long by two broad. The tree is called *Chicot* in Canada, and sometimes *Stump Tree*, from its dead appearance in winter, and the absence of conspicuous buds. It is also called the *Kentucky Coffee Tree*, because the seeds were formerly roasted and ground as coffee in Kentucky. It grows well in Britain. The wood is used both by cabinet-makers and by carpenters. It has very little sap-wood. The pods, preserved like those of the tamarind, are said to be wholesome and slightly aperient.

GY'MNOGENS, in the botanical system of Lindley, are those plants with exogenous stems and perfectly naked seeds. He forms of them a separate class, of which *Coniferæ*, *Taxaceæ*, *Cycadaceæ*, and *Gnetaceæ* are the orders. They are remarkable for the large apparent perforations or disks in the vessels of the wood, but they have concentric zones, spiral vessels, and a central pith, like other exogenous plants. Their great peculiarities, however, are the total absence of a pericarp, and that fertilisation takes place directly through the foramen of the ovule, without the intervention of style or stigma.

GYMNOSO'MATA (Gr. naked-bodied), an order of Pteropodous (q. v.) molluscs, destitute of shell, having a distinct head, and swimming by fins attached to the sides of the neck. They are all marine. The *Clio borealis* of the arctic seas (see CLIO) is the best known and most interesting example.

GYMNO'SOPHISTS (i.e., 'naked sages'), the name given by the Greeks to those ancient Hindu philosophers who lived solitarily in the woods, wore little or no clothing, and addicted themselves to mystical contemplation and the practice of the most rigorous asceticism. Strabo divides them into Brahmans and Samans, the former of whom adhered to the strictest principles of *caste*, while the latter admitted any one into their number regarding whose character and kindred they were satisfied.

GYMNO'TUS, a genus of malacopterous fishes, of which only one species is known, the celebrated *G. electricus*, or Electrical Eel. This genus gives its name to a family, *Gymnotidæ*, of which, however, no other known species has any electrical powers. The *Gymnotidæ* are mostly South American, inhabiting the fresh waters of the tropical regions. They are eel-like in form, and like eels are destitute of ventral fins (*apodal*), but they are furnished with complete jaws and with ribs, and their fin-rays are jointed or branched. They have pectoral fins, but no dorsal; the anal fin is largely developed, extending either to the point of the tail, as in the electrical eel, or leaving it free. The electrical eel has the skin entirely soft, and destitute of scales. It is very widely diffused over the warm parts of America, and is found both in streams and pools. Its electrical apparatus and powers are described in the article ELECTRICITY, ANIMAL. It is capable of being tamed, and when familiar, will allow itself to be handled without giving a shock, but employs its electrical powers both in order to kill prey and to defend itself from assailants, most frequently, perhaps, alligators. All the *Gymnotidæ* are remarkable for the position of the anus, which is so very far forward as in the electrical eel to be before the gill-openings, whilst in some of the other fishes of this family it is even before the eyes. Some fishes of this family have an elongated snout. The electrical eel, however, has a rounder and more obtuse nose than the common eel.

Electrical Eel (*Gymnotus electricus*).

GYNE'RIUM. See PAMPAS GRASS.

GYÖNGYÖS, a town of Hungary, in the county of Heves, is situated at the southern base of the Matra Mountains, about 50 miles north-east of Pesth. The last declivities of the Matra Mountains produce an excellent red wine called by the Germans Erlauer, and very like Burgundy, for which, indeed, it is often mistaken. G. has a gymnasium, manufactures woollen fabrics, and carries on trade in wine and fruit. Pop. (1869) 15,830.

GYPAËTOS. See LÄMMERGEIER.

GYPSIES (Egyptians), [Fr. *Bohêmiens*; Germ. *Zigeuner*; Dutch, *Heathens*; Dan. and Swed. *Tatars*; Ital. *Zingani*; Span. *Gitanos*, *Zincali*; Hung. *Czijányok*, *Pharaonepek*; Pers. *Sisech*; Hindu, *Karachee*; Arab. *Harami*; Gyps. *Rom* (man), *Sinte* (from Ind), *Calo* (black); nicknamed in Fr. *Cagoux*, *Geux*; Germ. *Zich-Gauner*, &c.], a mysterious vagabond race, scattered over the whole of Europe and parts of Asia and Africa. Whence they originally came, and what were the motives which drove them from their native soil, are questions which, after having passed through a long stage of helplessly absurd speculation, have of late years been ventilated by competent investigators, both linguists and historians, and are still but partially solved. So much only seems now established, that India, the cradle of many nations, was also the source from which they sprang. Whether, however, they are the Tshandalas of which the laws of Menou speak, or the kinsmen of the Bazeegars or Nuts of Calcutta; whether they belong to the Tshingani, a band of robbers near the mouth of the Indus, or are the descendants of those Luris—identical, according to Persian and Arabic authorities, with the Zuts or Djatts of Northern India—whom Firdusi mentions as having been called into Persia by Bahram Gur to the number of 10,000, about 420 A.D., that they might act as musicians to the poor—cannot be affirmed with certainty, although there can be no doubt that theirs must have been at all times one of the poorest and most obscure tribes of India. The first considerable body left Asia for Europe before the 12th c., perhaps in consequence of disastrous encounters with the Arabian conquerors; and Tamerlane was unquestionably the cause of still more numerous emigrations in the 14th century. The first notice of them which occurs in European literature is embodied in a free paraphrase, in German, of the Book of Genesis, written by an Austrian monk about 1122. They are there described as 'Ishmaelites[*] and brasiers, who go peddling through the wide world, having neither house nor home, cheating the people with their tricks, and deceiving mankind, but not openly.' Two hundred years later, we find them settled in Hungary (under Belus II.), at Cyprus, and in Wallachia. In 1417, they travelled in great hordes into Moldavia and many parts of Germany. In 1418, five months after the Council of Constance, they appeared, about 1000 strong, before Zürich, commanded by a Duke Michael 'of Little Egypt,' accompanied by several dukes and knights, and carrying with them a good supply of money, sporting-dogs, and other 'marks of nobility.' From Switzerland they descended into Italy, and in 1422 they shewed themselves at Bologna and Forli. Another band, numbering, this time, according to the old Swiss historian, Stumpf, 14,000, arrived in the same year at Basel. On the 17th of August 1427, a band of them, coming from Bohemia, made their appearance before Paris, which, however, they were not allowed to enter, but were lodged at La Chapelle Saint Denis. Other hordes succeeded these in the following years, spreading in rapid succession over all parts of Germany, over Spain, England, Russia, Scandinavia, and, indeed, over the remotest parts of Europe. The account which they most frequently gave of themselves was, that they originally came from 'Little Egypt;' that the king of Hungary had compelled about 4000 of them to be baptized, had slain the remainder, and had condemned the baptized to seven years' wandering. Another version of their story was, that the Saracens had gone to war with them in Egypt, had subdued them, and forced them to renounce Christianity; that, after some years, they had been reconquered by the Christians, and that the pope, Martin V., had laid upon them, as a penance for their renunciation of the true faith, a life of wandering for the space of seven years, during which they were not to sleep in a bed. At the end of this period, they would be sent to a fine and fertile land. Yet another account was, that they were commanded by God to roam through the world for that period, in expiation of their want of hospitality towards Joseph and Mary—a notion which has, curiously enough, been partly revived in our own day by Roberts, with this difference only, that he proves them, from the prophecies of Isaiah, Jeremiah, and Ezekiel, to be the descendants of the ancient Egyptians, and their wanderings to be the predicted punishment of the various iniquities of their forefathers.

At first, they were well received. The romance with which they surrounded themselves, their pretended state of penitence, above all, the pomp and wealth they displayed, were sufficient to secure the good-will of the countries through which they passed—so much so, that letters of safe-conduct were given them by the Emperor Sigismund, the genuineness of which there is no reason to doubt. Soon, however, the tide began to turn. Their resources gone, they were everywhere treated with contumely, and despised chiefly on account of the degrading arts of chiromancy, magic, and thieving, to which they again resorted for their support, like their earlier brethren, described by the monk. And with the reckless brutality characteristic of the middle ages, edict after edict was hurled against these 'diviners and wicked heathens.' The governments of Europe vied with each other in banishing, outlawing, and slaying them whenever and wherever found, and in most severely punishing those that dared to shelter them, chiefly 'because of their traffic with the devil.' These edicts remained in force in many countries down to the 18th c.; and Frederick the Great, in 1748, renewed the law that every Gypsy beyond the age of 18, found in his states, should be hanged forthwith. In England, the most barbarous decrees against them were issued by Henry VIII. in 1531 and Elizabeth in 1563. In Scotland, where, under James V., a certain Johnny Faa had been officially recognised by the crown as Lord and Count of Little Egypt, some of the severest edicts date from 1570, 1603, and 1609; and in 1624, Helen Faa, a descendant of Johnny, together with fifteen other women of the seed-royal, were condemned to be drowned. Towards the latter half of last century, however, more humane measures were adopted towards them, with a view to the improvement of their social and moral state. Maria Theresa, in 1768 and 1773, issued ordinances for the education of their children, and their gradual settlement as cultivators of the soil, chiefly in Hungary and Transylvania, where they swarmed in large numbers; special streets were built for them at the ends of the villages, and the name of Uj-Magyar, Uj-Parasztok (New Peasants), was officially bestowed upon them. Joseph II. renewed these edicts in 1782, with certain modifications. Various other methods of gradually amalgamating them with the general population were tried elsewhere (a society was formed for that purpose at Southampton by the Rev. Mr Crabb in 1832), but with comparatively little effect. They have continued—with few exceptions—their peculiar nomad life, with all its questionable resources and practices, its joys and its sorrows, unchanged, up to this day; and even gypsy children, brought up far from their tribe, in the midst of Christian families, have, driven by some mysterious and uncontrollable impulse, run away from their civilised homes as soon as a favourable opportunity offered.

Before proceeding to give a general outline of their present condition, we must briefly mention what have been the opinions held about them since the 15th c. by the learned. They have been, then, by turns set down as Egyptians, Nubians, Tartars,

---

[*] Ishmaelites—a notion perpetuated in the designation *Geschmeilim* of the Danish thieves' jargon, and the German *Rothwälsch* (Dorph, 44 and 45; Grolman, 65)—a term which has hitherto puzzled all investigators, Pott himself not excepted (cf. p. 28; Heister, p. 8), but which is nothing but a corruption of the Hebrew *Jishmăelim*—Ishmaelites.

Cilicians, Mesopotamians, Assyrians, Ethiopians, Moors, Armenians, Manichæans, Banditti, and German Jews. More recently, they were, on account of the name of Zingari or Zingani—probably a corruption from their own name Sinte (from Ind), by which they are known in many countries of Europe—brought in connection with the Sigynnai, a people of Median origin, settled on the Danube, mentioned by Herodotus; with the Sigynni of Strabo, in the Caucasus; with the Usbecks, and a host of other tribes known and unknown. Again, their name has been derived from one Zinganeus, who, in 1517, when they had long been known as Zingani, fled with his followers to escape the vengeance of Selim. The now recognised theory of their Indian origin, proved incontestably by their language, was first positively advanced by Rüdiger in 1782; and in his track followed, with more or less success—collecting, comparing, or arranging new and old linguistic materials—Grellmann, Alter, Seetzen, Pottinger, Hoyland, Puchmayer, Ouseley, Danilowicz, Bischoff, Domeny de Rienzi, Graffunder, Borrow, Richardson, Bishop Heber, and many others. But the *facile princeps* of all Gypsologists is Professor Pott of Halle, whose *Zigeunersprache* (1844—1845) is the most wonderfully thorough and exhaustive book ever written on this subject of gypsies and their language.

This their language, then—a daughter of the old Sanscrit—has, besides giving the only real clue to their origin, also shed some rays over the dark period between their first emigration and their appearance in Europe. Originally the distinct mode of speech of a single and special border tribe of Northern India, it has, during the many wanderings of the race, appropriated words from every country through which they passed; while, on the other hand, it lost many of its own words, and still more of its own inherent power and elegance, and much also of its resemblance to its mother and sisters. These adopted foreign words, their respective number, and their more or less corrupted state, point plainly to the gypsies having passed first into Persia, to their having remained there for a considerable time, to their having then wended their way to some Greek country, perhaps Asia Minor (the designations for 7, 8, and 9 being still Greek), and to their descent thence into Hungary, Cyprus, &c.

But their language also (Romany Tschib), though split into different dialects, has also remained almost the only tie which binds the widely-scattered nomad members together. Those of their branches who for centuries have had no intercourse with each other, would, although the strange elements in the other's speech would be incomprehensible to them, yet recognise each other at once by certain words and formulas indelibly written in the memory of the whole race. The outward appearance of the gypsies, who have been pronounced by competent writers to be one of the handsomest races of humanity, varies in some degree according to the climate under which they are born and in which they roam. Their chief characteristics, however, remain everywhere the same: tawniness of skin; slightly projecting, but agreeably formed cheek-bones; long hair, of the colour and lustre of coal; large black eyes, exquisitely shaped mouths, ruddy lips, teeth of a dazzling whiteness, slenderness and agility of limb, expressive features, and well-proportioned, often elegant build. Their women are, indeed, exquisitely beautiful when young, but they lose their good-looks at a very early period, partly on account of the squalor of their habits, and partly from their unsettled and precarious life. Like children, they are fond of showy colours in dress, and do not disdain to adorn themselves with even dubious trinkets and fine garments in a forward state of decay; but they always arrange their clothes, however poor, with great taste. Of their other qualities, their manners and customs, we can only say that they were, and still are, supposed to be cowardly, revengeful, and treacherous; that they allow themselves to be used as spies, are the associates of robbers and thieves, and that their women, chaste themselves, ply all sorts of questionable trades, chiefly selling poisons, and acting as go-betweens. It is further said that their language has no word for God, immortality, soul—that, in fact, they have no religion whatever; that their marriages, contracted very early, are not binding; that they were, or are, wont to eat their parents; and that they are altogether a very criminal race. How much of all these charges is more founded on fact than their intercourse with demons, for which they have been so dastardly slaughtered in former days, we are not able to decide; certain it is, however, that their ethical code differs most essentially from that of other people (Gorgio), whom they despise on account of their childish credulity and brutal cruelty. They have proved themselves, on several occasions, bold and courageous as lions, but they prefer running away to fighting the battles of the foreigners; and it is also agreed on all hands, that they are passionately attached to their relations; that they are fatalists, and have a sort of fetichism or pantheism, though its peculiar form has never been revealed by them to any inquisitive tourist. At the same time, they belong outwardly to the religion of every country which they happen to inhabit, and repeat the process of baptism as often as they can, with a view, as some have it, to the presents of godfathers and godmothers. They believe in a metempsychosis or transmigration of souls, and refrain for that reason from eating certain animals (eels, &c.), although, generally, they are anything but choice in their food. They are dirty, lazy, fond of drinking and smoking. Their talent for music is remarkable in the extreme; their ears seize, and their instruments reproduce, after the first hearing, the most difficult and complicated pieces, even entire symphonies. Many famous artists (Kecskemecz, Bunks, &c.) have issued from their ranks; and their own melodies sounding over the wide Hungarian pushtas, the steppes of Russia, or through the streets of Jassy, are not easily forgotten. Some of them have indeed become the much-valued property of other nations, or are embodied in some of our favourite operas. No less wonderful is the grace and charm of their wild dances. Altogether, the gypsies are one of the most gifted races, the lost geniuses, so to say, of humanity. The real truth about them, their traditions, and religion, will, we fear, be ever kept a secret. The statement of Borrow, who has lived so long among them, that their entire catechism is summed up in the three precepts: 'Be true to your people—be faithful to your husbands—and never pay any debts except those owing to your own kindred,' must, we fear, be received with the same degree of caution which, we are sorry to say, has to be applied to many other statements about their manners and customs contained in his otherwise useful *Gypsies in Spain*. The incredibly absurd descriptions of the Jewish marriage-ceremonies, about which we do possess the fullest and most authoritative information, given there as a counterpart to those of the gypsies, shew plainly how easily and abundantly his good-natured credulity must have been worked upon.

The increase of population, and the growth of culture all over Europe, are their worst enemies. Their forests are cut down, their heaths enclosed, the houses are pushed right into their commons; and the easy and remunerative belief in their secret arts is waning more and more. It is doubtful, indeed, whether they will, as a separate race, survive many more centuries in Europe. Their numbers at this moment are stated so very differently, that we would fain caution the reader against an implicit belief in the following figures, which we extract from the comparatively most reliable authorities: in Hungary, 140,000; in Transylvania and the Principalities, 162,000; Spain, 40,000; England and Scotland, 18,000 (their chief families in these countries being the *Royal* Lees, the Stanleys, Coopers, Hernes, Smiths, Lovells, &c.); Poland, 2000; Russia, 10,000; Germany, France, and Italy, 40,000; Norway, 1500. Altogether, including those in Turkey and in Asia and Africa (their sojourn in Mexico is questionable), they are computed at about five millions (Rienzi). A small portion only of these occupies as a body fixed habitations in Hungary and Transylvania, where they are agriculturists and goldwashers; and in the Principalities, where they live in a kind of serfdom, and are divided into four different classes—Rudari or Aurari (gold-seekers), Ursari (bear-leaders), Lingurari (manufacturers of and dealers in wooden spoons, mouse-traps, &c.); and Laîessi (masons, smiths, tinkers, &c.). All the rest lead a roaming life, live in kennels and under tents from one end of the year to the other, gaining their scanty livelihood, like their forefathers, as best they can, fearing and detesting nothing so much as a fixed and continuous occupation, which would take them away from 'their free mountains, their plains and woods, the sun, the stars, and the winds.'

The following is a specimen of their language in the form of a short improvised stanza:

Poraquel luchipen abajo
Abillela un balichoró,
Abillela á goli goli,
Ustilame Caloró.

There runs a swine down yonder hill
As fast as e'er he can,
And as he runs, he crieth still:
'Come steal me, gypsy man.'

GYPSUM, a mineral consisting essentially of sulphate of lime and water, the proportions of its constituents being lime, 32·56; sulphuric acid, 46·51; water, 20·93. It is very widely diffused, occurs in great abundance in many parts of the world, and is found in rocks and strata geologically very different, as in transition rocks, in secondary and in tertiary formations. It often occurs in nests or kidney-shaped masses in clay or marl. It is found above chalk in many places, and large quantities of it are quarried in some parts of England from the red marl immediately above the great bed of rock-salt. It sometimes occurs in beds many feet thick. It is transparent or opaque, white, yellowish-white or gray, or even yellow, red, brown, or black, according to its purity of chemical composition or the quantity and nature of impurities present. It is also compact, fibrous, foliated, or earthy; sometimes crystallised in six-sided prisms or in lenses. Twin crystals are frequent. It is easily broken, scratched, and cut. Before the blowpipe, it becomes opaque, if not already so, and fuses into a white enamel. The water which it contains is driven off by a heat of about 272° F., and it is then easily reduced to powder, in which state it is well known as *Plaster of Paris.* Unburned G. is tough, and not easily reduced to powder. G. is soluble in cold water, to the extent of about one part in 461, and is a frequent ingredient in the water of springs; it is scarcely more soluble in boiling water or in acids. To this solubility in water, although so slight, must be ascribed the value of G. as a manure; the further chemical explanation of which, however, still remains to be ascertained, although theories have been proposed by Sir Humphry Davy and by Liebig, the former supposing the G. to act chiefly by itself, becoming the nutriment of the crops to which it is most beneficially applied; the latter supposing it to act chiefly by fixing the ammonia of the atmosphere and conveying it to their roots. As a manure, G. is more extensively used in some parts of the continent of Europe and of North America than of Britain. In North America, it is reduced to a fine powder by mills, in order to be used as a manure, for much of its value depends on the fineness of trituration. To clover crops, the application of G. is particularly beneficial, and although it does not produce much benefit in its direct application to grain crops, yet in an alternation of wheat and clover, the crop of wheat is larger because of the liberal supply of this mineral manure to the clover. An excess of G., however, is prejudicial, as has been found in some parts of England, where the subsoil containing it in great quantity has been rashly brought up by the plough.—G., deprived of its water by burning, and reduced to powder, forms a paste which almost immediately *sets*, or becomes firm and solid, when mixed with its own bulk of water; hence the great use of *Plaster of Paris* for making casts and cornices. But if the G. is burned at too great a heat, it refuses to set, and the powder of the mineral called *Anhydrite*, which is an anhydrous sulphate of lime, has not the property of setting.—One of the finest varieties of uncrystallised and untransparent G. is Alabaster (q. v.).—*Satin Spar* is a beautiful fibrous variety of G., exhibiting a fine play of light, and employed for necklaces, inlaid-work, and other ornamental purposes, but having the disadvantage of being easily scratched.

GYRATION, CENTRE OF. See CENTRE OF GYRATION.

GYR-FALCON, or **JER-FALCON** (*Falco gyrfalco* or *F. Islandicus*), a species of Falcon (q. v.) of large size, the female, which is the largest, being about two feet in entire length; the plumage almost brown when the bird is young, but gradually changing to white as it advances in age, the white margin of each feather encroaching on its

Gyr-falcon (*Falco Islandicus*).

brown centre, until aged birds are almost pure white. It is rarely seen in Britain, and very rarely in the southern parts of the island, but inhabits all the very cold northern parts of the world. It was formerly in high esteem for falconry, and was procured at great expense from Iceland and Norway. It is sometimes called ICELAND FALCON, and sometimes GREENLAND FALCON.

GYRI'NUS, a Linnæan genus of coleopterous insects, now constituting a family, *Gyrinidæ*, closely allied to *Dytiscidæ*, or Water Beetles (see DYTISCUS), but differing in having the antennæ very short, the two fore-legs long and stretching forward like arms, the other legs very short and comparatively broad. The eyes are divided by horny processes, so that each of them almost becomes two. The body is oval, as in the *Dytiscidæ*. The *Gyrinidæ* are very generally characterised by metallic brilliancy of colour. They are mostly small insects. They fly well, swim and dive well, spend the winter in the mud at the bottom of ponds, and in spring and summer may be seen swimming very actively on the surface of the water, ready to dive on the slightest alarm. In diving, they carry down with them a bright bubble of air. They generally swim in little parties, seeming to chase each other in circles, whence their French name, *Tourniquets*, and their English name, *Whirligigs*. They feed on smaller aquatic animals, which they seize in their gyrations. They deposit their eggs on the leaves of aquatic plants. Their larvæ are aquatic, having their bodies composed of thirteen deeply divided rings, of which three bear the feet, and the rest bear filaments probably serving as organs of respiration. The most common British species is *Gyrinus natator*, a smooth shining blackish insect, three lines long.

Gyrinus natator.

GY'ROMANCY (*gyros*, a circle, and *manteia*, prophecy) was a method of divination by means of a circle, and was generally performed in the following manner: the soothsayer described a circle, and marked it all round with letters; then he commenced to walk round the circle, repeating his incantations, and at the places where he stopped the letters were carefully noted, and by the interpretation put upon these letters, the answer of the god was obtained.

GYRO'PHORA. See TRIPE DE ROCHE.

GY'ROSCOPE, an instrument invented by M. Foucault to render palpable to the eye the earth's rotation. Its success depends on the principle, that if a mass be set in rotation freely in space, it will, unless disturbed or constrained, preserve absolutely the plane of its rotation, and will, to effect this, even overcome slight obstacles. In the gyroscope, a heavy ring of metal is almost freely suspended by mechanical contrivances, after having communicated to it a very rapid motion, and to maintain itself in the plane of its rotation, while the earth in revolving on its axis turns round the whole mechanism, it causes a graduated slip to move round under a telescope placed in position, and so renders the earth's motion palpable to the eye. See GYROSCOPE in SUPP., Vol. X.

GYU'LA, a town of Hungary, in the county of Bekes, is situated on the White Körös, which divides it into the German and Hungarian quarters, 30 miles north of the town of Arad. The trade is chiefly in cattle. Pop. (1869) 18,495.

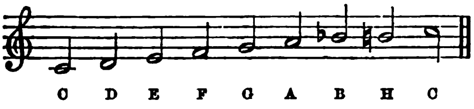
H

H THE eighth letter in the English alphabet, belongs to the order of gutturals, and is a mere attenuation of the sound indicated by the Greek χ and the German (and Scotch) *ch*. The tendency of guttural sounds to become lighter and lighter, and at last disappear, is strikingly seen in tracing the history of the letter *h*. The form of the character corresponds to the Phœnician or Hebrew *cheth* (ח) and the Greek *eta* (Η, probably at one time pronounced *heta*), which denoted originally the *syllable che*. The Greeks dropped the guttural part of the sound, and took the character to mark the vowel *ē*, while in the Latin alphabet it was taken to mark the (faint aspirated) guttural. That the sound of *h* in Latin must have been faint, is proved by the fact, that many words were written indifferently with or without an *h*; as *honustus* or *onustus; aheneus* or *aĕneus*. In the languages derived from the Latin, the force of *h* has almost disappeared. It is retained in French as a character, but is scarcely heard in pronunciation. The Italian language altogether ignores the character. In Spanish, it has taken the place in many cases of the Latin *f*, as *hijo* = Lat. *filius*, a son; *humoso* = *fumosus*, smoky.

In the languages of the Gothic stock, *h* often represents the hard guttural sound of *k* or *c*. See letter C. This substitution, and the subsequent disappearing of *h*, especially before *r* and *l*, have completely disguised the relationship of many words which are yet of the same root: e. g., Eng. *raw;* Ang.-Sax. *hreaw;* Lat. *cru*-or, blood, *cru*-dus, bloody, raw.

The natural tendency in English, as in other tongues, is to attenuate the sound of *h*, and altogether eliminate it. This tendency is strongest among the illiterate, who are unrestrained by the presence of the written character; and accordingly 'to drop one's *h*'s' (e. g., *am* for *ham*) is a sign of the want of education and of vulgarity. The perversity of putting *h* where it ought not to be (e. g., *heggs* for *eggs*), is not easily accounted for.

The Germans use the letter H, in their musical notation, for the same note which we call B, while they call our B flat simply B; possibly from the flat seventh being more nearly related to C, as a fundamental note, than B natural the sharp seventh is, which they designate H. Thus,



HAA'RLEM, the chief town of a district of the same name in the province of North Holland, is a clean, well-built city, lying on the shores of the Spaarn, 12 miles west of Amsterdam, and intersected, like most Dutch towns, with canals and avenues of trees. Pop. (1872) 32,156. H. is the seat of government for the province, and the see of a Catholic bishop. Among its 13 churches, the principal is that known as De Groote or St Bavo's Kerk, which was built in the 15th c., is the largest in Holland, and is specially noted for its lofty tower and its famous organ, constructed by Müller of Amsterdam, which, till recently, was the largest of its kind, having 5000 pipes, 60 stops, and 4 rows of keys. Before the church stands the marble statue of Laurens Coster (q. v.), to whom his countrymen ascribe the invention of printing. Among the buildings worthy of note, we may instance the town-hall, with its fine carvings, formerly the residence of the Counts of Holland; the palace of the states-general; the prison; and the Teyler Institution, which is endowed with ample funds for the poor, and has numerous scientific and antiquarian collections. H. has a good gymnasium, numerous academical, scientific, and benevolent institutions, and is also the head-quarters of the Society of National Education, which has here its school for teachers. Although H. is no longer celebrated, as in former times, for its flourishing trade, it still possesses extensive refineries of salt, tanneries, foundries for type of Greek and Hebrew, and various manufactories of silk, linen, and thread, and carries on an extensive trade in flowers and seeds, sending its tulips, hyacinths, and other bulbs to every part of Europe. H. was a flourishing town as early as the 12th c., when it took an important part in the wars between the Hollanders and West Frisians. At the close of the 15th c., it lost all its privileges, and suffered severely during the revolt of the peasantry; and in the following century, during the war of independence, it sided with the allies, and underwent a seven months' siege in 1572—1573, which is unparalleled in the annals of history for the heroism evinced by the citizens, and for the atrocities which, in violation of their faith, the Spaniards perpetrated after the surrender of the city.

HAARLEM LAKE, which is now drained (see POLDER), lay between the towns of Haarlem, Leyden, and Amsterdam, and communicated with the Zuider Zee by a narrow strait called 'Het Y.' Before its thorough drainage (1839—1852), it embraced the four ponds of Haarlem, Leyden, Spieger, and Helle, which, in consequence of an irruption of the sea in the 16th c., when several villages were destroyed, had merged into one vast sheet of water, and in the course of time encroached so far upon the adjacent land as ultimately to cover an area of more than 60,000 acres. The depth did not exceed 15 feet, more than half of which was composed of mud and clay, from which the Dutch prepared a kind of brick known as 'klinkers,' which were used for purposes of paving. The waters of the lake frequently rose during storms to an alarming height, necessitating an enormous annual outlay in keeping the dams and sluices in repair. In consequence of the damage done to the cities of Amsterdam and

Leyden by an overflow of the lake in 1836, the government entered into an agreement with a company of English engineers to drain it. This undertaking was effected by several gigantic steam-engines, by which the water was pumped up into a canal, which had been dug round the circumference of the former area of the lake, and connected with various inlets of the sea. By these means the bed of the lake was left dry, except channels for the purpose of drainage, and a space of more than 50,000 acres of good land reclaimed and thoroughly drained. This has now been divided into farms, and is under tillage. Pop. (1870) 11,272, with 2 Dutch Reformed, 2 Dissenting churches, and 3 R. C. chapels.

HABA'KKUK (Greek forms, *Ambakoum*, *Abacum*, &c.; Latin, *Ambacum*, *Ambacuc*, and *Abacuc*), the eighth of the twelve minor prophets. No account whatever is contained in the book itself either of the events of his life, or even the date when he lived; and the numberless conjectures that have been made respecting him are unworthy of notice.

In turning to the book itself, we find him, first of all, bewailing the general corruption of his people, and prophesying the speedy vengeance of God by the hand of the Chaldeans. These, however, shall, when they have fulfilled the divine wrath, perish suddenly themselves, because of their own iniquities; and the prophet winds up with thanks for this just retribution. It is evident from this that H. must have lived at a late period, about the time of Nebuchadnezzar's invasion; but whether he wrote, as the rabbinical traditions suppose—at the time of Manasseh, or as others (Keil, Davidson, Delitzsch) assume, at the early time of Josiah, or, finally, in the days of Jehoiakim, according to Ewald, Rosenmüller, Knobel, Meyer, De Wette, Hitzig, Stähelin, are points upon which we cannot enter. We must not omit to mention here, that the various chapters have also been supposed to have been written under different successive kings (Rosenmüller, Kalminsky, &c.); but the unity of the whole book is so obvious, that this notion has been almost unanimously rejected.

Critics have, in all times, been unanimous in their praise of the style of this prophetic composition. It ranks, indeed, for grandeur and sublimity of conception, for vigour and fervour of expression, for gorgeousness of imagery, for melody of language, among the very first productions of sacred literature. It is more especially the peculiar strophic arrangement of the second chapter, with its awful four 'woes' denounced against the Chaldeans, and above all, that matchless 'Pindaric Ode,' as Ewald calls the third chapter, which have challenged universal attention and admiration.

HA'BEAS CO'RPUS, WRIT OF, a writ directed by courts of law or equity to produce the body of a person illegally detained, and to state the reasons of such detention, so that the court may judge of their sufficiency. This writ is one of the chief guards of English liberty, and the envy of foreign nations, being one of the best securities against tyranny ever devised. It is often erroneously supposed that this efficacious protection of personal freedom was first bestowed by the statute of 31 Ch. II. c. 2, called the Habeas Corpus Act. But the true foundation of that act, as well as of many other cardinal principles of the English constitution, is to be found in the Great Charter, or Magna Charta, of which Hallam (1 *Const. Hist.* 16) observes: 'No freeman could be detained in prison except upon a criminal charge on conviction, or for a civil debt. In the former case, it was always in his power to demand of the Court of King's Bench a writ of *habeas corpus ad subjiciendum*, directed to the person detaining him in custody, by which he was enjoined to bring up the body of the prisoner, with the warrant of commitment, that the court might judge of its sufficiency, and remand the party, admit him to bail, or discharge him, according to the nature of the charge. This writ issued of right, and could not be refused by the court.' The Great Charter, as Professor Creasy sums up this part of its substance, 'contained two great principles. First, that no man shall be imprisoned on mere general grounds of suspicion, or for an indefinite period, at the discretion or caprice of the executive power; but that imprisonment shall be only inflicted as the result of a legal trial and sentence, or for the purpose of keeping in safe custody, when necessary, an accused person on a definite charge, until he can be tried on that charge. Secondly, that, as a general rule, every person accused of a criminal offence shall have the question of his guilt or innocence determined by a free jury of his fellow-countrymen, and not by any nominee of the government.' And Blackstone, with great spirit, thus discourses on the social and political effects of this feature of the British constitution (1 Bl. *Com.* 135): 'Of great importance to the public is the preservation of this personal liberty, for if once it were left in the power of any, the highest, magistrate to imprison arbitrarily whomever he or his officers thought proper, there would soon be an end of all other rights and immunities. Some have thought that unjust attacks, even upon life or property, at the arbitrary will of the magistrate are less dangerous to the commonwealth, than such as are made upon the personal liberty of the subject. To bereave a man of life, or by violence to confiscate his estate without accusation or trial, would be so gross and notorious an act of despotism, as must at once convey the alarm of tyranny throughout the kingdom; but confinement of the person by secretly hurrying him to jail, where his sufferings are unknown or forgotten, is a less public, a less striking, and therefore a more dangerous engine of arbitrary government. And yet, sometimes, when the state is in real danger, even this may be a necessary measure. But the happiness of our constitution is, that it is not left to the executive power to determine when the danger of the state is so great as to render this measure expedient, for it is the parliament only or legislative power that, whenever it sees proper, can authorise the crown, by suspending the *Habeas Corpus* Act for a short and limited time, to imprison suspected persons, without giving any reason for so doing.'

The Habeas Corpus Act, which was passed in 31 Ch. II. c. 2, therefore did not introduce any new principle, but merely defined with greater precision and detail the appropriate remedies, in consequence of the frivolous objections made by the judges in the preceding reign. The substance of these details is as follows: Where any person is committed and charged with crime, the lord chancellor or any of the judges may, unless there has been great delay in application, issue the writ, and order the person to be brought up and discharged with or without bail. The writ is to be obeyed more or less promptly according to the distance, but in no case must the delay exceed twenty days. Any officer or keeper neglecting to deliver a copy of the warrant of commitment, or shifting the prisoner to another custody without cause, shall forfeit £100, and for the second offence £200, and be disabled to hold office. No person once delivered by *habeas corpus* shall be recommitted for the same offence under a penalty of £500. Every person committed for treason or felony may insist on being tried at the next assizes, or admitted to bail, unless the crown witnesses cannot be ready in that time; and if not tried at the second assizes or sessions, he shall be discharged from the imprisonment. The prisoner may apply either to the Court of Chancery, or to the Courts of Queen's Bench, Common Pleas, or Exchequer, and any judge denying such writ is liable to a fine of £500. The writ may be applied for by persons confined in any part of England, or Jersey and Guernsey. Indeed, it was recently held, in the case of Anderson the fugitive slave, that this writ could be applied for by a person confined in Canada or any other of the colonies, even though there were courts established there which had previously been applied to, and had the power to issue the writ, but refused to do so. The judges of the Queen's Bench, on examining the authorities, held that this prerogative power had always been inherent in the English court in favour of British subjects wherever imprisoned, except in a foreign country, and had never been taken away by express statute. There has now, however, been passed a statute (25 Vict.) depriving the English courts of this jurisdiction over the colonies, whenever local courts exist by which such a jurisdiction can be exercised.

As the Habeas Corpus Act extended only to cases where persons are imprisoned on criminal or supposed criminal charges, the other cases being left to the operation of the common law, which was found defective, the statute 56 Geo. III. c. 100 was passed, which extended the writ to other cases. Under this last act, any person confined or restrained of his liberty (otherwise than for criminal matters, and except persons imprisoned under a judgment or decree for debt), may apply to any judge of the common law courts for a *habeas corpus*, on shewing by affidavit that there is a reasonable and probable ground for complaint.

The result is, that in all cases whatever where a person, whether man, woman, or child, is illegally confined in England, the remedy is for some friend to apply for a *habeas corpus*, which, on a good *prima facie* case, will be issued to the person who so illegally confines the applicant; and if such person refuses to make a proper return—that is, shew good legal grounds for what is done—he will be committed for contempt. If the party is confined under recognised authority, as a child by a parent, these facts must be stated. If the party is confined under some legal authority, then the warrant of commitment must be produced, and the rule is that such warrant must set forth the subject matter, and the jurisdiction of the judge or justice who so committed the party, so that the legality of the imprisonment may be judged of.

The Habeas Corpus Act does not extend to Scotland, but in that country similar redress is provided to the subject under the Wrongous Imprisonment Act, 1701, c. 6 (q. v.), which is often called the Scotch Habeas Corpus Act.

Habeas corpus is also the formal commencement of several other legal writs in English law of a kindred nature to that last mentioned, and which is strictly called the writ of *habeas corpus ad subjiciendum*. Thus, the *habeas corpus ad respondendum* is a writ issued by a common law court to bring up a prisoner to serve him with a writ in another action. So a *habeas corpus ad satisfaciendum* is a similar writ to take the prisoner in execution for another cause of action. *Habeas corpus ad testificandum* is the writ by which a prisoner is brought up by the jailer to give evidence as a witness in a court of justice.

HABE'NDUM, in English Law, is the name given to a clause in a deed of grant or lease, in which clause the kind and nature of the estate is described, and it is stated for how long the estate is to be held.

HABE'RE FA'CIAS POSSESSIO'NEM, in English Law, is the name of the writ which issues after a successful plaintiff has recovered judgment in an action of ejectment. He then calls on the sheriff, by this writ, to put him in possession of the land or premises, and the sheriff executes it by breaking open the doors, if necessary, and then delivering over the possession to the plaintiff. *Habere facias seisinam* is a similar writ, now superseded by the last.

HABE'RGEON, a short coat of mail, consisting of a jacket without sleeves. In early times, the habergeon was composed of chain-mail; but in the 14th c., a habergeon of plate-armour was worn over the hauberk. See Hauberk.

HABIT. This familiar word applies to a certain portion of our acquired powers or aptitudes. Common usage does not very closely define the kind or extent of acquisitions intended by it. Habits may be either intellectual or moral. We speak of a habit of talking or writing, as well as of a habit of early rising, or of truthfulness. The principle of the human constitution on which the growth of habit depends, when generalised to the utmost, may be called the power of *retentiveness*, or of plastic growth, and is one of the foundations of the intellect, inasmuch as memory and all the other intellectual faculties involve it in a greater or less degree. See Intellect, and Association of Ideas. Education of every kind must proceed upon this property, and should be conducted in conformity with its exact nature and laws. The maxims that govern the formation of habits are the same as the principles of mental acquirement in every shape. Some of the most important of these may be indicated here.

1. It should be understood, at the outset, that all persons are not alike susceptible of the growth of new powers, or of the process of education; nor is the same person equally susceptible as regards all subjects. The consequence is, that a much greater amount of practice is necessary in one case than in another; iteration being the mode of supplying the defective cohesiveness of the system.

2. However common the remark, that youth is the season for improvement, it may be doubted if we generally appreciate to the full degree the superior plasticity of early years, and the gradual decrease of the property as life advances. The as yet unoccupied state of the infant mind must be taken into account along with the very great energy of the principle of growth, which gives a firmness and security of hold to early impressions beyond everything that is communicated in later life. We see this in the impossibility of eradicating a provincial accent after one has grown to maturity; so the opinions and sentiments contracted in youth can seldom be changed in middle or advanced life.

3. In acquiring habits, the favourable disposition of the mind is of the greatest importance. Liking, taste, or predilection for the task concentrates all the energies of the system upon the work, and favours to the utmost the cementing process. A strong natural liking will often compensate for want of natural aptitude, by making the most of what power there is.

4. In the default of natural liking for the subject, the attention may be secured to a certain extent by pains and penalties; but as these waste and enfeeble the powers of life altogether, there is a loss on the whole, although there may be a gain in the particular case. The education of the young cannot be conducted wholly on the principle of fascination; but if pain has to be frequently or systematically

resorted to, no considerable general progress need be looked for.

5. Health, freshness, and vigour in the bodily system are conditions of the growth of habit. The brain may be powerful in a feeble body, but a certain co-operation of the other organs is necessary to the integrity of its functions; and when the stage of nervous exhaustion has been reached, there is nothing gained by continuing the exercise. After adequate rest and refreshment, the plastic property is at its height; there is a limit to what it can perform, which is marked by the approaching sense of fatigue; and at this point, the efforts in the way of learning should cease. The prevailing error hitherto has been to overrate this limit, and to keep up school exercises too long at one time. A short intermission enables the work to be resumed.

6. These observations apply to mental acquisitions generally. In the peculiar case of *moral* acquisitions—such as habits of fortitude, courage, contentment, honest dealing, obedience—some special considerations are applicable. In the first place, there must be a powerful *initiative*, or some influence strong enough to make a decided commencement and to keep up the desired conduct for a certain length of time. Either the coercion of some authority, or a powerful example, or an energetic resolution of the individual will, should induce the person to enter on the course prescribed, and to persevere until the plastic process, in other words, the power of habit, has had time to operate. The commencing stimulus may then be gradually withdrawn in favour of the self-sustaining force that iteration has engendered.

HABIT AND REPUTE, a phrase used in Scotch Law to denote something so notorious that it is taken without further proof to be true. The best known example of this is where a man and woman cohabit as husband and wife, and are reputed by the neighbours to be married, in which case the law of Scotland, with great liberality, assumes, as a positive and incontrovertible fact, that a previous marriage had taken place, and no evidence to contradict such a presumption, or legal fiction, is even allowed. In England, no such doctrine prevails, and the marriage would have to be proved in the usual way, if called in question, by a suit which directly raises such question though the parties had all their lives lived together as man and wife.—There is also, in Scotland, an application of the doctrine of habit and repute to persons when convicted of stealing; for if the individual is a habit and repute thief—i. e., a notorious thief—his offence is greater, and liable to a more severe punishment. In England, a somewhat similar effect is produced more circuitously, by proving after the trial that the thief had been several times previously convicted, in which case he is generally punished by a severer sentence.

HABITA'TION, in the Roman Law, meant a servitude by which a person could only use a house as a habitation or dwelling-house, and for no other purpose. In England and Scotland, such a restriction can only be produced by the operation of express covenants or stipulations in the lease.

HA'CKBERRY. See Nettle Tree.

HACKLÄNDER, Fried. Wilh., a popular German poet, was born at Burtscheid, near Aix-la-chapelle, 1st November 1816. After several vicissitudes, he proceeded to Stuttgart, where he commenced his literary career with *Bilder aus dem Soldatenleben im Frieden*, which appeared in the *Morgenblatt*, and has since been translated into several languages. The truth and pleasant humour of this little book attracted the attention of Baron von Taubenheim, who invited H. to accompany him on his travels to the East. The literary fruits of this journey were *Daguerreotypen, aufgenommen auf Einer Reise in den Orient* (2 vols. Stuttg. 1842; 2d edit. 1846), and the *Pilgerzug nach Mekka*, a collection of Oriental tales and legends. At a later period, he published *Wachtstuben-abenteuer* (a continuation of the *Soldatenleben*), *Märchen*, and a variety of smaller works. In March 1849, he went to Italy, was present in the campaign in Piedmont, and afterwards published his *Soldatenleben im Kriege* (2 vols. 1849—1850). In 1849 he married, and settled near Stuttgart, where he has since published several humorous romances: *Handel und Wandel* (2 vols. 1850), *Eugen Stillfried* (3 vols. 1852), *Namenlose Geschichten* (3 vols. 1851), &c. H. has been styled the German Dickens. His comedy entitled the *Geheimer Agent* has been performed on all the stages of Germany, and translated into Hungarian, Polish, and English. His *Magnetische Curen* was a success. Other works of his are *Ein Winter in Spanien* (1855); *Der neue Don Quixote* (1858); *Kunstlerman* (1866); *Zwölf Zettel* (1867); *Das Geheimness der Stadt* (1868); the play *Die Marionetten* (1868); and *Der Letzte Bombardier* (1870).

HA'CKMATACK. See Larch.

HA'CKNEY, the name of a parish of England, in the county of Middlesex, which now forms a suburb of London, and is three miles north-north-east of St Paul's. It was at one time a favourite suburban residence of the London citizens, but the current of fashion having for many years been setting to the west, H. no longer holds the rank it formerly did. In its earlier and fashionable days, it is said to have given its name to hackney-coaches.

HACKNEY-COACHMEN differ in no respect from other carriers, except that in addition they are generally put under police regulations in all the towns and cities of the United Kingdom, and a tariff of fares imposed upon them. They require a licence from the town-council or other similar body, and must conform to the regulations imposed by this authority. In London, acts of parliament have been passed to define these regulations, and the legal fare is fixed at 6*d.* per mile, or part of a mile. In other cities and towns, the legal fare is higher.

HA'DDINGTON, a market town and royal and parliamentary borough of Scotland, capital of the county of the same name, is situated at the foot of the Garleton Hills, on both sides of the river Tyne, about 16 miles east of Edinburgh. The old Abbey Church, a fine Gothic structure, in partial ruin, and situated close to the banks of the river, is the most interesting object in the town. John Knox and George Wishart preached in this church. Among the other principal buildings may be mentioned the Corn Exchange, necessarily a very commodious building, H. being one of the largest grain-markets in Scotland. The inhabitants are chiefly dependent upon agriculture, but there are nurseries, corn-mills, breweries, tanneries, &c., in the town and vicinity. H. unites with North Berwick, Dunbar, Jedburgh, and Lauder in sending a member to parliament. Pop. (1871) 4007.

HADDINGTONSHIRE, or EAST LOTHIAN, a maritime county in Scotland, lying between N. lat. 55° 4′ and 56° 5′, and W. long. 2° 25′ and 3° 2′, is bounded on the N. and E. by the Firth of Forth and the German Ocean, S. and S. E. by Berwickshire, and on the W. by Midlothian. The extreme length is about 25 miles, and breadth about 17; area, 179,142 acres, or 280 square miles. In the south of the county are the Lammermuir Hills, rising to the height of 1732 feet. In the north and north-east is a strip of level ground of unequal breadth, composed of clay and loam, and mostly very productive for all kinds of crops. The climate is excellent on the lower grounds, and the rainfall much under the average. There are few streams of any considerable size, the principal being the Tyne, which flows north-east across the county into the sea at Tyningham. East Lothian has long enjoyed high agricultural fame. John Cockburn of Ormiston, who is regarded as the father of improved Scottish husbandry, and who was born in this county in the end of the 17th c., was the first to test its capabilities. This enterprising man gave long leases, and encouraged his tenantry to lay out their farms in regular enclosed fields. He introduced the culture of turnips, rape, and clover; and turnips in drills were sown on one of his farms as early as 1725, and brought to such perfection in ten years thereafter, that a specimen of a turnip, weighing 35 pounds, was sent for public exhibition to Edinburgh. Potatoes were also first planted in the fields in 1734 at Ormiston. Pennant says that hedges round fields were first planted in this county, and here the thrashing-machine was first introduced, in 1786, by a native, Andrew Meikle. In September 1862, the first steam-plough possessed by a tenant-farmer in Scotland was introduced into this county by Mr Sadler, Ferrygate. The well-known varieties of wheat, Hunter's, Hopetoun, Fenton, and Shirreff's bearded, all originated in Haddingtonshire.

According to the agricultural statistics taken in 1873, the total number of acres under rotation of crops was 112,608, occupied by 545 tenants. There were 10,793 acres under wheat; 15,498 under barley; 15,948 under oats; 2921 under beans; 6185 under potatoes; and 15,335 under turnips. The number of draught and other horses was 3629; cattle, 7678; sheep, 114,152; swine, 2911. Total stock, 128,370. On comparison with the other Scotch counties, it will be found there are only 3 with a greater acreage of wheat, 4 with more barley and potatoes, and 13 with more turnips; while in yield per acre H. occupies a very high position, particularly in its crops of oats. The land rental, exclusive of railways, was £291,452; railways, £17,478. Old valuation (1674), £14,072. Coal and limestone are abundant. The former was wrought in the 13th c., the earliest recorded in Scotland. H. returns one member to the House of Commons; its parliamentary constituency in 1873—1874 was 924. Pop. (1871) 37,771.

Historical interest is confined almost entirely to the battle-field of Dunbar, where Cromwell defeated the Covenanting army in 1650; and Prestonpans, where the Pretender defeated the royal troops in 1745. Among the antiquities may be named the ruins of the Castles of Tantallon, Dirleton, Luffness, Hailes, and Innerwick. The principal towns are Haddington, Dunbar, and North Berwick.

HADDOCK (*Gadus* or *Morrhua Æglefinus*), a fish of the same genus with the cod, and much resembling it in general appearance. The number of fins is the same as in the cod, there being three dorsals and two anals. The H., like the cod, has a barbule at the point of the lower jaw. The H. is brown on the back, silvery on the belly; the lateral line is black, and there is a black spot behind each of the pectorals, these spots sometimes extending so as to meet on the back. A ridiculous legend ascribes these spots to the finger and thumb of St Peter, and states the H. to be the fish from the mouth of which he took the tribute-money, 'the inventors of the legend never adverting to the improbability of a marine fish living in the fresh-water lake of Gennesaret.' The H., indeed, is not even found in the Mediterranean. Nor does it enter the Baltic, although plentiful in the northern parts of the Atlantic Ocean, both on the European and the American coasts. On the British coasts, it is abundant almost everywhere, appearing in great shoals at particular seasons, but in size and quality the haddocks taken at one part of the coast differ much from those of another. Those of the east coast, and particularly those caught in deep water, are in great esteem, and those of Dublin Bay are remarkable for their large size. A H. of 16 lbs. has been taken in Dublin Bay. Generally, however, this fish is much smaller. It is taken both by trawl-nets and lines. Pieces of the herring and sand-eel are most attractive baits. The H., when really of good quality, is perhaps the finest of all the *Gadidæ;* and the numbers taken on some parts of the British coasts are very great, rendering it, in an economical point of view, a very important fish. It does not 'take salt' so well as the cod, but is often cured by drying and smoking. In March and April, the H. is out of season; in October, November, December, and January, it is in finest condition. *Finnan Haddocks* and *Bervies* are well known, particularly in the Scottish markets.

HADERSLEBEN, or **HADERSLEV**, a town of the German empire, in the north of the province of Slesvig-Holstein, on the Hadersleben Fiord, a narrow arm of the sea, stretching inland westward from the Little Belt, 33 miles north of Flensborg. The church of St Mary is a large and handsome edifice. H. has a port for small vessels; and a gymnasium. Pop. (1871) 8259. H., which formerly belonged to Denmark, received its town-rights from Waldemar II., in 1292; and here, in 1448, Count Christian of Oldenburg was elected king of Denmark, and began the present dynasty.

HADES, in Greek Mythology, was the god of the lower world, more commonly spoken of as Pluto (q. v.); the name was also applied to his kingdom, the abode of the departed spirits or shades. See GREEK RELIGION, also HEAVEN and HELL.

HADITH (something new, a story, legend, tale; emphatically, Hadith Ar-Rassul), the traditions about Mohammed the Prophet's sayings and doings, which, as a complementary to the Koran, form, together with it, the supreme authority for all religious and legal questions of the Mohammedans. Originally, it was not allowed to commit them to writing (like the Mishnah, q. v.), but the danger of their being entirely forgotten in the course of time, led to their being written down in the first centuries after Mohammed. Those who, notwithstanding, know them well by heart are honoured with the title of Hafiz (retainer, keeper). The six principal sources for these traditions are Ayeshah, after the death of Chadija, the prophet's favourite wife; Abu Hureira, his constant companion and servant; Abdallah Ibn Abbas; Abdallah bnu Omar b. Al-Ass; Djaber b. Abdallah Ansari; and Ans b. Malik. The principal and most authoritative collections of traditions are those of Bochari, Malik, Abu Dhaud, Tarmesi, Nissai, Moslem, and Sojuti. Of these, again, the most important code is the *Sahih* of Bochari, who, it is said, spent sixteen years of his life in travelling through the length and breadth of the land for the purpose of collecting such traditions, and who singled out, from a number of 60,000, about 7270 as alone genuine. This code was printed for the first time with commentaries (Delhi, 1848—1854), of which only three copies are to be found in Europe—one is at present in the British Museum; and another edition (by Krehl, in Leyden) has been published. See SUNNA, MOHAMMED, MOHAMMEDANISM.

HADJI KHALIFAH, the surname of MUSTAFA-BEN-ABDALLAH, a celebrated Turkish historian, who was born at Constantinople about the end of the 16th c., and died in September 1658. From 1622 till 1633 he was employed in the Turkish army, and had an excellent opportunity of acquiring information regarding matters of history, geography, &c., of which he eagerly availed himself.

H.'s works are written in Turkish, Arabic, and Persian. Besides a number of smaller works on geography and history, we have the celebrated *Asam al-kotoub ve al-fonoum* (Names of Books and Sciences), written in Arabic, and of which Flügel has given a translation with the text under the title *Lexicon Bibliographicum et Encyclopædicum a Mustafa-ben-Abdallah* (Leip. 1835—1858, 7 vols.). There is also a French translation, by Petis de la Croix (1694—1705), which is to be seen in MS. in the Imperial Library. In this work, H. gives a definition of each science and the principal writers on each; specifies the titles, contents, language, dates of composition, and translations of more than 25,000 works; also the names of the authors and dates of their death. It is the most complete catalogue in existence of works written in Arabic, Persian, and Turkish; *Tarikh Kebir* (Great History), a history of the world from the creation of Adam to 1655, containing notices of 150 dynasties, principally Asiatic; also a history of the Ottoman empire from 1591 to 1658; and a history of the maritime wars of the Turks, which has been translated into English (Lond. 1831).

HADLEY, JOHN, an English mathematician, the intimate friend of Newton, from whom, as is now generally supposed, he borrowed the idea of the instrument called Hadley's Quadrant (see SEXTANT). In 1717, he became a member of the Royal Society, before which he read some useful papers, which were afterwards published in their *Transactions*. The honour of having invented the sextant is claimed by their supporters for H., Godfrey, and Newton; for H., because he was the first to construct the instrument, and give a description of it, which he did in 1731, before the Royal Society; for Godfrey, because, in 1730, he presented a gentleman in Philadelphia, United States, with a description of the instrument almost coinciding with H.'s, which description was transmitted to the Royal Society in 1732; and for Newton, because he, in 1727, gave a description of the instrument to his friend Halley, who, for some reason unknown, suppressed it, and it was not till after his death in 1742 that it was discovered. The Royal Society decided that Godfrey and H. were both entitled to the honour of the invention, and accordingly each received a reward of £200. H. died 15th February 1744.

HADRIA'NUS, P. ÆLIUS, a Roman emperor (117—138 A. D.), was born at Rome, 24th January 76 A. D. During the reign of Trajan, who was his guardian, and with whom he was connected by marriage (his father, who was a Roman senator, having married the aunt of Trajan), he filled several high offices in the state. He accompanied the emperor in his wars against Decebalus, where he distinguished himself by his bravery; and in 117, when Trajan set out on his return to Italy, he was left behind with the army as governor of the province of Syria. When the intelligence reached Antioch that Trajan had died in Cilicia on his journey home, H. was proclaimed emperor by the army, August 11, 117 A. D. The state of the empire at the time was extremely critical. Insurrections had broken out in Egypt, Palestine, and Syria; Mœsia in the East, and Mauritania in the West, were both invaded by barbarian hordes; while the Parthians had once more asserted their independence, and won several successes over the imperial forces. H., perceiving the advantage of a peaceful policy, wisely resolved to limit the boundaries of the Roman dominion in the East, and concluded a peace with the Parthians, surrendering to them all the country beyond the Euphrates. In 118, he repaired to Rome (where he had been acknowledged by the senate), established his authority by liberality towards the people, and suppressed with great severity a patrician conspiracy against his life. The Roxolani (modern Russians), who had made an inroad into Mœsia, were induced to retire by large gifts. In the year 119, for the purpose of becoming acquainted with the state of the provinces, he commenced his celebrated journey, which he is said to have performed chiefly on foot. He visited Gaul, Germany, Britain (where he built the famous wall extending from the Solway to the Tyne), Spain, Mauritania, Egypt, Asia Minor, and Greece, whence he returned to Rome, 126 or 127 A. D., and received the title of *Pater Patriæ*. H. spent the years 132 and 133 in Athens, for which city he had a great predilection. After once more visiting Syria, he returned to Italy, and spent the last years of his life at Rome and Tibur. During the severe illness which carried him off, July 10, 138, at Baiæ, he was subject to violent outbursts of cruelty, to which, as well as to jealousy and pleasure, he was naturally addicted. After the death of Lucius Ceionius Commodus, whom he had adopted under the name of Lucius Ælius Verus, he appointed Titus Aurelius (afterwards the emperor Antoninus Pius) his successor. During his reign the army was vigorously disciplined and reorganised, so that the barbarians were not likely to attribute H.'s conciliating and peaceful policy to fear or weakness. As a civil ruler, he merits high praise, particularly for the just and comprehensive view he appears to have taken of his duties as a sovereign. Hence to him is attributed, more than to any other, the consolidation of the monarchical system of Rome. H. also divided Italy into four parts under four consuls, to whom was intrusted the administration of justice. H. erected numerous splendid edifices, the chief of which were—the mausoleum called the *Moles Hadriani*, in Rome (the groundwork of the modern castle of St Angelo), the Ælian bridge leading to it, and the magnificent villa at Tibur. He likewise laid the foundation of several cities, the most important of which was Adrianopolis. H. was a lover of the fine arts (in the history of which, as well as of jurisprudence, his reign forms an important era), of poetry, philosophy, and rhetoric, all of which he attempted. He set a high value on Greek literature, and likewise on the *cultus* of Greece, and caused himself to be initiated into the Eleusinian mysteries.

HÆMADYNAMO'METER (derived from the Greek words *hæma*, blood, *dynamis*, force, and *metron*, a measure) is the name of an instrument devised about thirty years ago by Poisseville for determining the pressure of the blood in the arteries and veins of the living body. The pressure of the blood is measured, as in the barometer, by the column of mercury that it balances. The instrument has been recently improved in various ways, and a contrivance has been added by which the oscillations of the mercury are inscribed in the form of an undulating curve on a cylinder made to revolve by clock-work; the height of the undulations denoting the *pressure*, and their horizontal amplitude the *time*.

HÆMASTA'TICS AND HÆMADYNA'MICS, the Statics (q. v.) and Dynamics (q. v.) of the blood (Gr. *haima*). See BLOOD, CIRCULATION OF THE BLOOD.

HÆMATE'MESIS (Gr. *haima*, blood, and *emesis*, vomiting), a rejection of blood from the stomach, usually in consequence of some morbid change in its mucous membrane. See STOMACH, DISEASES OF. Hæmatemesis is apt to be mistaken for Hæmoptysis (q. v.), unless careful attention is given to the mode in which the blood is ejected. The proper remedies are the liberal use of ice or of ice-cold water; acetate of lead, in doses of two to five grains; tannin, five to ten grains (it must not, however, be given with acetate of lead); oil of turpentine, six to ten drops, repeated every hour or two. The first and the last are perhaps the most effectual means, which can be used in combination. The turpentine may be given whipped up with the white of an egg. It must be discontinued when the symptoms of urinary irritation begin to appear.

HÆ'MATINE, or **HÆMATO'SINE**, is the term applied by chemists to the red colouring matter of the blood of the higher animals. In the normal state, it occurs in solution in the interior of the blood corpuscles or cells; but in certain morbid conditions, in which the blood undergoes a species of decomposition, it is deposited in a solid form in the tissues surrounding the smaller vessels through whose walls it has percolated. It can only be isolated in a coagulated form, in which state it has been submitted to analysis by Mulder, who assigns to it the formula $C_{44}H_{22}N_3O_6Fe$. Its chief peculiarity is, that it contains a comparatively large percentage of iron (very nearly 7 per cent.). It is the only constituent of the body (if we except the hair) which does contain this metal.

HÆ'MATITE (Gr. *haima*, blood), a mineral consisting chiefly of peroxide of iron, often occurs in large quantity, and is a valuable iron ore. See IRON. There are two principal varieties, *Red H.* and *Brown Hæmatite.* The former frequently occurs in globular and grape-like masses, with a radiating fibrous structure. It is sometimes of a dull reddish-brown, sometimes of a brilliant bluish-gray colour; the streak is blood-red. An earthy kind is called *Iron Froth*, and consists almost entirely of peroxide of iron. Brown H. contains about 14 per cent. of water. Its colour is generally some shade of brown, sometimes almost black. Different shades of colour are often presented in concentric wavy bands. The surface is often covered with a beautiful black varnish, which is sometimes iridescent. It is not unfrequently found crystallised in rhombohedric, prismatic, or tabular crystals. The primary form is a right rhombic prism. Both Red H. and Brown H. are found in Britain, but the former more abundantly.

HÆ'MATOCELE (Gr. *haima*, blood, and *kēlē*, tumour), a tumour containing blood; opposed to Hydrocele (q. v.).

HÆMATO'XYLINE is a chromogen (a term used by chemists to denote certain nearly or quite colourless substances which, under certain influences, yield well-marked colours) obtained from logwood (*Hæmatoxylon Campeachianum*). Its composition is represented by the formula $C_{32}H_{14}O_{12}$ + 6aq., and in its pure state it occurs in transparent glistening straw-coloured prisms. It has a sweet and not astringent taste, is sparingly soluble in cold water, but dissolves readily in boiling water, alcohol, and ether. The watery solution is not affected by the oxygen of the air, but if a very small quantity of ammonia is added, it assumes an intensely reddish purple colour.

Hæmatoxyline is obtained by mixing powdered extract of logwood with quartzose sand (to prevent its agglomeration into lumps), and digesting this powder for several days with about six times its volume of ether. The liquid is then distilled till the residue assumes the consistence of a syrup. If this residue is mixed with water, crystals of hæmatoxyline are in a few days deposited, which on an average weigh about one-eighth of the extract that was employed.

The colour reactions of this substance with metallic compounds are singular, and in consequence of the tinctorial power of some of them, deserve a brief notice. Solution of acetate of lead gives with one of hæmatoxyline a white precipitate, which speedily becomes blue; salts of copper give a dirty green precipitate, which also soon becomes blue; chloride of barium produces a red precipitate; protochloride of tin gives a rose-coloured, and iron alum, a scanty blackish precipitate.

The purple colour which the solution of hæmatoxyline assumes if oxygen and ammonia are present, is due to a decomposition, of which a substance termed *hæmatein* is one of the products; the compound resulting from the union of hæmatein and ammonia possessing this tint.

The solution of hæmatein-ammonia (or hæmateate of ammonia, as some chemists have termed it) yields coloured precipitates with many metallic salts; with acetate of lead, it gives a deep blue, with sulphate of copper, a violet blue, with protochloride of tin, a violet, and with iron alum, a black precipitate.

It is upon the various reactions which have been described in the preceding paragraphs that the value of logwood as a dye depends.

HÆMATOZO'A (Gr. *haima*, blood, and *zoōn*, a living creature) is the term applied by helminthologists to the entozoa existing in the blood. They occur in mammals, birds, reptiles, fishes, and many invertebrate animals. Some of them belong to the Nematoidea, others to the Trematoidea, and others to the Protozoa. Most of them are microscopic, devoid of generative organs, and exist in the blood, circulating both in the arteries and in the veins. A very small number attain a considerable size, and are provided with organs of reproduction. These larger ones are generally found in some definite part of the circulating system. Thus, for example, in man the *Distoma hæmatobium* is almost entirely restricted to the abdominal venous system; in the horse, the *Sclerostoma aneurysmaticum* to the abdominal arterial system; and in the porpoise, the *Pseudalius filum* to the pulmonary artery and its branches.

Nothing definite is known regarding the origin of these parasites, but certain observations made upon the H. of the frog by Valentin (and subsequently confirmed by Vulpian), lead to the belief, that some of the more minute forms are the larvæ of a worm living in the organs surrounding the vessels. We shall restrict our remarks to the H. occurring in man, the horse, and the dog. By far the most important of human H. is the *Distoma hæmatobium* already mentioned. It has only been observed in Egypt, where it is very common, and where it was found by Griesinger 117 times in 363 autopsies. The male, which is the larger of the two, is about $\frac{3}{10}$ths of an inch in length. The common Liver Fluke (*D. hepaticum*) has, in one instance at least, been found in the interior of the portal vein. In the various cases in which distomata have occurred in tumours, they must have been conveyed to the places in which they were found by the blood.

In the year 1665, Ruysch discovered a large number of small worms in a dilatation of the mesenteric artery of a horse. Sixty years afterwards, a second case was noticed, and it is now known that such cases are of extreme frequency. These verminous aneurisms of the abdominal arteries occur in the ass and in the mule, as well as in the horse. The worm found in them is the *Sclerostoma armatum*, one of the Nematoidea, and often more than an inch in length. It is old horses that are chiefly affected; indeed they scarcely ever seem to escape, for Rayer found these tumours 48 times in the examination of 50 worn-out horses. For much very interesting information on this curious subject, the reader is referred to Rayer's Memoir in the *Archiv. de Médecine comparée* for 1842.

In the dog, H. sufficiently large to be visible to the naked eye are rare. Thirteen such cases are collected by Davaine in his *Traité des Entozoaires*, 1860, the worm generally being a filaria. The microscopic larvæ of a nematoid worm are sometimes found in enormous quantities circulating in the blood of this animal. From the examination of the blood of 480 dogs, Gruby and Delafond believe that 1 in every 20 of these animals presents this peculiarity.

In none of the above cases does the presence of these entozoa appear to affect the general health of the individual in whom they reside, whether he be man, horse, or dog.—For further information on this subject, the reader may be referred to Davaine, *op. cit.* pp. 306—342, and Vogel's *Pathological Anatomy*, p. 442, &c.

HÆMATU'RIA (Gr. *haima*, blood, and *ouron*, urine), the discharge of blood with the urine, usually from disease of the kidneys or bladder. It is rather a symptom than a disease, and takes its character from the associated morbid conditions of the parts concerned. It is a symptom always of some gravity, but not very often directly fatal. Perhaps the best general remedy is the tincture of the muriate of iron, given in water in doses of twenty drops.

HÆMODORA'CEÆ, a natural order of endogenous plants, consisting of herbaceous plants with fibrous roots, and sword-shaped leaves; differing from *Iridaceæ* in habit, and in having the stamens six in number, or if only three, opposite to the petals. There are about fifty known species, chiefly natives of North and South America, South Africa, the Mascarene Islands, and New Holland. Some of them have beautiful flowers. A red colour exists in the roots of some; hence the name Blood-root has been given to them. In this order are ranked the *Vellozias* or Tree Lilies.

HÆMO'PTYSIS (Gr. *ptysis*, spitting), expectoration of blood, a very significant and often dangerous symptom of disease of the lungs or heart, in all cases of great importance, and requiring immediate attention, but apt to be viewed popularly with a somewhat exaggerated alarm. It is seldom directly fatal. It is rather as an indication of dangerous disease, than from its immediate danger, that it requires such careful attention; but unquestionably, it is a matter of common prudence to seek medical advice on the appearance of even the slightest tinge of blood in the expectoration from the lungs. The gravity of this symptom depends very much on its cause. The treatment can scarcely be undertaken without a medical examination; but in case of extremity, it may be desirable to know that repeated doses of Ipecacuanha (q. v.), carried even up to the emetic effect, have often been found serviceable.

HÆ'MORRHAGE (Gr. a bursting forth of blood), a flux of blood from ruptured arteries, veins, or capillaries. See Bleeding.

HÆ'MORRHOIDS (Gr. flowing of blood). See Piles, for which disease hæmorrhoids is a technical synonym.

HÆMUS, Mount. See Balkan.

HÆRE'DITAS JA'CENS, in Scotch Law, means the heritable estate which a deceased person has left, as it remains before the heir has made up a title to it, and when therefore the property lies to a certain extent in abeyance. When a creditor of the deceased wants to recover his debt, he was formerly compelled by a circuitous process first to compel the heir to complete his title, or declare his refusal to do so; but now, by the Titles to Land (Scotland) Act, 31 and 32 Vict. c. 101, he merely raises an action in the usual way, and obtains a decree of adjudication, under which he can help himself to the property. The expression of hæreditas jacens is not used in England, where similar niceties of feudal conveyancing have long been extinct.

HÆRE'TICO COMBURE'NDO, an old writ in English ecclesiastical law for burning a heretic, now abolished by 29 Char. II. c. 9.

HAFF, a word now obsolete in ordinary speech, signifies, in the Danish language, the sea, or a considerable portion of the sea. In German, it occurs only as the proper name of three estuaries of peculiar form on the southern coast of the Baltic—viz., the Stettin Haff (q. v.), the Frisches Haff (q. v.), and the Kurisches Haff (q. v.). Haff-fishing is a term used by the inhabitants of Shetland to signify sea-fishing.

HAFIZ (one who knows the Koran and the Traditions by heart), Mohammed, Shams-ad-Din (Sun of Religion), also called Lishan-al-Ghaib (Voice of Mystery), an eminent Persian divine, philosopher, and grammarian, and one of the greatest poetical geniuses of all times. He was born in the beginning of the 14th c. at Shiraz, and early applied himself to the pursuit of science and learning. His proficiency in various branches of knowledge brought him under the notice of the then reigning House of Muzaffer, and he was not only appointed teacher in the royal family, but a special college was founded for him. His spirit of independence, however, stood in the way of his worldly advancement, and notwithstanding many offers of princely favour, he remained during his whole life in the humble condition of a dervish. The burden of his poetical compositions is for the most part wine, love, nightingales, flowers—in fact, beauty in every form; occasionally also the praise of Allah and the Prophet, and reflections upon the instability of life and its joys; through all of them there runs, however, a withering contempt of all professional piety, mock-humility, and sanctified abhorrence of the good things of this world. These poems are of such exquisite sweetness, that the poet has also received the name of *Tschegerleb* (Sugarlip); and his contemporaries speak of his having drunk from the fountain of life, a draught of which was brought to him, in reward for his untiring perseverance in study, and his power of self-abnegation, by Zikhr (the Mohammedan Elijah) himself. No less remarkable are the sudden and striking transitions in his writings, and the readiness of wit which he displayed on several noticeable occasions during his lifetime.

Hafiz was married, and appears to have reached a happy old age. The time of his death is uncertain, the dates being variously given between the years 791 H. (1388 A.D., the date on his tombstone), and 797 H. (1394 A.D.). The enmity, however, which had been provoked in the breasts of the zealous defenders of religion by the freedom of his manners, and his more than Sufistic contempt for the outward forms of godliness, broke out undisguisedly at his death. The ministers of religion refused to repeat the usual prayers over the dead body, and after long altercations between the members of his family and his enemies, it was agreed that the question, according to the usual custom of the East, should be decided by lot. The result was favourable; whereupon he was buried with great honour. His tomb, situated about two miles to the north-east of Shiraz, has been adorned with the greatest sumptuousness by princes and nobles, and is still resorted to by pilgrims from all parts of Persia. It has been visited and described by Kæmpfer, Pietro della Valle, Chardin, Le Bruyn, Scott Waring, W. Franklin, Ouseley, and others.

How far some of the odes of H. are *bonâ fide* productions of a most licentious nature, or are intended as an allegorical and mystical revelation of things divine in the manner of Sufism (q. v.), as is declared by H.'s pious admirers, is a question which has at different times been raised before ecclesiastical and critical courts. A style brilliant, yet clear—imagery gorgeous, yet clothed in pure and unaffected diction—undulating melody and classical harmony, are the chief characteristics of H.'s anacreontic lyrics, which have not only become the national poetry of his country, but are even appealed to as an oracle on most important questions of peace and war. The number of their commentators is legion; the most valuable notes, however, are those of Shemii, Sururi, Sudi. The *Divan* was first collected by Said Kasim Anvari, after the death of the poet. Lithographed and printed editions of H. have been published at Calcutta (1790 and 1826), at Bombay (1828—1850), at Cawnpore (1831), Bulak (1834 and 1840), Constantinople (1841), &c. A very valuable edition by H. Brockhaus is now in the course of publication at Leipsic. Of translations in European tongues, we may mention those of Rewitzki in Latin (Vienna, 1771); Richardson, Jones, Ouseley, Hindley, Rousseau, in English; and by Hammer-Purgstall and Daumer, in German.

HAG (*Myxine* or *Gastrobranchus*), a genus of cartilaginous fishes, allied to lampreys, and with them ranked among Dermopterous Fishes by Owen. The fishes of this genus are of low organisation, and seem to connect fishes with cephalopodous mollusca. The vertebral column is reduced to a mere flexible cartilaginous tube, nor are there any other bones. The shape resembles that of an eel or worm, and Linnæus placed these animals among the *Vermes*. The mouth is formed by a mere membranous ring, with a single tooth on its upper part, whilst the tongue is furnished with two rows of strong teeth, and also performs the office of a piston in the use of the mouth as a sucker. Around the mouth are eight barbules or cirrhi, which have been regarded as analogous to the tentacles of the cuttle-fish, and are apparently the principal special organs of sensation. There are no eyes. There are six gill-bags on each side, receiving streams of water from the gullet (*œsophagus*) by as many tubes, the water being admitted to the gullet by an aperture situated rather on the left side, and carried off by a canal which opens about the end of the first third of the length. The tail is surrounded by a narrow fin. The skin is smooth and very unctuous.—One species, the GLUTINOUS HAG (*M. glutinosa* or *G. cœcus*), is found in the British seas, and is more common on the coast of Norway, where it is an object of dislike to fishermen, as they believe it to enter by the mouths of haddocks and other fishes caught in their lines, and to prey upon them so as to reduce them to mere skin and skeleton. A fish which has been thus treated is called a *robbed fish*. Six hags have been taken out of a single haddock. The hag is also said to make its way into fishes through their skin, and is therefore sometimes called the *Borer*. Some suppose, however, that hags are swallowed by the fishes on which they afterwards prey. The glutinous hag attains a length of 12 to 15 inches, and exudes a mucous fluid, which soon turns into a kind of jelly. It is of a dark-bluish brown colour above, and whitish beneath. The quantity of mucus which it exudes is so great that a single hag, confined in a jar of water, soon turns it all into a kind of jelly. The mucus is exuded from lateral pores.

Hag.

HAGAR (LXX. *Agar*), Gen. xvi. ff., an Egyptian bondwoman of Sarah. This her Semitic name (the Egyptian is unknown) has been derived from various roots, and has been translated accordingly—'slender,' 'stranger,' and 'flight' (in allusion to her after-life). Sarah having remained barren up to a very advanced age, at last gave H. to Abraham, ten years after his sojourn in Canaan, as a concubine—according to the Eastern custom—in the hope of being 'edified through her,' i. e., establishing a family of her own. H. bore Abraham a son, whom he called Ishmael (God has heard), and in whom he for a time saw the future father of the progeny promised him. But sixteen years later, and when Abraham was (we are told) a hundred years old, Sarah herself bore Isaac; and we find it significantly repeated nine times in seven verses (Gen. xxi. 2—9) that Abraham and Sarah were his parents—in repudiation, according to rabbinical authorities, of certain rumours about Isaac's illegitimacy, spread by Hagar. At last the domestic contentions that naturally arose led Abraham, though reluctantly, to cast out H. together with Ishmael. How the two fugitives lost their way in the desert of Beersheba; how the water in the bottle being spent, the broken-hearted mother set herself at a distance from her child, in order that she might not see his death; how her weeping and the loud voice of the boy were answered by an angel, who pointed out a well (Temzem, in the enclosure of Mecca)—all this forms one of the most touching and well-known narratives of the Bible.

In the New Testament, H. is referred to allegorically as Mount Sinai or 'the Jerusalem which now is' (Gal. iv. 22). Some rabbinical traditions (Ber. R. 67 d.) identify her with Keturah, the second wife of Abraham, mentioned Gen. xxv. 1; others (Ber. R. 51 d.) make her the daughter of Pharaoh, who, seeing the miraculous interference on behalf of Abraham in Egypt, said: 'Better that my daughter should be the slave of this man than the queen of any other.' The Mohammedans look upon H. as the legal wife of Abraham, and she is supposed to be buried in Mecca.

HAGBERRY. See BIRD-CHERRY and NETTLE TREE.

HAGEN, a small town of Prussia, in Westphalia, is situated on the Volme, 26 miles west of Arnsberg. It contains several churches, and has a pop. (1871) of 13,445, who carry on a considerable industry in dyeing and printing, and in the manufacture of cloth and hardware.

HAGENBACH, KARL RUDOLF, German theologian, was born, 4th March 1801, at Basel, where his father, Karl Friedrich Hagenbach, author of the *Tentamen Floræ Basileensis*, was professor of anatomy and botany. While at the universities of Bonn and Berlin, he became acquainted with the direction given to theology by Schleiermacher; and on his return to Basel, he received, from his intercourse with De Wette, a fresh impulse to the development of his theological opinions. After being an extraordinary professor, he became ordinary professor of theology in 1828, becoming an honorary doctor of theology in 1830. He delivered to public audiences beyond the university, and has since published through the press, several courses of lectures on the Nature and History of the Reformation (*Wesen u. Gesch. d. Reformation*, 6 vols. 1834—1843; 2d ed., 1851—1856), on the Early History of the Church (*Aeltere Kirchengesch.*, 2d ed., 1857—1863), and on the Church History of the 18th and 19th Centuries (*Kirchengesch. d.* 18 *u.* 19 *Jahrh.*, 2 vols., 3d ed., 1856, translated into English). His tabular view of the History of Dogmas (1828), and his compend of the same department of historical theology (*Lehrbuch. d. Dogmengesch.*, 2 vols., 4th ed., 1857, translated into English), are highly praised. His *Encyklopädie u. Methodologie d. Theologischen Wissenschaften* is one of the most useful manuals for the student of German theology, and its popularity in Germany has necessitated seven editions. A History of Evangelical Protestantism, several volumes of Sermons, a Memorial of De Wette, and a work on Religious Education in the Gymnasia, have also come from his pen; and he has given proof of his poetical talents in two small volumes of poetry, and in a collection of poems entitled *Luther u. Seine Zeit.*—Of H.'s brothers, JOHANN JAKOB has gained distinction as an entomologist, and EDUARD as a physiologist.

HA'GERSTOWN, a town in Maryland, United States, America, 66 miles west-north-west from Baltimore. It is a well-built town, with nine churches, two academies, seven newspaper-offices, court-house, town-hall, almshouse, and jail. Pop. (1870) 5779.

HA'GGADA (Heb. from *nagad*, *hagged*, to say, relate) is the free, rabbinical interpretation of Scripture, chiefly for homiletical purposes. As its name signifies, Haggada was something 'said' (not 'received,' like the authoritative Halacha) (q. v.): legend, saga, tale, gnome, parable, allegory; in fact, poetry springing up from the sacred soil, wild, luxuriant, and entangled like a primeval forest. On its three principal directions—the *Peshat* or hermeneutical investigation, *Derush* or practical application, and *Lod* or mystical illustrations—we cannot dwell here, nor can we follow Zunz's minute divisions of Haggada into: 1. Targumim; 2. Haggadistic elements in Halacha; 3. Ethical Haggada; 4. Historical Haggada; 5. Secret esoteric doctrine; 6. Special Haggada. It flowed in an uninterrupted stream for more than a thousand years—from the Babylonian exile to the 10th c. A. D.—and its innumerable authors are either entirely anonymous or at best pseudonymous. It grew into immense dimensions, as, although orally delivered, parts of it were gradually added in the shape of marginal notes or glosses to Bible MSS., or were committed to writing in the shape of independent collections. These either followed the order of the Scripture, and were called after the special biblical book around which they had woven their fabric, or they were arranged and called after the Sabbatical and festive pericopes on which they treated. The most extensive collections, originally composed of single fragments, which have survived are Midrash Rabboth (commenced about 700 A. D., concluded about 1100 A.D.), comprising the Pentateuch and the five Megilloth, and the Pesikta (about 700 A. D.), which contains the most complete cycle of pericopes. Strangely enough, this latter itself had, through the many extracts made from it at an early period (Jalkut, Pesikta, Rabbathi, Sutarta, &c.), fallen into oblivion since the 15th c., until Zunz, in his *Die Gottesdienstl. Vorträge der Juden* (Berlin, 1832), not only proved its existence by evidence, but even restored it out of these fragments and parallel passages; and about the same time, the old MS., which agreed with Zunz's statements to the minutest details, was found by Steinschneider at Oxford.

For the general form of Haggada, its language, its sources, and its development, no less than its vast influence on Christianity and Mohammedanism, and its immense usefulness for historical and theological investigations, we refer the reader to the articles MIDRASH and TALMUD.

Haggada shel Pesach is the name of a ritual, partly in Hebrew, partly in Chaldee, used on the two first evenings of the Passover, which contains, besides a brief description of the exodus, extracts from the Scripture, the Mishna, Tosephta, Mechiltha, Sifri, and the two Talmuds, and some liturgical pieces. Originally within a very small compass, it has been extended to its present larger size by subsequent centuries. Two 'Piutim,' or religious poems, were added in the 11th c., and four more Hebrew and Chaldee songs (the last originally a German *Volkslied*) as late as the 14th century.

HA'GGAI (*Aggæus*, *Haggæus*), the tenth of the twelve minor prophets, and the first of those who prophesied in Palestine after the Babylonian captivity. Of his own history, nothing positive is known. It is related that he was born in Babylon, of priestly lineage, and came to Jerusalem at a very early age. The Church Fathers suppose him to have been one of the exiles who had returned with Zerubbabel and Joshua; and Ewald infers from ii. 3, that he was one of the few who had seen the first temple, in which case he must have been a very old man when he composed his book. The time of his prophecies, however, is known with accuracy to fall in the 6th, 7th, or 8th month of the second year of Darius Hystaspis (cf. Ezra, v. 1; vi. 14; Haggai, iv. 24) = 520 B. C. Fifteen years had then elapsed since the foundations of the new temple had been laid; but during the reign of Cambyses and Pseudo-Smerdis, the work had been neglected, and even the most zealous men began to think that the time of the re-establishment of the sanctuary was not yet at hand. Suddenly, H. presented himself before Zerubbabel and Joshua the high-priest, and strongly urged the re-establishment of the sanctuary, pointing at the same time to the famine in the land, as the divine punishment for the culpable neglect of the people, who only thought of their own houses, and not of that of God. His words made a deep impression, and the building was recommenced (i.). The second discourse of the prophet—about a month later—predicts a still greater glory to the new temple than had belonged to the former (ii. 3—9). Two months afterwards, he had to renew his reproaches against their inertness, and his promises of a blessed future (ii. 10—19). The fourth prophecy (ii. 20—23), delivered on the same day, is directed to Zerubbabel, and foretells great revolutions and political changes; but he, Zerubbabel, shall remain a 'signet' in the hands of God—i. e., the Jews and their princely leaders would not be harmed.

The style of H. is prosaic, and labours under an uncommon tameness and poverty of expression, principally apparent in the frequent repetition, within the short space of two chapters, of certain words and phrases, which could not well have been purposely retained for the sake of ornamentation (Eichh. Einl., s. 599). There is hardly any parallelism; but the prophet has endeavoured to impart a certain vivacity to his writing by means of interrogation. The diction itself is, generally speaking, pure and clear. H.'s name appears joined to that of Zechariah in some of the inscriptions of the Psalms (127 and 145—148 in lxx., 125, 126, 145—148 in Peshito, 111 and 145 in Vulgate), a circumstance which must point to the existence of an old tradition about these prophets having striven for the re-establishment of the music and singing of the psalms in the temple. Some critics suppose our present book of Haggai to be simply an epitome of some larger book, or a condensation of H.'s orally delivered prophecies. However this may be, they have certainly not gained in strength by any such compression, as must well have been presumed.

HAGHE, Louis, a well-known water-colour painter of the present day, was born in Belgium in 1802, but settled in London at an early age. He first acquired a reputation as a lithographer, his most splendid lithographic work being Roberts's 'Sketches in the Holy Land, Syria, Idumea, Arabia, Egypt, and Nubia.' Not less superb were his lithographs of his own drawings of old Flemish interiors. Subsequently, he devoted himself to painting in water-colours, became a leading member of the association formed to promote this branch of art; and in the exhibitions of this Society, his productions have always been among the most attractive. H. displays a decided predilection for the scenery and history of his native land. Among his pictures may be mentioned the 'Palace of Courtray,' and the 'Audience Chamber at Bruges,' which are remarkable for their harmony of colour, fidelity in detail, and richness of architecture. He obtained a gold medal at the Paris Exhibition of 1855.

HAGIO'GRAPHA. See Bible.

HAGUE, or The **HAGUE** (Dutch, *'s Gravenhage*), the capital of the Netherlands, and the residence of the king, is a pleasantly situated, well-built city in South Holland. Pop. (in 1870) 90,277. It is intersected in all directions by canals, and shady avenues of linden-trees, and abounds in palaces, public buildings, and stately houses. It has a good public library, containing 100,000 volumes, and noble galleries of paintings, the choicest of which, containing some of the most precious specimens of the Dutch school, is in the palace of the present king. The town contains 14 churches, the most notable of which is that of St James, founded in 1308, and distinguished for its lofty hexagonal tower with a *carillon* of 38 bells. The H. is the seat of the second chamber of the states-general, and of various tribunals and public offices, in one of which are deposited the archives and state papers which have been preserved by the republican and regal governments of the country for 400 years. In a historical point of view, the most interesting buildings of the H. are the Gevangenpoort, or the prison gate-house, in which Oldenbarnevelt, the brothers De Witt, and many others distinguished in the history of Holland, have at different periods been confined; the Binnenhof, in which the former of these patriots was executed, and which, together with the Buitenhof, forms an irregular mass of public buildings of various ages, enclosed by moats, and approached by draw-bridges. Besides the various palaces within the H. itself, which are appropriated to the residence of different members of the royal family, or to the preservation of various national collections of interest, the most notable of which is the Mauritz Huis, containing a splendid collection of pictures by the Dutch masters, the palace known as 't Huis in 't Bosch (The House in the Wood), which lies on the outskirts of the town, in the midst of a noble wood, is specially worthy of notice for the frescoes and other paintings which it contains by Rubens, who, in conjunction with several of his most distinguished pupils, painted the ceiling and walls of several of the apartments. The H. is essentially a city of fashion, and its prosperity depends chiefly on the court and nobility. The trade consists principally of book-printing, lithographing, metal-founding, carriage-building, beer-brewing, distilling gin, cabinet-work, rope-spinning, making leather, &c.; and the natives of the port gain a livelihood by fishing. In the neighbourhood are many handsome country-seats; and not far off are Ryswick, celebrated for the treaty of peace signed there in 1697, and Schevingenen, a favourite bathing-place on the sea-coast, with which the H. is connected by a broad causeway, bordered with rows of trees. The origin of the H. is very ancient; and as far back as 1250, William, Duke of Holland and Emperor of Germany, erected a hunting-seat there, on the site of an older residence of his predecessors. In the 16th c., it was the seat of government of the states-general; and in the next century, it became the birthplace of many distinguished members of the House of Orange, and amongst others, of William III. of England; while, as the residence of the stadtholders, it was naturally the centre of the numerous important negotiations of European diplomacy, with which they were associated. The H. is connected by a railway with Amsterdam, 36 miles north, and Rotterdam, 13 miles south.

HAGUENAU, a town of the German empire, in the province of Alsace-Lorraine, ceded by the French in the war of 1870—1871, is situated on the Moder, 18 miles N.N.E. of Strasburg. It had been a free town of Germany before it belonged to France. It was founded in 1164 by Frederick Barbarossa, and, as it was intended for the reception of the imperial insignia, it was strongly fortified. It successfully withstood many sieges, especially during the Thirty Years' War; but on its occupation in 1675 by the imperialists, its fortifications were destroyed. On the 17th Oct. and 22d Dec. 1793, bloody battles took place here between the French and Austrians, in which the former were the victors. H. is a place of considerable manufacturing industry. Pop. (1871) 11,331.

HAHNEMANN, Samuel, a celebrated German physician, was born in April 1755, at Meissen, a small town in the neighbourhood of Dresden, the capital of Saxony. His father—a painter of the ware known as Dresden china—intended his son to follow his own occupation, but the boy displayed so ardent a love of letters that the head-master of the college (*Fürstenschule*) of Meissen afforded him gratuitously all the advantages of that institution, and he remained at it till he was 20 years of age. He then left Meissen, with 20 crowns as his whole fortune, and went to Leipsic, to prosecute his medical studies. Here he maintained himself by translating works out of Latin, French, and English into German. By his industry and frugality, he saved enough of money to enable him to visit Vienna, where, under the direction of Dr Quarin, he pursued his studies, and after various vicissitudes of fortune, he returned to Saxony, and settled in Dresden in the year 1784. Here he discovered a new salt of mercury, known by the name of *Mercurius Solubilis Hahnemanni*, and still extensively employed by physicians in Germany. He also published a monograph upon arsenical poisoning, which is distinguished by such accuracy of observation and clearness of diction as to be quoted with approval by Christison and other modern toxicologists. After spending four years in Dresden, where he had for a time the direction of a large hospital, he returned in the year 1789 to Leipsic. In the following year, while translating Cullen's *Materia Medica* out of English into German, his attention was arrested by the insufficient explanations advanced in that work of the cure of ague by cinchona bark. By way of experiment, he took a large dose of that substance, to ascertain its action on the healthy body. In the course of a few days, he experienced the symptoms of ague; and it then occurred to him that perhaps *the reason why cinchona cures ague is because it has the power to produce symptoms in a healthy person similar to those of ague.* To ascertain the truth of this conjecture, he ransacked the records of medicine for well-attested cures effected by single remedies; and finding sufficient evidence of this fact, he advanced a step further, and proposed in an article published in *Hufeland's Journal*, in the year 1797, to apply this new principle to the discovery of the proper medicines for every form of disease. Soon afterwards, he published a case to illustrate his method. It was one of a very severe kind of colic cured by a strong dose of *Veratrum album*. Before this substance gave relief to the patient, it excited a severe aggravation of his symptoms. This induced H., instead of drops and grains, to give the fraction of a drop or grain, and he thus introduced *infinitesimal* doses. Some years later, he applied his new principle in the treatment of scarlet fever; and finding that belladonna cured the peculiar type of that disease which then prevailed in Germany, he proposed to give this medicine as a *prophylactic*, or preventive against scarlet fever. From that time it has been extensively employed for this purpose. In the year 1810, he published his great work entitled *Organon of Medicine*, which has been translated into all European languages, as well as into Arabic. In this book he fully expounded his new system, which he called Homœopathy. See HOMŒOPATHY. His next publication was a *Materia Medica* consisting of a description of the effects of medicines upon persons in health. These works were published between the years 1810 and 1821, at Leipsic, where he founded a school, and was surrounded by disciples. As his system involved the administration of medicines, each separately by itself, and in doses infinitely minute, there was no longer any need of the apothecary's intervention between the physician and the patient. In consequence of this, the Apothecaries' Company brought to bear upon H. an act forbidding physicians to dispense their own medicines, and with such effect that he was obliged to leave Leipsic. The Grand Duke of Anhalt-Köthen appointed him his physician, and invited him to live at Köthen. Thither, accordingly, he removed in the year 1821, and there he prepared various new editions of his *Organon* and new volumes of his *Materia Medica* for publication. In 1835, he married a second time; his wife was a French lady of considerable position; and in the same year he left Köthen, and settled in Paris, where he enjoyed a great reputation till his death, which took place in the year 1843. On the centenary of his birth-year, in 1855, a statue was erected to his honour at Leipsic, at the expense of his disciples in Germany, France, England, and other countries, with the concurrence of the local authorities, who supplied the site in one of the public places in their handsome town.

H. is universally acknowledged to have displayed great genius, industry, and erudition. Jean Paul Richter calls him 'a prodigy of philosophy and learning.' He was a man of unblemished purity of morals, and his life, as well as his writings, was characterised by strong natural piety. He left a numerous family of sons and daughters.

HAHN-HAHN, IDA, COUNTESS, daughter of Karl Friedrich, Count von Hahn, a well-known authoress, was born at Tressow, in Mecklenburg-Schwerin, 22d June 1805. At the age of 21, she married a relative of her own; but the union proving unhappy, was dissolved in 1829. The lady sought consolation in poetry and travel, and visited Switzerland, Vienna, Italy, Spain, France, Sweden, and finally Syria and the East. In 1850, sick of her restless and unsatisfactory mode of life, she embraced Roman Catholicism, and two years later, entered the mother-house of the Order of the Good Shepherd at Angers. Her writings, consisting of poems, novels, and voyages, are voluminous, and are generally marked by morbid sentimentality and aristocratic prejudice. She is sometimes clever, and even brilliant, but always superficial. Several of her novels have been translated into English.

HAIL, HAILSTORM. The word hail, in English, is unfortunately used to denote two phenomena of apparently different origin. In French, we have the terms *grêle* and *grésil*—the former of which is hail proper; the latter denotes the fine grains, like small shot, which often fall in winter, much more rarely in summer, and generally precede snow. The cause of the latter seems to be simply the freezing of rain-drops as they pass in their fall through a colder region of air than that where they originated. We know by balloon ascents and various other methods of observation, that even in calm weather different strata of the atmosphere have extremely different temperatures, a stratum far under the freezing-point being often observed between two others comparatively warm.

But that true hail, though the process of its formation is not yet perfectly understood, depends mainly upon the meeting of two nearly opposite currents of air—one hot and saturated with vapour, the other very cold—is rendered pretty certain by such facts as the following. A hailstorm is generally a merely local phenomenon, or at most, ravages a belt of land of no great breadth, though it may be of considerable length. Hailstorms occur in the greatest perfection in the warmest season, and at the warmest period of the day, and generally are most severe in the most tropical climates. A fall of hail generally *precedes*, sometimes accompanies, and rarely, if ever, follows a thunder-shower. A common idea, which has found its way, as many popular prejudices continually do, into scientific treatises, assigns electricity as the origin of hail. But all observation, rightly interpreted, seems to shew that electricity and hail are *results* of the same combination of causes.

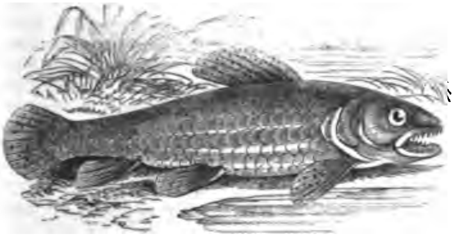
When a mass of air, saturated with vapour, rising to a higher level, meets a cold one, there is, of course, instant condensation of vapour into ice by the cold due to expansion; at the same time, there is generally a rapid production of electricity, the effect of which upon such light masses as small hailstones is to give them in general rapid motion in various directions successively. These motions are in addition to the vortex motions or eddies, caused in the air by the meeting of the rising and descending currents. The small ice-masses then moving in all directions impinge upon each other sometimes with great force, producing that peculiar rattling sound which almost invariably precedes a hail-shower. At the same time, by a well-known property of ice (REGELATION), the impinging masses are frozen together; and this process continues until the weight of the accumulated mass enables it to overcome the vortices and the electrical attractions, when it falls as a larger or smaller hailstone. On examining such hailstones, which may have any size from that of a pea to that of a walnut, or even an orange, we at once recognise the composite character which might be expected from such a mode of aggregation. Hailstones are reported to have fallen in tropical countries sometimes as large as a sheep, sometimes as large as an ox, or even an elephant! But it is probable that the aggregation in these cases was produced by regelation at the surface of the earth, when a series of large masses had impinged on each other, having fallen successively on the same spot. Whether this be the true explanation or no, it is certain that in British India, at the warmest season, hailstones have remained of considerable size for many days after their fall. A curious instance of the fall of large hail, or rather ice-masses, occurred on one of Her Majesty's ships off the Cape in January 1860. Here the stones were the size of half-bricks, and beat several of the crew off the rigging, doing serious injury.

We may conclude by a description (taken from *Mem. de l'Acad. des Sciences*, 1790) of one of the most disastrous hailstorms that has occurred in Europe for many years back. It illustrates very happily the greater part of what we have said about the origin of this meteor. This storm passed over parts of Holland and France in July 1788. It travelled *simultaneously* along two lines nearly parallel—the eastern one had a breadth of from half a league to five leagues, the western of from three to five leagues. The space between was visited only by heavy rain; its breadth varied from three to five and a half leagues. At the outer border of each, there was also heavy rain, but we are not told how far it extended. The general direction of the meteor was from south-west to north-east. The length was at least a hundred leagues; but from other reports, it may be gathered that it really extended to nearly two hundred. It seems to have originated near the Pyrenees, and to have travelled at a mean rate of about sixteen and a half leagues per hour towards the Baltic, where it was lost sight of. The hail only fell for about seven and a half minutes at any one place. The hailstones were generally of irregular form, the heaviest weighed about eight French ounces. This storm devastated 1039 parishes in France alone, and an official inquiry fixed the damage at about 24,690,000 francs—nearly a million of English money.

HAIMHALDA'RE, an old Scotch law-term, meaning to recover one's goods and bring them home again—now disused.

HAI'MSUCKEN, or **HAMESUCKEN**, a Scotch law-term, denoting the offence of feloniously assaulting a man in his own house or lodgings. This was an aggravation of the ordinary offence of assault. It was not so in England, where there is no peculiar name to distinguish this from other assaults.

HAIMU'RA (*Erythrinus macrodon*), a large fresh-water fish of Guiana, highly esteemed for the table.



Haimura.

It belongs to a small family of fishes, *Erythrinidæ*, exhibiting relations to the herring, salmon, and carp families. It is sometimes four feet in length. The teeth are large, and so formidable, that instances are said to have occurred of a captured H. biting off a man's hand. The H. abounds particularly in the upper parts of the rivers of Guiana.

HAINA'N, a large island in the China Sea, constituting a department of the province of Kwang-tung, is about 180 miles long and 100 broad, and is separated from the mainland by a strait 15 miles wide, filled with shoals and reefs. Its principal city, Kiung-chau, in 20° 7′ N. lat., and 110° 15′ E. long., is the most southern of the ports open for trade. The interior of the island is mountainous, and the inhabitants give but a partial submission to the Chinese. The population is about 1,500,000. Its productions are rice, sweet potatoes, sugar, tobacco, fruits, timber, and wax. Typhoons or cyclones are frequent off the coast during the summer months. Whaling is pursued here with success by Chinese fishermen.

HAINAUT, or **HAINAULT** (Ger. *Hennegau*), a frontier province of Belgium, is bounded on the E. by the province of Namur, on the N. by the provinces of Brabant and East and West Flanders, and on the S.W. by France. Area, 1424 square miles; pop. (1870) 896,285. The surface consists in the north and west of flat and fruitful plains, the south is occupied by the Forest of Ardennes. Hills occur only in the south-east, and consequently the course of most of the rivers is toward the west and north-west. The principal rivers are the Haine—from which the province has its name—the Scheldt, the Dendre, and the Sambre, the last a tributary of the Meuse. The soil is highly productive; wheat and flax are very extensively grown. Excellent breeds of horses, horned cattle, and sheep are reared. Toward the west, in the neighbourhood of Mons, are very extensive coal-fields. There are in this district more than 200 coal-pits, from which about 2,000,000 tons of coal are annually exported. Iron is also produced in considerable quantity, and marble, building stone, and limestone are quarried. Linen, porcelain, and pens are extensively manufactured.

HAINAUT, French. See the French department of Nord.

HAI'NBURG, or **HAIMBURG**, a small but old and interesting town of Austria, in the crown-land of Lower Austria, is situated on the right bank of the Danube, 27 miles east-south-east of Vienna, and two miles from the Hungarian frontier. It is surrounded by old walls, pierced by two castellated gates, and contains an imperial tobacco factory, the largest in the country, an institution for cadets, and an infantry school. Among its more notable edifices are the town-house, with a Roman altar, a tower, called the Roman tower, with the supposed statue of Attila, and on the summit of the Castle Hill the remains of an old castle, destroyed in 1596, when its powder-magazine was struck by lightning. Pop. (1869) 4178.

Many consider H. the ancient *Carnuntum*, once an important Roman stronghold, and the station of the Danubian fleet, and which rose to its highest prosperity during the reign of M. Aurelius. However this may be, it is certain that considerable remains of the fortifications of *Carnuntum* are found in the immediate vicinity. A Roman aqueduct still supplies the market of H. with water. In the *Nibelungenlied*, the castle of Hainburg is called Heimburc, the border fortress of the country of the Huns. It was forcibly torn from the Hungarians in 1042 by the Emperor Henry III., and afterwards it became a residence of the Austrian princes.

HAIR, including bristles, wool, fur, &c., is a modification of the Epidermis (q. v.), and consists essentially of nucleated particles. An ordinary hair consists of a *shaft* and a *bulb*. The shaft is that part which is fully formed, and projects beyond the surface. If we trace it to the skin, we find it rooted in a follicle in the cutis or true skin, or even in the connective or cellular tissue beneath it. This follicle is bulbous at its deepest part, like the hair which it contains, and its sides are lined with a layer of cells continuous with the epidermis. The layer (*b*) in fig. 1, according to Todd and Bowman (*Physiological Anatomy*, vol. i. p. 417), 'resembles the cuticle in the rounded form of its deep cells, and the scaly character of the more superficial ones, which are here in contact with the outside of the hair (*c*). The hair grows from the bottom of the follicle, and the cells of the deepest stratum gradually enlarge as they mount in the soft bulb of the hair, which owes its size to this circumstance. If the hair is to be coloured, the pigment cells are also here developed. It frequently happens that the cells in the axis of the bulb become loaded with pigment at one period, and not at another, so that, as they pass upwards in the shaft, a dark central tract is produced, of greater or less length, and the hair appears here and there to be tubular (*e*). The shaft is much narrower than the bulb, and is produced by the rather abrupt condensation and elongation into hard fibres of the cells, both of those which contain pigments and those which do not.' If the tissue is softened by acetic acid, these fibres may be readily seen under the microscope; they seem to be united into a solid rod by a material similar to that which cements the scales of the cuticle. The central cells, when filled with pigment, have less tendency to become fibrous than those lying more externally; and hence some writers have described the centre as a *medulla*, in distinction from the more fibrous part of the shaft, which they term the *cortex*. (This tubular character is constant in the hair of many animals, but is very variable in human hair, and even in the same hair at different parts of its length.) The term *cortex* or *bark* is more correctly applied to the single outermost layer of cells which overlap one another, and cause the sinuous transverse lines which are seen on examining a hair under the microscope.

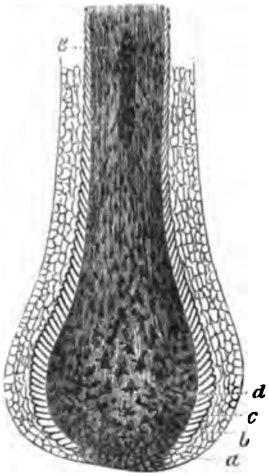


Fig. 1.
Magnified section of bulb of a small black human hair.
a, basement membrane of the follicle; *b*, layer of epidermic cells resting upon it; *c*, layer of imbricated cells, forming the outer lamina, or *cortex*, of the hair; *d*, more bulky cells containing pigment; *e*, a mass of cells in the axis of the hair, loaded with pigment.

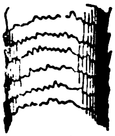


Fig. 2.
Surface of human hair, magnified.

In some hairs, especially those which act as tactile organs in some of the lower animals (as, for instance, in the whiskers of the various cats), a true papilla, furnished with nerves and capillaries, projects into the hair-bulb, and an approach to this papillary projection may often be seen in human hairs.

The hairs, like epidermis, are thus seen to be organised, and to maintain a vital, although not usually a vascular connection with the body. The colour of hair seems to depend on the presence of a peculiar oil, which is of a sepia tint in dark hair, blood-red in red hair, and yellowish in fair hair. This oil may be extracted by alcohol or ether, and the hair is then left of a grayish yellow tint. The chemical composition of hair closely resembles that of horn, and will be described in the article HORNY TISSUES.

Hair is extremely strong and elastic, and hence its uses for the construction of fishing-lines, the stuffing of cushions, balls, &c. Amongst its other physical properties, we may mention that, when dry and warm, it is easily rendered electrical, and that it is extremely hygroscopical; readily attracting moisture from the atmosphere, and no doubt from the body also, and yielding it again by evaporation when the air is dry. Hairs elongate very considerably when moist—a property of which Saussure availed himself in the construction of his hygrometer, in which a human hair, by its elongation and contraction, according as the atmosphere is moist or dry, is made to turn a delicate index.

Hairs are found on all parts of the surface of the human body, except the palms of the hands and the soles of the feet; they differ, however, extremely in length, thickness, shape, and colour, according to situation, age, sex, or race. The differences dependent on situation, age, and sex, are so obvious that we shall pass them over without notice, and proceed to the most important differences dependent on race. With respect to the quantity of hair that grows on the human body, there are great differences in different races. The Mongols, and other northern Asiatics who are similar to them, are noted for the deficiency of their hair and for scanty beards, and the same character is ascribed to all the American nations; while, on the other hand, among the *Ainos*, or in the Kurilian race, there are individuals who have the hair growing down the back, and covering nearly the whole body. The northern Asiatics and the Americans have generally straight lank hair, while Europeans have it sometimes straight and flowing, and occasionally curled and crisped. Negroes present every possible gradation, from a completely crisp, or what is termed woolly hair, to merely curled, and even to flowing hair; and a similar observation holds regarding the natives of the islands in the great Southern Ocean. As there is a generally diffused opinion that the head of the African is covered with a species of wool instead of with true hair, we may mention that all true wools which have been examined microscopically (as merino wool, the wool of the tiger, rabbit, bear, seal, and wolf-dog, which were investigated by the late Mr Youatt), present a more or less sharply serrated or jagged surface, while hairs present merely an imbricated appearance. This characteristic of wool is shewn in fig. 3, where *a* represents a fibre of merino wool, viewed as a transparent, and *b* as an opaque object. 'Hairs of a negro, of a mulatto, of Europeans, and of some Abyssinians, sent to me (says Dr Prichard) by M. d'Abbadie, the celebrated traveller, were, together with the wool of a southdown sheep, viewed both as transparent and opaque bodies. The filament of wool had a very rough and irregular surface;

the filament of negro's hair, which was extremely unlike that of wool and of all the other varieties mentioned, had the appearance of a cylinder, and the colouring matter was apparently much more abundant than in the others.' It is in consequence of the above named difference between hair and wool that, although the former will entangle to a certain degree, it will not felt into a compact mass, which is the characteristic property of good wool.

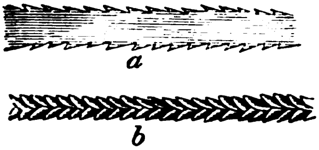


Fig. 3.
Fibre of Wool.

The grayness of hair in advanced life results from a deficient secretion of pigment. Well-authenticated cases are on record in which the hair has grown gray or white in a single night, from the influence of fear, distress, or any variety of strong mental excitement. It is not easy to explain this phenomenon. Vauquelin suggested that it might result from the secretion at the bulb of some fluid (perhaps an acid), which percolates the hair, and chemically destroys the colouring matter.

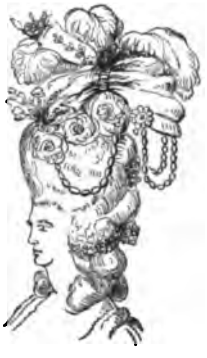
The chief use of the hair, and particularly of the fur of various mammals which is especially developed in the winter, is to protect the body from external cold. Except on the scalp, and on the throat, this cannot be considered as applying to man. What, then, are the uses of the hair on the face, and especially on the upper lip? We shall answer this question with an extract from an article 'On the Use of the Hair' in *The Lancet* for November 3, 1860: 'Mr Chadwick, who has done so much for sanitary reform, tells us that he was once very much struck by seeing some blacksmiths who wore beards, with their moustaches discoloured by a quantity of iron dust which had accumulated amongst the hairs. Turning it over in his mind, it struck him that had not the dust been so arrested by a natural respirator, it must have found its way into the lungs, where it could not have been otherwise than productive of evil consequences. He hence rightly advised that the razor should be discarded by labourers in all dusty trades—such as millers, bakers, masons, &c.; by workmen employed in grinding iron or steel; and by travellers on dusty roads. In hot, sandy countries, the use of the beard is soon discovered; and travellers in Syria and Egypt find it necessary to defend their mouths against the entrance of the hot air of the desert. But not against dust alone is the facial hair a protection; it is the best barrier against cold air, biting winds, and wheezy fogs that a Northman can obtain. . . . . According to Mr Chadwick, the sappers and miners of the French army, who are remarkable for the size and beauty of their beards, enjoy a special immunity against bronchial affections.' In corroboration of the last-named fact, we may mention another of a still more striking character. During the long-continued search for Franklin's expedition, a transport vessel, the *North Star*, was frozen up during one of the severest arctic winters on record, in Wolstenholme Sound. The crew maintained their health perfectly during all the trials to which they were exposed. On their return to England in the early summer, they shaved off the hair that had been growing around the mouth and throat for the last eight or nine months, and within a week *every man* was on the sick list with some form of bronchial or pulmonary disorder.

The length to which the hair of the head may grow normally, especially in women, is very considerable. In the 'Hair Court' of the International Exhibition (1862), there was a beautiful specimen of jet-black hair (British, we believe) measuring 74 inches.

Cases occasionally occur where there is an abnormal abundance of hair of considerable length in women, on parts where the hair is usually little more than down. A hairy lady, named Julia Pastrana, supposed to be a Mexican, was some years ago exhibited in London. Her embalmed body was exhibited also in that city in 1862, and we extract the following remarks from a memoir on her in *The Lancet* for May 3 of that year: 'The ears, and all parts of the face except the eyes, were covered with hair of different lengths. The beard was tolerably thick, the hairs composing it being straight, black, and bristly, the part of it which grew on the sides of the chin hanging down like two plaits. . . . The upper portion of the back of the neck and the hinder surface of the ears, were covered with hairs. On the shoulders and legs, the hairs were as abundant as they are occasionally seen on very powerful men.'

Dr Chowne has described similar but less marked cases of hairy women in *The Lancet* for 1843.

HAIR-DRESSING. As a matter of convenience, as well as of taste and fashion, the dressing of the hair has received much attention in all civilised nations, ancient and modern. The growth of hair on the sides and lower part of the male face has caused some perplexity in management, and as a method of overcoming the difficulty, shaving has been resorted to, although at the sacrifice of what nature gives to distinguish the male from the female countenance, and also to protect the respiratory organs. See BEARD. The Jews, by their scriptural law, were enjoined not to shave. The Romans shaved, and so did their immediate successors, the Romanised Britons. The Saxons and Danes did not shave, and wore long hair. The Normans shaved, but they, too, adopted long hair as a fashion; and from them, and the more modern French, the courtiers and cavaliers of the 17th c. adopted the practice of wearing those flowing 'love-locks' which excited the ire of the Puritans. It was, however, in the management of ladies' hair, that the art of the professional hair-dresser was in those times mainly exercised. In the 18th c., through the influence of French fashions, the dressing of hair, male and female, rose to a great pitch of extravagance and folly. The hair of a lady of fashion was frizzed up in convolutions and curls, decorated with ribbons, jewels, and feathers, and filled with pomatum and powder to a degree perfectly monstrous. The adjoining figure represents one of those extraordinary head-dresses. As women of less exalted rank slavishly attempted to follow these absurdities, the business of dressing hair was extensively followed. The cost of a full dressing being, however, too high to be lightly incurred, often one dressing was made to suffice for a week or fortnight, during which period such care was taken to preserve the greasy fabric undisturbed, that it became the resort of insects, and how to extinguish these odious pests was in itself a matter of serious concern. From pressure of business, it frequently happened that, previous to



From Stewart's *Whole Art of Hair-dressing*, 1782.

balls, ladies' hair had to be dressed one or two days in advance; and to keep the head-dress uninjured, the lady sat in a chair perhaps two nights, instead of going to bed. The writer of this has conversed with a lady who in this manner sat up one night for the sake of her finely powdered and frizzed-up hair. A taxation on hair-powder, along with the simplification of fashions consequent on the French revolution, not only expelled hair-powder and perruques, but brought the profession of hair-dresser within reasonable bounds. As regards ladies' hair, fashion is constantly altering; and at present the chignon, consisting of cushions at the back or top of the head, and covered with hair, is gradually giving way to a system of coils and plaits. With respect to men's hair, short cutting is now universal, and any indulgence in long hair behind is thought to mark a degree of slovenliness or whimsicality of fancy. Pursued as an ordinary business in England and continental countries, hair-dressing in the United States is entirely resigned to men of colour, and in connection with many of the hotels they are provided with workrooms.

Innumerable are the oils, essences, and pomades which are vended for the hair, on the assumption that they improve and nourish it. According to the experience of the best perruquiers, all such applications, any unguent in particular, and however sanctioned by tradition, are injurious. In ordinary circumstances, regular but not violent brushing is preferable for maintaining cleanliness and glossiness. When the head becomes affected with scurf which the brush does not remove, let the following efficacious and simple method of purification be adopted. Beat up an egg, and rub it well in all over the head; then pour over it warm water, which, while removing the egg, will likewise carry away all the scurf; lastly, dry thoroughly with a cloth. The head may be hung over a small tub during the process. After this, the hair will be very clean, and will take on a fine gloss with a brush. On no account use sharp combs to clean the head, for they are apt to irritate the roots of the hair, and after all fail in the desired object.

HAIR DYES. Various means have been adopted for changing the natural colour of the hair to a more favoured one, and for hiding the approaches of age, as indicated by the presence of gray hairs. These usually consist in washing the hair with a solution of some metallic salt known to have the effect of darkening its colour. These are the salts or oxides of silver, mercury, lead, and bismuth. The most perfect mode of dyeing the hair, however, is that of previously preparing it by a complete soaking with a solution of sulphide of potassium; the strength of this solution must depend on the depth of tint intended to be given; the stronger the solution, the darker the colour will be. When thoroughly wetted, the hair is allowed to dry partially; and whilst still damp, it is to be again thoroughly wetted with a solution of nitrate of silver, also proportioned in strength by the same rule as in the case of the solution first applied. This makes a very permanent dye, which only requires renewing as the new growth of hair becomes conspicuous. The fashion of dyeing the hair is very ancient, and belongs as much to savage as to civilised nations; but in the case of the former, vegetable dyes have been chiefly used; and the ladies of China and other eastern countries also resort to the same: the juice of the petals of Hibiscus Trionum, the Bladder-Ketmia, and probably other species of Hibiscus, is in general use with them.

The detection of stained hair is sometimes an object of medico-legal investigation. Lead may be detected by boiling the hair in dilute nitric acid, and then applying the tests for Lead (q. v.) to the acid solution; while the presence of silver may be shewn by digesting the hair in dilute hydrochloric acid or chlorine water, when the resulting chloride of silver may be dissolved out with a solution of ammonia, and submitted to the ordinary tests for Silver (q. v.).

HAIR GRASS (*Aira*), a genus of grasses, having loosely panicled flowers, and two unequal glumes containing two perfect florets, each with two thin membranous paleæ, of which the outer is generally awned near the base. The species are natives of temperate and cold climates. A number of them are natives of Britain, some of which are of very humble growth, and are chiefly found in moors, sandy pastures, and other situations where the soil is unfertile. The TUFTED H., or TURFY H. (*A. cæspitosa*), common in better pastures and meadows, is a beautiful grass when in flower, but forms coarse tufts; has very rough leaves, which, if drawn roughly across the hand, inflict considerable wounds, whence the plant sometimes receives the name of 'Cutting Grass.' It is rejected by cattle, if other herbage is within their reach. It attains a height of 2—4 feet, and is sometimes used for thatching ricks of hay or corn, and in some places for making mats. It grows luxuriantly in moist situations, and indicates a soil in want of draining. It is sometimes tolerated, in order to add to the bulk of *Bog Hay* in moorish grounds, but is carefully extirpated wherever agricultural improvement takes place. For its extirpation, drainage is requisite above all things; but the digging out of the tufts is also practised, and other grasses are sown instead. This grass is, however, sometimes sown to form cover for game, particularly hares; and in marshy situations, for snipes and wild fowl. It is the *windlestrae* of the Scotch.—Allied to the genus *Aira* is *Catabrosa* (q. v.).

HAIR MANUFACTURES. These consist of fabrics woven or felted of various kinds of hair; brushes made of particular kinds of hair; and ornamental hair-work.

Woven Fabrics.—The most important in this country is the horse-hair cloth so extensively used for covering the seats of chairs, couches, and other articles of furniture; this is made of the long hair of horses' tails. As the hair is of such various colours, it is necessary to dye all the darker shades so as to produce a uniform glossy black; this is done by logwood and sulphate of iron (copperas) in the following manner. The hair must first be cleansed and deprived of its grease by soaking it in lime-water for a day; it is then transferred to the dye-vat, which is thus prepared for a hundredweight of hair. Sufficient water to fill a boiler large enough to receive the hair, is boiled with 60 lbs. of cut logwood for three hours, after which it is suffered to cool, when 2 lbs. of copperas are added. This constitutes the bath, as it is called; and the hair, after being removed from the lime-water, and well washed in soft-water, either rain or river, is immersed in it for 24 hours; it is then removed, and again washed, to free it from the superfluous dye, dried, and shaken out ready for use. Perfectly white horse-hair can be dyed various colours, and is well adapted to receive the brighter ones, hence it has been much used of late years to produce ornamental hair-cloths, which are in great request abroad, especially in South America. The weaving of horse-hair cloth is different from that of other tissues, in consequence of the shortness of the hair, which, for the same reason, can only be used for the weft, except in the open or sieve cloth which is only made in small squares for the sieve-makers. Each hair has to be worked singly, and the loom requires two persons to work it. The warp used is either worsted, cotton, or linen yarn, generally the last. The hairs for the weft are kept wet by the side of the weaver, and are handed to him one by one. He receives them on a kind of hook at the end of his shuttle, the hook catching a knot tied by the attendant child who hands the hair. In other respects, the weaving differs little in its general character from that ordinarily employed for other fabrics. When the web is completed, it is dressed by calendering, which gives it a smooth and glossy surface. It is to be regretted that the popular taste in Great Britain does not turn to the ornamental kinds, which are not only very beautiful, but are durable and easily cleaned. The true crinoline cloth, for ladies' dresses, &c., was at first made of horse-hair, usually the white kind; but the immense demand led to the introduction of Agave or Aloe fibre, which soon supplanted it for most purposes, except the manufacture of bonnets, for which it is largely employed both as a material for the body of the bonnet and also as a trimming. The trade in crinoline trimming in Switzerland and France is large, and considerable quantities are imported into Britain. Horse-hair is twisted into thick yarn, and woven into sacking in the ordinary way, in Anatolia and Roumelia; and cow-hair is worked up into a rough yarn, and is woven into carpets in Germany; and in Norway is made into socks by the peasants. Pig's hair is similarly employed in China; and amongst the natives of the Hudson's Bay territories, dog's hair is used for the same purpose. The goat's hair of Tibet and Persia, and the camel's hair used in weaving, belong rather to the true wools, and will be treated of under WOOL.

The difference between hair and wool depends chiefly upon the greater or less smoothness of the surface of each fibre, hence the hairs which are smoothest cannot easily be felted, for if brought into contact, they have no projections of the surface to keep them from slipping away from each other; but some of the hairs proper, by a little preparation, may be so roughened as to fit them for felting. Thus, coney wool, or the hair of rabbits and hares, if properly moistened with a solution of nitrate of mercury, loses its straight and smooth character in drying, and is then readily felted.

The shorter kinds of horse-hair from the manes and tails, also cow-hair and the softer kinds of pig-hair, are twisted into ropes, which, after being boiled and then thoroughly dried in an oven, are pulled to pieces. The hair retains the twist given it, and is then used for stuffing seats of chairs, &c.

Brushes of hair are of various kinds; some are made of the stiff hairs from the backs of pigs, and others are made of the soft hairs of the camel and other animals. The hairs for the first kind are called bristles (see BRISTLES), which constitute an important trade with foreign countries. They are chiefly used in the manufacture of hair and clothes brushes, tooth and nail brushes, house-sweeping brooms, the larger kinds of painters' brushes, &c. The second kind are chiefly employed in the manufacture of the fine brushes or hair-pencils used by painters and artists. The best bristles come from Russia. Besides the camel, hairs are yielded for this purpose by the badger, sable, goat, dog, &c. In both cases, the sorting of the hairs into lengths is a very important and troublesome matter. Generally, it is done by placing the hairs in small boxes (with the tips upward), sufficiently deep to keep them upright; and the sorter then, with nice eye and hand, selects the sizes, by pulling out all the longest, as they overtop the others; then the next size, and so on. This, in the case of the hairs for artists' pencils, is an extremely difficult operation, as great exactness is necessary. Several attempts have been made, in Russia and in this country, to sort bristles by machinery, and one person has succeeded in doing so with a rude wooden machine. But the really successful manufacture of a machine which can be made generally available, belongs apparently to Mr W. S. Yates of Leeds, who exhibited in the International Exhibition (1862) a machine of great beauty and simplicity, which sorts into ten sizes, and with great rapidity. Most hair-brushes are required to have the bristles or hairs placed with great evenness, so as to form a flat surface outward; but in the case of those which are called artists' and painters' pencils, their value consists in having a fine point, so that the selection of the hairs so as to insure this, is a work of difficulty. The first step is, after selecting a small quantity, to see that all the tips are in one direction; this is usually done in removing them from the skin, a pair of flat-bladed pincers being employed to hold each cut of hairs, whilst the knife or shears severs them from the skin. They are then placed in small shallow tin boxes, with the tips upward; and the box being carefully shaken, and gently struck on the bottom until the hairs have completely arranged themselves in an upright position, they are then picked out, as before described; each size is placed by itself; and the brushmaker, according to the kind of pencil he is making, takes the proper size, and separating a sufficient number, they are placed upright in another little tin box, but now with the root-end of the hairs uppermost, so as to insure the tips being perfectly even, which is further insured by gently tapping the box as before. Fine thread is then looped round the base of the little bundle of hairs, and securely tied; sometimes more than one ligature is thus made; and the brush, now so far completed, only requires its handle of quill or wood, according to its size and character. Artists' pencils being of various sizes, and many extremely small, several kinds of quills are required. These are obtained from several birds, as the swan, goose, duck, fowl, pigeon, lapwing, and even such small ones as the lark and thrush. Previous to receiving the brush, the quills, besides being cut to the required lengths, have to be further prepared by soaking in water, to prevent them splitting, as the thick end of the brush is being pushed down from the wider to the narrower end. They also contract somewhat in drying, and consequently hold the brush very tightly.

Ornamental Hair-work consists chiefly of the human hair plaited into chains, guards, &c., or worked up into various other fanciful devices, as souvenirs, &c. Under this head we may also mention those manufactures of the human hair which are either required to supply a personal deficiency, or to meet the demands of fashion. To the former class belong the wig, the front, and other imitations of the natural covering of the human head; and to the latter, a variety of contrivances, whose mysterious names are only known to barbers and ladies' maids, for the purpose of giving an appearance of greater abundance to the natural supply.

The wig, like all other portions of human attire, has undergone a great many variations in fashion. In the present day, the great object is, in the first place, as far as possible, to imitate nature, and deceive the eye; and secondly, to produce wigs of extreme lightness—a full-sized peruke rarely being more than two or three ounces in weight. A full head of hair, from a young woman's head, will sometimes weigh five or six ounces. There are two heads of hair in the South Kensington Museum, which are in the raw state as imported, and weigh together 11½ ounces.

The chief portion of the hair used in Great Britain is received through French dealers, who collect it from Holland and Germany, as well as from the various departments of their own country. The light colours are usually obtained from the former countries, and the dark shades from Brittany. This does not arise from the circumstance that these countries yield the finest heads of hair, but because the poverty of the people causes its sale to be a matter of importance, and the peculiar fashions of the country head-dresses render its loss of less consequence.

The wholesale price of long hair is from 30*s*. to 400*s*. per lb., and the peasants of France alone supply 20,000 lbs., of the value of £40,000. The average import, during four years from France, was 14,000 lbs., of the value of £28,000. Besides the imports from France, which chiefly comprise the darker colours, a considerable quantity comes from Germany, usually of light shades.

HAIR-POWDER, a pure white powder, made from pulverised starch, scented with violet or some other perfume, and at one time largely used for powdering over the head. The strange fashion of using hair-powder is said to have originated from some of the ballad-singers at the fair of St Germain, in France, whitening their heads, to render themselves more attractive. Introduced into Great Britain, the fashion became universal among the higher and middle classes, and by ladies as well as gentlemen. To make the powder hold, the hair was usually greased with pomade, and accordingly the fashion was extremely troublesome. An act of parliament fixed that the fine dust of which the powder was composed should be made from starch alone; and we learn from the *Gentleman's Magazine*, that on November 20, 1746, fifty-one barbers were convicted before the Commissioners of Excise at London, and fined £20 each, for having in their keeping hair-powder not made of starch, contrary to act of parliament; and on the 27th of the same month, forty-nine others were fined, for the like offence, in the same penalty. In 1795, a tax of a guinea (afterwards £1, 3*s*. 6*d*.) was put on the use of hair-powder, and at one time yielded £20,000 per annum, but it had the effect of causing hair-powder to fall into general disuse. The French revolution, which overturned so many institutions, contributed also to the people of Europe returning to natural and unpowdered hair. When gentlemen first left off hair-powder with queues, they were considered very unfashionable; and the custom of having the hair cut short, which is quite universal at present, was then deemed vulgar. At the present day, powder continues to be used by some of the footmen of the nobility and higher ranks as part of their livery; and occasionally, at public or private *bals costumés*, ladies and gentlemen still appear with their heads powdered. The tax on hair-powder was done away with under 32 and 33 Vict. c. 14, the act which substituted a system of excise licences for the former mode of collecting assessed taxes. At the time of its abolition, it was paid by about 800 persons, and yielded a revenue of about £1000 a year.

HAIR-SPRING. See Balance-Spring.

HAIR-TAIL (*Trichiurus*), a genus of acanthopterous fishes, which, on account of their compressed and very elongated form, have been classed in the Ribbon-fish family, but are otherwise allied to the mackerel, tunny, &c., and are therefore, in recent systematic works, referred to the family *Scomberidæ*. The dorsal fin extends along the whole back, and is spiny throughout; there are no ventral fins, no anal fin, and no tail fin, the tail ending in a single elongated filament. One species, the Silvery H. (*T. lepturus*), sometimes called the Blade-fish, is found in the Atlantic Ocean, and has been cast on the shores of Britain, but is more common in warmer regions. It is called Sabre-fish in Cuba. It sometimes attains a length of twelve feet. Its flesh is good.—An East Indian species, the Savala (*T. Savala*), is much esteemed for food, and commonly sold in the markets of India.

HAIRS, in Botany, are very different from the hair of animals, although there is sometimes a considerable general resemblance, and the same purpose of protection from cold and from various atmospheric influences seems also to be sometimes served by

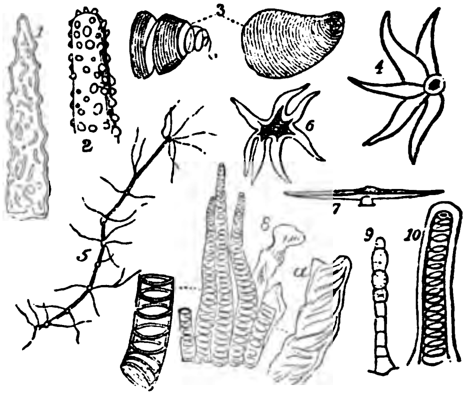


Fig. 1.—Hairs of Plants.

(Copied from the *Micrographic Dictionary*.)

1, hair of Delphinium Pinnatifidum—magnified 200 diameters; 2, hair of Anchusa Crispa—200 diameters; 3, scale-like hairs from the seed of Cobœa Scandens—50 diameters; 4, stellate hair of ivy leaf—100 diameters; 5, branched hair of Verbuscum Thapsus—25 diameters; 6, stellate hair of Alyssum—100 diameters; 7, horizontal stalked hair of Grevillea Lithidophylla—50 diameters; 8, annulated hairs from seed of Ruellia Formosa, in water—50 diameters; 8*a*, detached cell wall—200 diameters; 9, glandular hair of Byronia Alba—50 diameters; 10, hair from the seed of a Salvia—50 diameters.

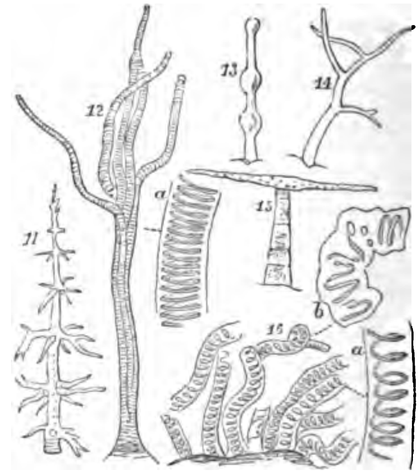


Fig. 2.—Hairs of Plants.

11, branched hair of Alternanthera Axillaris—100 diameters; 12, hair from the seed of Acanthodium Spicatum—50 diameters; *a*, fragment of a branch—200 diameters; 13, hair from the corolla of Antirrhinum Majus—50 diameters; 14, branched hair from epidermis of Sisymbrium Sophia—50 diameters; 15, T-shaped hair of garden Chrysanthemum—50 diameters; 16, spiral fibrous hairs from seed of Collomia Grandiflora, in water—50 diameters; *a* and *b*, fragments shewing the cell wall and free fibre.

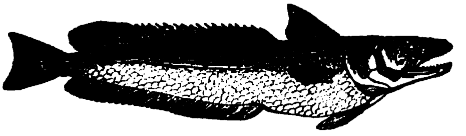
them. They are produced by no special organ analogous to the bulbs from which the hairs of animals grow, but are composed of cellular tissue, arise from the epidermis, and are covered with extensions of the cuticle. Some hairs consist of a single elongated cell; some of several cells, placed end to end. The gradations are quite indefinite between the most elongated hairs and the mere warts or rugosities which often appear on the surface of plants. In like manner, hairs pass into *bristles* (*setæ*) and prickles (*aculei*), which are merely stronger and harder hairs; but spines or thorns are totally different, arising from the wood of the stem or branch. Hairs are very often connected with *glands*, which are cells or clusters of cells, producing secretions; hairs often arise from glands, and then generally serve as ducts through which the secretion may pass; but hairs also often bear glands at their apex. Stinging hairs, as in Nettles, *Loasas*, and some *Malpighias* (see these heads), are ducts, with venom-secreting glands at their base.

HA'JDUK (in ancient Latin documents, *Hajdones*) is the name for the population of a free district called Hajdu Kerület, in the eastern part of Hungary. The H. are direct descendants of those warriors, who, during the long and bloody contest between the House of Hapsburg and the Protestant insurgents of Hungary, formed the nucleus of Prince Stephen Bocskay's valiant armies. The H. enjoyed privileges of nobility, and immunities from taxation ever since 1605, in which year the whole tract of land they are in possession of to the present day was given them by the above-named munificent prince. Notwithstanding repeated attempts made by the Austrian government against their privileges, the H. retained the peculiar organisation of their district, until after the disastrous issue of the struggle in 1848—1849, when they were reduced to the same level with the so-called hereditary provinces of the empire. At the dawn of the Reformation, the H. were among the first to adopt Calvin's doctrines (designated during a long period 'the Hungarian Faith,' in opposition to Luther, whose followers were chiefly among the Slaves of Upper Hungary). The H. are almost exclusively addicted to agriculture, and with the simplicity of manners unite all the qualities which distinguished their ancestors. Their total number amounts to 70,000, forming six 'towns.' The political chief of the district bears the title of Captain.

HAJILIJ, or BITO-TREE (*Balanites Ægyptiaca*), a tree of the natural order *Amyridaceæ*, a native of Egypt and of Central Africa, cultivated for its fruit, a drupe, which is edible, and from the seeds of which a fixed oil is expressed, called *Zachun*. So much is this tree valued in Central Africa, that there is a common proverb to the effect that a milch cow and a bito-tree are the same. (Barth's *Travels*.)

HAJJ (HAJI, HAGGE), (Heb. *Hag*, one of the three festivals appointed to the Jews for the purpose of pilgrimage to Jerusalem), Arab. pilgrimage, emphatically, pilgrimage to the Kaaba (q. v.) or temple of Mecca, which every Mohammedan, male or female, whose means and health permit, is bound to perform, once at least in his life, otherwise, 'he or she might as well die a Jew or a Christian.' Mohammed, after many fruitless attempts to abolish altogether the old custom of pilgrimage—prevalent among most peoples in ancient, and some even in modern times, and perhaps arising from an innate, instinctive, travelling propensity, but is not unfrequently fraught with mischievous consequences—was compelled finally to confirm it, only taking care to annul its idolatrous rites, and to destroy the great number of ancient idols around Mecca. The 12th month of the Mohammedan year, the Dsul Hajjeh, is the time fixed for the celebration of the solemnities, and the pilgrims have to set out for their journey one or two months before (in Shawâl or Dhulkada), according to the respective distances they have to traverse. They first assemble at certain variously appointed places near Mecca, in the beginning of the holy month, and the commencement of the rites is made by the male pilgrims here first putting on the Ihrâm or sacred habit, which consists of two woollen wrappers—one around their middle, the other around their shoulders; their head remains bare, and their slippers must neither cover the heel nor the instep. It is enjoined that the pilgrims, while they wear this dress, should be particularly careful to bring their words and thoughts into harmony with the sanctity of the territory they now tread, a territory in which even the life of animals is to be held sacred from any attack. Arrived at Mecca, the pilgrims proceed at once to the temple, and begin the holy rites there by walking first quickly, then slowly, seven times round the Kaaba, starting from the corner where the black stone is fixed (Tawaf). This ceremony is followed by the Sai, or running, likewise performed first slowly, then quickly, between the two mounts Safâ and Merwa, where, before Mohammed's time, the two idols Asaf and Nayelah had been worshipped. The next rite takes place on the ninth of the Dhulhajja, and consists in the Wukuf or standing in prayer on the mountain of Arafat, near Mecca, till sunset. The whole of the succeeding night is spent in holy devotions at Mogdalifa, between Arafat and Mina. The next morning, by daybreak, the pilgrims visit the Masher-al-Haram, the sacred monument (a place where the Prophet stood so long in prayer that his face began to shine), and then proceed to the valley of Mirra, where they throw seven (or seventy) stones at three pillars, for the purpose of putting the devil to flight. The pilgrimage is completed with the slaughtering of the sacrifices on the same day and in the same place. The sacrifice over, they shave their heads and cut their nails, burying the latter on the same spot. They then take leave of the Kaaba, and, taking with them some sacred souvenirs, such as dust from the Prophet's tomb, water from the well Zemzem, &c., they proceed to their homes. The return of the holy caravans is watched everywhere with the most intense anxiety, and is celebrated with great pomp and rejoicings. Henceforth, the pilgrim never omits to prefix the proud name of Hajji to his name. It is permitted that those who, through bodily infirmity, are incapacitated from performing the holy journey themselves, may send a substitute, who acts as their representative in almost every respect, but this substitute has no share whatever in the merits and rewards belonging to the Hajj.

HAKE (*Merlucius*), a genus of fishes of the cod family (*Gadidæ*), having a flattened head, an elongated body, two dorsal fins, of which the first is short, and the second very long, one very long anal fin, and the mouth destitute of barbels. One species, the COMMON H. (*M. vulgaris*), is found in the British seas, in those of the north of Europe, and in the Mediterranean. It is sometimes three



Hake (*Merlucius vulgaris*).

or four feet in length; and is of a whitish colour, grayish on the back. It is a very voracious fish, devouring great numbers of herrings and pilchards; hence it is frequently called the *Herring Hake*. It is a coarse fish; its flesh white and flaky; but it is important as an article of human food and of commerce; being salted and dried in the same manner as cod and ling, in common with which it receives in this state the name of *stock-fish*. It is generally taken by lines, like cod and ling. In the spawning season, when it keeps near the bottom, it is sometimes caught by trawl-nets.—Other species of H. are found in high southern latitudes.

HAKIM BEN ALLAH, or BEN HASHEM, called Mokanna (the Veiled), or Sagende Nah (Moon-maker), the founder of an Arabic sect who first appeared in the 8th c., during the reign of Mahadi, the third Abassidian calif, at Neksheb, or Meru in Khorassan. H. is said to have commenced his extraordinary career as a common soldier, but to have soon been promoted to a captaincy, and finally to have put himself at the head of a band of his own. In a fight, an arrow pierced one of his eyes, and in order to hide this deformity, he henceforth constantly wore a veil, a habit attributed by other writers (Rhondemir, &c.) to a desire to conceal his extraordinary ugliness—by his own followers, however, to the necessity of shrouding the dazzling rays which issued from his divine countenance from the eye of the beholder. H. set himself up as God. He had first, he said, assumed the body of Adam, then that of Noah, and subsequently of many other wise and great men. The last human form he pretended to have adopted was that of Abu Moslem, a prince of Khorassan. Thabari sees in this idea of metempsychosis the Jewish notion of the Shekinah—the divinity resting on some one chosen person or place—and concludes that H. may have been a Jew. He appears to have been well versed in the art of legerdemain and 'natural magic,' principally as regards producing startling effects of light and colour. Among other miracles, he for a whole week, to the great delight and bewilderment of his soldiers, caused a moon or moons to issue from a deep well; and so brilliant was the appearance of these luminaries, that the real moon quite disappeared by their side. H. found many adherents; and his little band increased so rapidly, that ere long he was able to seize upon several fortified places near the cities of Neksheb and Kesh. Sultan Mahadi marched against him, and after a long siege took the last stronghold in which he had fortified himself, together with the remnant of his army. H., however, having first poisoned his soldiers with the wine of a banquet, threw himself into a vessel filled with a burning acid of such a nature that his body was entirely dissolved, and nothing remained but a few hairs: in order that the faithful might believe him to have ascended to heaven alive. Some remnants of his sect still exist, and their outward distinguishing badge is the white garb, which they wear in memory of the white garb worn by their divinity, as a standing token of opposition to the black colour adopted by the Abassidian califs. H. has furnished the subject of many romances, of which the one contained in Moore's *Lalla Rookh* is the most brilliant and best known.

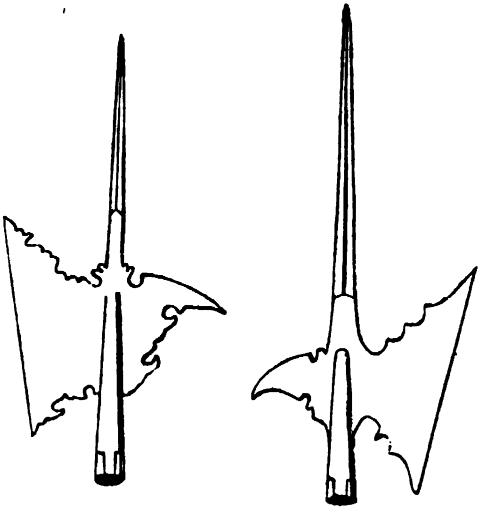
HAKLUYT, or HACKLUYT, RICHARD, an English author, was born in 1553. While at Westminster School he eagerly perused narratives of voyages and travels, and continued this course at Christ-church, Oxford, whither he proceeded in 1575. Being appointed lecturer on geography or cosmography in that university, he introduced the use of globes and other geographical appliances into English schools. Private individuals, as well as commercial companies and towns, consulted him respecting nautical enterprises. In the year 1584, he went as chaplain to the English embassy to Paris, where he had Laudonnière's manuscript narrative of the discovery of Florida printed, first in French and afterwards in English, at his own expense. On his return to England, with the assistance of Sir Walter Raleigh, he began to collect materials for the history of the discoveries made by his countrymen. He published the fruits of his researches, in notices of more than 200 voyages, under the title *Principal Navigations, Voyages, Traffiques, and Discoveries of the English Nation*, (Lond. 1589; new edit., 5 vols. Lond. 1809—1812). Government rewarded him by bestowing upon him a prebend in Westminster Abbey, and a living in Suffolk. A work entitled *A Selection of Curious, Rare, and Early Voyages and Histories of Interesting Discoveries*, &c., chiefly published by H., or at his suggestion, but not included in his celebrated compilation (4to, Lond. 1812), forms a supplement to the above works. He died in 1616, and was buried in Westminster Abbey. H.'s unpublished manuscripts were made use of by Purchas in his *Pilgrims*. An island in Baffin's Bay was named after him by Bylot, and a promontory in Spitzbergen by Hudson. The *Hakluyt Society*, instituted in 1846, likewise took its name from him. Its object is the publication of all the histories of the earlier voyages and travels.

HAKODADI, or HAKODATE, the most northern of the opened ports of Japan, situated in 41° 40′ N. lat., and 141° 15′ E. long. The town stretches three miles along the base of a lofty promontory, which juts out into the strait of Tzagar, from the southern extremity of the island of Yesso. It is connected with the mainland by a low alluvial isthmus, and separated from the mountainous region to the north by a plain bordered by an amphitheatre of hills. The adjacent scenery is striking and picturesque, closely resembling that of Gibraltar. H. was ceded to the Tycoon by the Prince of Matsumai in 1854. It was then a poor fishing-village, but has now become a place of importance. The houses are of a single story, fragile wooden buildings with single roofs, which are retained in their places by cobble stones. Each house has on its roof a tub filled with water for use in case of fire. The streets are between 30 and 40 feet wide, clean, well drained, and macadamised. In June 1869, after the revolution, the Mikado's forces attacked H., which was occupied by the rebels, and a great part of the town was laid in ashes. Considering the latitude of H., its climate is severe, and during its winter season the thermometer has been found to indicate 18° below zero. The observations of 1859 make its summer very nearly correspond to that of Edinburgh. The snow disappears about the beginning of April (though it often lies on the mountains until midsummer); and torrents of rain, brought up from the Pacific by the south-east wind, quickly deluge the recently snow-denuded ground. H. is said not to be healthy, and yet longevity is frequent. The harbour is one of the finest and largest in the world, but difficult of access. It is divided into an outer and an inner harbour. By article three of the Treaty of Yedo (August 26, 1858), H. was, together with Kanagowa and Nagasaki, opened to foreign commerce from the 1st July 1859. It maintains commercial intercourse with all the large ports of Japan; a monthly steamer of the Pacific Mail runs to Yokohama. In 1869, the imports were 789,325 dollars; the exports, 990,710 dollars; but in 1871, owing to the interference of the government with the fisheries, they were reduced to 183,010 dollars and 495,161 dollars respectively. Fish, oil, and fish-manure are the chief exports. There is a large fluctuating population connected with the fisheries. The registered Japanese population of the town in 1872 numbered 14,633; 28 Europeans are resident, of whom 13 are British.

HALACHA (Rule) is the general term for the Jewish oral law, which runs parallel with the written law contained in the Bible, and is supposed to be like this, of divine origin. Its relation to the ordinances contained in the Pentateuch is that of an amplified code to the fundamental, religious, and civil maxims—such as the changes wrought by time in the inner and outer relations of a rapidly increasing people would of necessity produce. Handed down through a long chain of highest authorities (Sinaitic revelation, Moses, Joshua, Elders, Great Synagogue [Ezra], &c.), it could only be treated and further developed by the foremost men of each generation—such, in fact, as through their eminence in learning belonged to a kind of aristocracy of mind (Chachamim, Wise Men), towering above the multitude (Hediotim, idiots). Their decision on all ordinances involved in contradictory traditions was final, because it was believed to spring from a deeper apprehension of Scripture. Often, indeed, they had recourse, in order to give their opinion a greater weight, to certain special letters, words, and even signs in the Scripture, which, seemingly superfluous where they stood, were supposed to point to the injunction under discussion. Halacha embraces the whole field of juridico-political, religious, and practical life, down to its most minute and insignificant details. Originally, as we said, the Oral Law, by way of eminence, it began to be written down when the sufferings, to which the Jews were almost uninterruptedly subjected from the first exile downwards, had made many portions of it already very uncertain and fluctuating, and threatened finally to obliterate it altogether from memory. The first collection of laws was instituted by Hillel, Akiba, and Simon b. Gamaliel; but the final reduction of the general code, Mishna (q. v.), is due to Jehudah Hanassi, 220 A.D. Later additions to this code are formed by the Baraithas and Toseftas. Of an earlier date with respect to their contents, but committed to writing in later times, are the three books (Midrashim): Sifra or Thorath Kohanim (an amplification of Leviticus), Sifri (of Numbers and Deuteronomy), and Mechiltha (of a portion of Exodus). The masters of the Mishnaic period, after the Soferim, are the Thanaim. These were followed by the Amoraim, who, by discussing and further amplifying the Mishna, became the authors of the Gemara (q. v.), a work extant in two redactions—that of Palestine and of Babylon. The Halacha was further developed in subsequent centuries by the Saboraim, Geonim, and the authorities of each generation. See also MIDRASH, MISHNA, TALMUD.

HALA'S, a town of Hungary, in the district of Little Cumania, is situated on the lake of Halastó, about 80 miles south-south-east of Pesth. It has (1869) 13,127 inhabitants, who are employed chiefly in agriculture and the cultivation of the vine.

HALBERD, or **HALBERT**, a weapon borne, up to the close of the 18th c., by all sergeants of foot, artillery, and marines, and by companies of halberdiers in the various regiments. It consisted of a strong wooden shaft about 6 feet in length, surmounted by an instrument much resembling a bill-hook, constructed alike for cutting and thrusting, with a cross piece of steel, less sharp, for the purpose of pushing; one end of this cross-piece was turned down as a hook, for use in tearing down works against which an attack is made. The honour of inventing the halberd is contested by the Swiss and Danes, but probably each produced something resembling it. Its name appears to be derived from the Teutonic *hild*, battle, and *bard*, axe. The halberd appears first in England about the time of Henry VIII., and maintained its position for upwards of two centuries. Now, it is rarely seen except on certain ceremonial occasions.



Ancient Halbert Heads.

HA'LBERSTADT, an ancient and quiet town of Prussian Saxony, in the government of Magdeburg, and 30 miles south-west of the city of that name, is situated amid fruitful plains on the Holzemme, a tributary of the Saal. It is well built; its streets are for the most part long, broad, and tolerably straight; and among its most notable buildings are the Church of Our Lady (1005—1284), in the Byzantine style, and the cathedral, an elegantly proportioned Gothic edifice, begun in the middle of the 13th c., and dedicated to St Stephen. H. has two good libraries, and numerous collections of paintings, coins, and antiquities, which, together with the Poetical Society (Dichterverein), formed by the poet Gleim, have had the effect of maintaining here a lively appreciation for the arts and sciences. The manufactures are woollen and cotton fabrics, leather, soap, gloves, tobacco, and cigars; brewing and oil-refining are also carried on extensively. Pop. in 1871, 25,421.

HA'LCYON DAYS, a name given by the ancients to the seven days which precede and the seven which follow the shortest day, on account of a fable, that during this time, while the halcyon bird or king-fisher was breeding, there always prevailed calms at sea. From this the phrase 'halcyon days' has come to signify times of peace and tranquillity.

HALCYO'NIDÆ. See KINGFISHER.

HALE, SIR MATTHEW, a distinguished lawyer, born in 1609 at Alderley, Gloucestershire. In his 5th year, he lost his parents, and was brought up by a kinsman of strict Puritan principles, and intended for the church. He was sent to Oxford University at 16, and was of studious disposition till a company of strolling-players visited that seat of learning, when the long pent-up passions of youth were suddenly let loose, and in this vagrant company he gave way to a good deal of dissipation, and at last was about to enter the army. But just at that time he became involved in a litigation about his patrimonial estate, and paid a visit to London to see Serjeant Glanvil, then a leading lawyer, on that subject. The serjeant turned young H.'s ambition into a new direction; and ultimately, in 1629, the latter entered the Society of Lincoln's Inn, and was in due course called to the bar. He had by that time renounced gay company, and became a great student, and soon acquired considerable practice. When the Long Parliament began to meet, he was of considerable reputation; and having cautiously refrained from committing himself to either of the great parties, both sought to enlist him in their service. But he declared for neutrality—conduct which Lord Campbell pronounces cowardly and selfish. When, however, the parliament triumphed, H. signed the Solemn League and Covenant, and sat in the Assembly of Divines at Westminster, tried to bring about a settlement between the king and parliament, and ultimately took his engagement to the Commonwealth, and was made a judge under Cromwell in 1653, having overcome his natural scruples about serving a usurper, on the plea of necessity. He acted as a *puisne* judge of the Common Pleas till Cromwell's death, but refused to have his commission renewed by Richard Cromwell, and then entered parliament. On the Restoration, he was made Chief Baron of the Court of Exchequer; and after eleven years, was transferred to the Chief-justiceship of the Court of Queen's Bench. He was reckoned the best judge of his time, being acute, learned, and sensible, and set his face against bribery, one of the vices of the age. John Bunyan was brought before him, and convicted of frequenting conventicles; and when Bunyan's wife afterwards moved for her husband's discharge, she was politely dismissed without redress. H. also sentenced some women, convicted of witchcraft, to be executed, avowing his full faith in the delusion of that age, that this was a grave and dangerous offence. During his career as a judge, H. led an austere and scholarly life, leaning to the side of the Puritans. He made a friend of Richard Baxter, and has left a great reputation for piety. He wrote some legal works, which are still of the highest authority, and he bequeathed several valuable legal MSS. to Lincoln's Inn, which are still treasured there. He resigned his office from ill health in 1676, and died ten months after, on Christmas-day of that year.

HALES, Stephen, an English natural philosopher, was born at Beckesbourn, in Kent, in 1677, and died at Teddington, in Middlesex, in 1761. He entered Bene't (now known as Corpus Christi) College, Cambridge, in 1696, was elected Fellow in 1702, and having taken holy orders, was presented about 1710 to the perpetual curacy of Teddington, where the remainder of his life seems to have been spent.

His first important publication was *Vegetable Staticks, or an Account of some Statical Experiments on the Sap of Vegetables* (1727), which rapidly acquired so high a reputation as to be translated into French, German, Dutch, and Italian, and which may be considered the starting-point of our true knowledge of vegetable physiology. A second part of this work, under the title *Hæmastaticks*, and treating of the circulation of the blood, appeared in 1733. Besides other independent works, he contributed numerous memoirs to the *Philosophical Transactions* on Ventilation, on the Methods of keeping Water Fresh, on Electricity, on the Analysis of the Air, &c. His ventilating machines were introduced into the London prisons, and were found most efficacious in diminishing mortality among the prisoners. His system was also adopted in France with similar good results.

His improvements in the mode of collecting gases did much to facilitate the subsequent labours of Black, Priestley, and Lavoisier.

HALÉVY, Jacques François Fromental, a French composer, was born at Paris, of Jewish parentage, May 27, 1799. He studied under Berton and Cherubini, and afterwards at Rome. The first work of H.'s that brought him any considerable reputation was *La Juive*, produced at the Grand Opéra in 1835. The most important of his subsequent pieces (of a serious character) were—*La Reine de Chypre*, *Charles VI.*, *Le Juif Errant*, and *La Magicienne*. Those executed for the Opéra Comique are regarded as his most successful; the principal are—*Les Mousquetaires* (probably his master-piece), *L'Eclair*, and *Le Val d'Andorre*. He was a great favourite with his countrymen; but his style was so purely national, that, in spite of his great dramatic power, he did not enjoy a great celebrity out of France. H. died in March 1862.

HALF-BLOOD, i. e., persons related through one parent only. When two persons have the same father, but not the same mother, they are called brothers or brother and sister consanguinean; when they have the same mother only, they are called brothers, &c. uterine. In the succession to real or landed property in England, the half-blood relations by the father's side succeed after the full-blood relations; and next, but at a considerable interval, the half-blood relations by the mother's side. In Scotland, also, the half-blood consanguinean succeed to heritable estate in the same way, though not in identically the same order; but the half-blood uterine never succeed in any event. In England, as regards personal estate, the half-blood on both sides succeed indiscriminately, and share equally with the full-blood. But in Scotland, the half-blood only succeed to movable estate after all the full-blood and their descendants are exhausted, and then the half-blood by the father's side succeed in exclusion of the half-blood by the mother's side, who do not come in until the succession reaches a distant point, viz., where the nearest relations are uncles and aunts paternal, or their descendants, in which case only the half-blood uterine after the mother's death take half the property, and the paternal relatives the other half. See Paterson's *Comp. of E. and S. Law*.

HALF-PAY, an allowance given in the British army and navy to commissioned officers not actively employed in the rank to which the half-pay has reference. It corresponds to the French *demi-solde*, or pay of *non-activité*. It has long been a disputed point whether half-pay is given to officers as a retaining fee, to keep them at hand for the time when their services may be again required, or an award on account of services already rendered; but whatever the terms of the original grant, there can be little doubt that, under the present regulations, half-pay, except when distinctly named *retired* half-pay, is in the nature of a retaining fee. This allowance is on quite a different footing in the navy and army.

In the royal navy of Great Britain, officers are merely appointed to serve during the period a certain ship is in commission; when this expires, their employment ceases, and they revert to a state of non-activity. As there are always many more naval officers than appointments for them to fill, a considerable number are at all times on the non-effective list. These are placed on half-pay until again called upon to serve; the amount of such half-pay being usually about 60 per cent. of the full pay of each grade. Half-pay is thus in the navy a recognised condition for all officers not immediately wanted afloat.

In the British army, the case is different; there, an officer, on joining, is posted to a particular regiment, with which, in theory, he is supposed to serve until removed from it on attaining the rank of general. Consequently, no fund like the naval half-pay list is in any degree admitted. Army half-pay is of two natures—*temporary* half-pay, and (so-called) *permanent* half-pay. The former is limited to officers incapacitated by casual sickness, to those who are without occupation, in consequence of any reduction of the corps in which they were serving, and to those serving in certain staff appointments.

Permanent half-pay can be demanded by any officer who has served for 25 years; it is also given to majors and lieutenant-colonels who, after serving for five years with a regiment in those ranks, are not re-employed. Since the abolition of purchase and sale of commissions, this last class may be expected, for the sake of promotion in the lower ranks, to increase considerably. The cost of half-pay is already very great; for 1873—1874 it was £348,000. Half-pay officers appear to live long; for many years a large proportion of the recipients were officers who were placed upon the list on the great reduction after the peace of 1815.

The first grant of army half-pay was made in 1698 by William III.

HALIBURTON, THOMAS CHANDLER, ex-colonial judge, author, and politician, was born at Windsor, in Nova Scotia, in 1796. His father, the Hon. Mr Justice Haliburton, of Nova Scotia, was descended from an ancient Scottish family. H. received his education at King's College in Nova Scotia, afterwards practised as a barrister, and became a member of the House of Assembly. He was raised to the bench of the Common Pleas of the colony in 1829, and in 1840 became judge of the Supreme Court. In 1850, he retired from the bench, and took up his residence in England, which he had always regarded as his mother-country. In 1858, he received the degree of D.C.L. from the university of Oxford, and in 1859 took his seat on the Conservative benches of the House of Commons as M.P. for Launceston, which he represented until his death. H. is best known as the author of *Sam Slick*, the name of a Yankee clockmaker and pedler, a sort of American Sam Weller, whose quaint drollery, unsophisticated wit, knowledge of human nature, and aptitude in the use of what he calls 'soft sawder,' have given him a fair chance of immortality. In a subsequent series, the author brings Sam Slick to England as an attaché of the United States legation, and is thus enabled to offer many shrewd and humorous observations on the aspects of British society, especially in regard to the upper classes and their pampered servants. *Sam Slick* has been almost universally read in the United States, where its extravagances are keenly relished. It has enjoyed a wide popularity in England, and has also been translated into many continental languages. H. is also author of the *Letter-bag of the Great Western*, *Wise Saws and Modern Instances*, *Nature and Human Nature*, *Bubbles of Canada*, *Rule and Misrule of the English in America*, and *A History of Nova Scotia*. He died in August 1865, having attained a place and fame difficult to acquire at all times—that of a man whose humour was nurtured in one country, and became naturalised in another; for humour is the least exotic of the gifts of genius.

HA'LIBUT, or HOLIBUT (*Hippoglossus vulgaris*), one of the largest kinds of flat-fish (*Pleuronectidæ*), in form more elongated than the flounder or the turbot, the eyes on the right side, the upper surface smooth, and covered with small soft oval scales, the colour brown, of different shades, the under surface perfectly smooth and white. The H., although esteemed for the table, is not to be compared in quality with turbot; its flesh is white and firm, but dry, and has little flavour. It is common on the British coasts, but more abundant in the north than in the south; and great numbers are taken by the Orkney fishermen. It is not found in the Baltic, but is plentiful on the coasts of Norway, Iceland, and Greenland, and large quantities are taken on the northern parts of the American Atlantic coast. It is a fish of great value to the Greenlanders, who preserve it for winter use by cutting it into long slips and drying it in the air. Oil is obtained from it in considerable abundance. It attains a great size; specimens have been caught weighing nearly five hundred pounds. Other species of the same genus occur in the seas of other parts of the world.

HALICARNA'SSUS (originally called *Zephyria*) was one of the Greek cities of Asia Minor, situated on the Ceramic Gulf. It was founded by a colony from Trœzene, and was one of the cities of the so-called Doric Hexapolis, from which confederacy, however, it was eventually excluded. H. was the largest and most powerful of the cities of Caria, and by its situation and the inaccessible position of its citadel, was reputed a place of great strength; but the people, owing to the enervating influence of the climate, were of a weak and effeminate character; and during the Persian conquests, readily yielded to the dominion of the conquerors. During this period (about 500 B. C.), however, a domestic tyrant, Lygdamis, rose to supreme power, as a vassal of Persia; and under his descendants the city, without forfeiting the Greek character, or ceasing to cultivate the Greek literature and arts, remained faithful to the Persian interest. Artemisia, the daughter and successor of Lygdamis, actually commanded a naval squadron in the fleet of Xerxes, at the battle of Salamis. Alexander the Great, provoked by the obstinacy with which the city held out against him, commanded that it should be destroyed by fire; but the inhabitants took refuge in the citadel, which successfully resisted his arms. The city was afterwards rebuilt, but it never recovered its ancient importance or prosperity. In the days of the Roman empire, it had sunk into comparative political insignificance, its only title to consideration at that time being the celebrated Mausoleum, erected in memory of one of the rulers, named Mausolus, by his sister (who had also been his wife and successor) Artemisia. H. was the birthplace of two of the most eminent of the Greek historians, Herodotus and Dionysius. The site of the city is occupied by the modern Boudroum. For an account of the discovery of the ancient remains of the city, and of the disentombment of the Mausoleum, see MAUSOLEUM.

HALICORE. See DUGONG.

HA'LICZ, a town of Austria, in the crownland of Galicia, is situated on the Dniester, in a fruitful district in the administrative division of Stanislawow, about 14 miles north of the town of that name. There are here a convent of the Minorites; a community of Jews of the sect of the Carites, distinguished for their industry and uprightness; and on the ridge of a hill in the vicinity, the ruins of the once strongly fortified castle of Halicz, which has frequently been the witness of bloody encounters. H., from which Galicia has derived its name, is the oldest town in that crownland. It was built in the 12th c., and its castle was the residence of the rulers of what was formerly the grand principality and kingdom of Halicz. Pop. 2600.

HA'LIDON HILL, situated about a mile to the north-west of the town of Berwick, in the fork formed by the Whitadder and the Tweed, was the scene of a bloody conflict between the English and Scots, 19th July 1333. Edward III., having determined to support the claims of Edward Baliol to the crown of Scotland, advanced to the borders with a large army, and laid siege to Berwick, the governor of which promised to surrender on the 20th of July, if not previously relieved. On the 19th, the acting regent of Scotland, Archibald Douglas, Lord of Galloway, surnamed 'the Tyneman,' with a large force, came in sight of Berwick, and found the English drawn up on the north side of Halidon Hill. Regardless of fatigue, the Scots immediately advanced to the attack, but while crossing the morass which skirts the base of the hill, suffered severely from the English archers. They nevertheless struggled onwards, and mounted the hill, when the English, charging in a compact body, threw them into irretrievable confusion. A total rout was the immediate result, and the English cavalry and Irish auxiliaries committed a prodigious slaughter among the fugitives; upwards of 10,000 Scots (according to some authorities, 14,000) being left on the field, among whom were Douglas the regent, three of the Stuart family, the Earls of Ross, Sutherland, Menteith, Lennox, and Athole, and many others of the nobility. The English loss was comparatively small. The town of Berwick immediately surrendered, and Edward Baliol again for a short time kept possession of the throne.

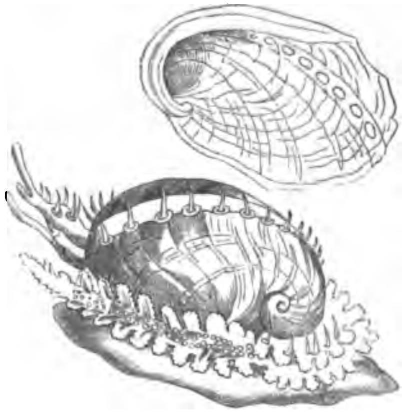
HA'LIFAX, the capital of Nova Scotia, stands on the south-east or outer coast of the peninsula, in lat. 44° 39′ N., and long. 63° 37′ W. Though it was founded only in 1749, yet so favourably was it situated, that in 1750 it supplanted Annapolis as the seat of government. The harbour of H. is one of the finest in the world. It is entered from the south, extends northwards about 16 miles, and terminates in a magnificent sheet of water called Bedford Basin, is spacious enough for the entire navy of England, and offers all the year round easy access and safe anchorage to vessels of any magnitude. The harbour has two entrances, made by M'Nab's Island, of which the western only is navigable for vessels of large tonnage. H., with its suburbs, extends along the slope of a hill, and is over two miles in length, and about three-quarters of a mile in width. The streets are well laid out, and at right angles; and handsome granite and freestone have superseded wood. The dockyard, covering 14 acres, is among the finest in the British colonies. The principal edifices are the Province Building (which contains the government offices), Dalhousie College, Government House, military hospital, lunatic asylum, provincial penitentiary, &c. H. also contains 23 places of worship, and is the seat of two bishops. It is an important military post, being defended by strong forts and batteries, one of which, called the Citadel, stands on the summit of the hill on which H. is built, and is said to be, after Quebec, the strongest fortification in America: H. and Quebec are now the only places in Canada where British troops are retained. The head-offices of the Nova Scotia Railway, and the Nova Scotia Electric Telegraph Co., are situated here; and the citizens look forward eagerly to the completion of the great Intercolonial Railway, which is not only to give them ready access to the chief markets of Canada, but to make their city the grand winter terminus of the Dominion. Railway communication has now been opened between H. and Windsor and Truro. The port engrosses nearly the whole of the foreign trade of the colony. In 1869 the exports amounted to $3,169,548, and the imports to $7,202,504, while the duties collected were $972,652·27. The population at the census of 1871 was 29,582.

HALIFAX, a thriving market-town, municipal and parliamentary borough of England, in the West Riding of Yorkshire, is situated principally on the right bank of the river Hebble, a feeder of the Calder, on the slope of an eminence rising above the river, and is almost wholly surrounded by hills. It is 43 miles south-west of York, and 217 miles north-north-west of London. Its situation is pleasing, and its general appearance handsome; while its ample supply of water-power and of coal, its facilities for transport both by water and by leading lines of railway, and its position in proximity to many of the great towns of the north of England, contribute materially to its manufacturing and commercial importance. The ecclesiastical architecture of H. strikes every visitor. The parish and Trinity churches, 'All Souls,' an Episcopalian church completed in 1861 from designs by Sir George Gilbert Scott, are fine specimens of Gothic. The 'Square Church,' belonging to the Congregational body, erected in 1863; and another connected with the same sect, built in 1867, are conspicuous features. The town-hall, opened by the Prince of Wales in 1863, is a very ornate erection. The Piece Hall, a large quadrangular stone building, erected in 1779, at a cost of £12,000, and comprising 315 apartments or warehouses for the reception and sale of manufactured goods; and the assembly rooms, Mechanics' Institute, and theatre. Among the numerous public and private educational institutions of H. are the Heath Grammar School—founded in 1585, with an endowment of £270 a year—and the Blue Coat School. In 1857, Mr F. Crossley, M.P. for the West Riding, presented a magnificent park to the town. It contains the largest carpet-works in the world. The manufactured goods, besides carpets, are chiefly shalloons, tammies, calamancoes, duroys, everlastings, moreens, shags, serges, merinoes, as well as baises, narrow and broad cloths, kerseymeres, and bombasins. Cotton fabrics, wool-cards, and paper are manufactured. There is also some trade in corn, in mill-machinery, and in raising coal and slate. Pop. (1871) 65,510.

A strange old local law, known as the Halifax Gibbet Law, was enacted here at an early period of the woollen manufacture, for the protection of the manufacturers against the thievish propensities of their hands, who were in the habit of robbing their employers, by keeping to themselves a portion of the material which ought to have gone into the cloth, so that when manufactured, the fabric was discovered to be of inferior weight and body. The Gibbet Law provided that all persons within a certain circuit, who had stolen property of or above the value of 13½*d.*, were to be tried by the frith-burghers within the liberty, and if found guilty, were handed over to the magistrates for punishment, and were executed on the first market-day following by means of an instrument similar to the guillotine. The stage or platform on which the executions took place is still to be seen, and the axe is preserved in the old jail in Jail Lane.

HALIFAX, CHARLES MONTAGUE, EARL OF, poet and statesman, grandson of Henry, first Earl of Manchester, and nephew of the famous Parliamentary general, was born at Horton, in Northamptonshire, 16th April 1661. He was educated at Westminster School and Trinity College, Cambridge. A laudatory poem on Charles II. first brought Montague into public notice. Two years later, appeared the parody on Dryden's *Hind and Panther*, entitled *The Town and Country Mouse*, of which he was joint author with Matthew Prior; but his poetry would hardly have made his name remembered in the 19th century. He almost disappeared from the field of literature after the appearance of his satire, save as the patron of Addison and other men of letters. He had intended to enter the church, as it afforded a regular income, but tempted by the offer of a seat in the House of Commons, he became member for Malden in the Convention Parliament, where he voted for the declaration that James II. had abdicated, and that the throne was thereby vacant. He retained his seat in William III.'s first parliament, and was appointed in 1692 a Commissioner of the Treasury. On the 15th December of this year he proposed, in the House of Commons, to raise a million sterling by way of loan. William required money for his wars—the moneyed classes were tired of bubble companies, and knew not where to invest safely, and the landowners were weary of heavy taxation; so the National Debt was established. In the spring of 1694, money was again wanted, and Montague was ready to supply it. This time, he did so by originating a national bank, a scheme for which had been laid before government by William Paterson three years before. The capital was to be £1,200,000, and the shareholders were to be called the Governor and Company of the Bank of England. The bill for this was ultimately passed; the result was immensely successful, and Montague became chancellor of the exchequer. His next work was the recoinage of 1695, which he carried out successfully, appointing Newton warden of the Mint, and raising a tax on windows to pay the expense, instead of the obnoxious impost called hearth-money. The interval between the last day on which the old money was receivable in payment of taxes, and the issue of the new coin, was, owing to the absence of a circulating medium, likely to cause much distress; but he obviated this by establishing exchequer bills bearing interest daily, and ranging in amount from £5 to £500. On Godolphin's resignation in 1697, he became premier, but soon becoming unpopular, was obliged to bestow upon himself the auditorship of the exchequer, and resign his higher offices. Harley insisted on his withdrawal from the Commons, and he became Baron Halifax, adopting a title which had just become extinct. He was impeached before the House of Lords for breach of trust in 1701, and again in 1703, but the proceedings fell to the ground. During the whole of Anne's reign, H. remained out of office, but was active in promoting the union with Scotland and the Hanoverian succession. On the queen's death, he was naturally appointed a member of the council of regency, and on George I.'s arrival, became an earl and prime minister. His rule lasted only nine months, being terminated by death on the 19th May 1715. H., though an arrogant and mean man, and fond of display, was a consistent politician, and one of the greatest financiers of his time.

HALIO'TIS, a genus of gasteropodous molluscs, the type of a family, *Haliotidæ*, belonging to the order *Scutibranchiata*, and having a widely open ear-shaped shell, with a very low spire, and a row of holes not far from the opposite margin over the fissure of the mantle, through which the water gains access to the gill-cavity. The holes are closed as the animal grows, and new ones formed, which first appear as notches along the margin of the shell. The animal, in a living state, exhibits great beauty of colours. It adheres to rocks by a large muscular foot, after the manner of limpets. One species, *H. tuberculata*, is not uncommon on the southern European coasts, and is found on those of the Channel Islands. It is used for food; the shell is also sought after for an ornament, and for the sake of the Nacre (q. v.) in which it abounds, and which is much used for mother-of-pearl ornaments, and particularly for ornamenting papier-maché articles. The shells of this genus are called *Ear-shells* or *Sea Ears*. They are the *Ormers* of the French. The species are very numerous; the most splendid are natives of warm climates.



Haliotis (*tuberculata*).

HALL, BASIL, CAPTAIN, R.N., a distinguished traveller, a younger son of Sir James Hall of Dunglass, was born in Edinburgh in 1788, and died at Portsmouth in 1844. He entered the navy in 1802, and became post-captain in 1817. When Lord Amherst was sent on a mission to the court of Pekin in 1816, H. commanded the *Lyra*, a small gun-brig, which accompanied the expedition, and took the opportunity of visiting some of the places along the coast of the Corea, which were little known to Europeans. The chief results of this exploration were published in a book, entitled *A Voyage of Discovery to the Western Coast of Corea and the Great Loo-Choo Island in the Japan Sea* (Lond. 1818), which excited much interest, and passed through at least three editions. Amongst his other works, we may mention *Extracts from a Journal written on the Coast of Chili, Peru, and Mexico, in* 1820—1822 (which forms two of the earlier volumes of *Constable's Miscellany*); *Travels in North America*, in three volumes (a work that was violently assailed by the American press); *Fragments of Voyages and Travels*, in three series, each consisting of three volumes (a work of great interest, and still very popular); and *Patchwork*, in three volumes, published in 1841. He was a Fellow of the Royal Societies of London and Edinburgh, and a member of the Astronomical Society of London. He was the author of various articles in the scientific journals of the day, and in the *Encyclopædia Britannica*. During the last two or three years of his life he suffered from mental alienation, induced probably by excessive literary work, and was placed in the Royal Hospital, Haslar, where he remained till his death.

HALL, JOSEPH, an English bishop, remarkable for his learning, piety, and misfortunes, was born in 1574 at Ashby-de-la-Zouch, Leicestershire. He was educated at Emanuel College, Cambridge, of which he became a Fellow. Entering the church, he became, in 1617, Dean of Worcester, was one of the English deputies to the synod of Dort, was consecrated Bishop of Exeter in 1627, and in 1641 was translated to Norwich. The latter years of his life were saddened by persecution. He was accused of Puritanism, though he zealously defended the Episcopacy. By attacking the Arminianism of Archbishop Laud, he is said to have 'exposed himself to the malignant and wanton attacks of that primate and his crew.' In 1641, having joined the prelates who protested against the validity of all laws passed during their forced absence from parliament, he was committed to the Tower, and threatened with a prosecution for high treason, but was set at liberty, at the end of seven months, on finding bail for £5000. On his return to Norwich, he found his revenues sequestrated and his property pillaged. He rented a small farm at Higham, near Norwich, to which he retired, 1647, and died in 1656, aged 82 years. His works, mostly of a controversial character, have been published in folio, quarto, and octavo. A new edition, with autobiography, notes, &c., was published by the Rev. Josiah Pratt (Lond. 10 vols. 1808); a later edition by the Rev. Peter Hall, a descendant of Joseph (Oxford, 12 vols. 1837—1839). His writings most interesting at the present time are poetical *Satires*, written at college, which Pope, no mean judge of that species of composition, affirms to be 'the best poetry and the truest satire in the English language.' Hallam, however (*Lit. Hist. of Europe*), accuses him of being 'harsh and rugged,' and asserts that 'his lines frequently bear no visible connection in sense or grammar with their neighbours.' Among his other works are *Contemplations*, *Art of Divine Meditation*, and *Enochismus, or Treatise on the Mode of Walking with God.*

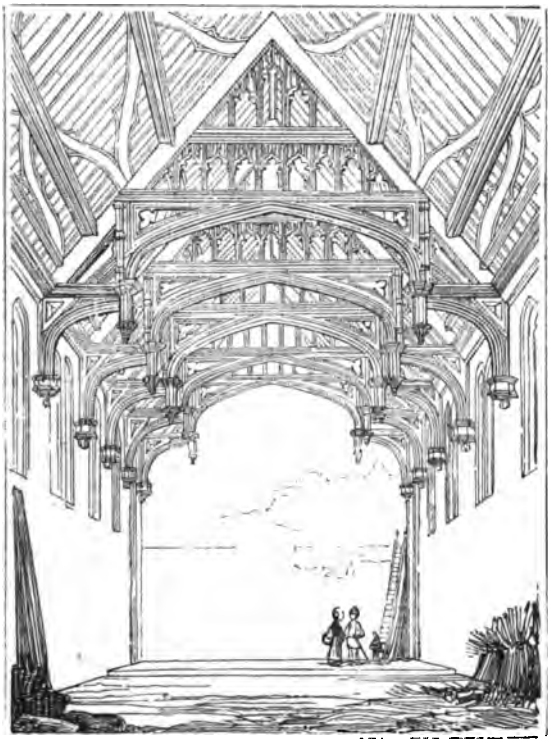
HALL, MARSHALL, an eminent physiologist and physician, was born at Basford, Nottinghamshire, in 1790, and died at Brighton in 1857. At the age of 20 (having been previously apprenticed to a chemist) he entered on the study of medicine at the university of Edinburgh, where, in 1812, he took his degree of M.D. After three years' subsequent attendance at the leading schools of medicine on the continent, he commenced practice in Nottingham in 1815, and rapidly obtained a high provincial reputation. In 1826, he removed to London, where his career as a physician was so successful, that he was enabled at the age of 60 to release himself from strictly professional labour. Among his contributions to physiology must be mentioned his *Essay on the Circulation of the Blood*, published in 1831, in which he made known his discovery of the remarkable 'caudal heart' connected with the vessels in the tail of the eel; his paper 'On the Inverse Ratio which subsists between the Respiration and Irritability in the Animal Kingdom,' in the *Philosophical Transactions* for 1832; and the articles 'Hybernation' and 'Irritability' in Todd's *Cyclopædia of Anatomy and Physiology*. But his name is best known in connection with the doctrine of the Reflex Function of the Nervous System, which was his most engrossing subject of pursuit for the last twenty-five years of his life. In the *Philosophical Transactions* for 1833 appeared his 'Memoir on the Reflex Function of the Medulla Oblongata and Medulla Spinalis.' His views on the subject of this memoir were extended and corrected in various publications, amongst which may be especially mentioned his *Lectures on the Nervous System and its Diseases* (1836), *Memoirs on the Nervous System* (1837), *New Memoir on the Nervous System* (1843), and *Synopsis of the Diastaltic Nervous System* (1850). There has been much discussion as to H.'s claims to be considered the discoverer of Reflex Action. He admitted that the phenomena of which he treated had been long known to physiologists, but he believed himself to have been the first to shew their independence of sensation, to bring them together under one generalisation, to establish with precision the laws of their production, to assign them their just rank in physiology, and to apply the doctrine to the elucidation of disease. His more strictly professional writings are many and valuable; they appeared partly as independent publications, and partly in the medical journals. His last bequest to the science of medicine and the cause of humanity, was the description of a simple and easily applied method of restoring suspended respiration, which has already been the means of saving many from untimely death, and is known as THE MARSHALL HALL METHOD. It is briefly described in the article ASPHYXIA. His memoirs, with a large collection of his letters, have been published by his widow.

HALL, REV. ROBERT, a celebrated English dissenting preacher and writer, was born at Arnsby, near Leicester, May 2, 1764. He was the son of a Baptist minister of some note as a preacher and author of religious works, and was the youngest of fourteen children. He was feeble in body and precocious in intellect, learning to read almost as soon as he could speak, from the tombstones of the churchyard, his playground. At the age of 15, he was sent to a Baptist academy at Bristol, when he gave promise of his future fame as an orator, but, from his nervous organisation, broke down in his first public efforts. In 1781, he entered King's College, Aberdeen, where he remained four years. An intimate companionship with Mackintosh, in which they read and discussed together philosophy and theology, was of great service to him. Graduating in 1785, he became, at the age of 21, assistant Baptist minister and tutor in the academy at Bristol. He was a fluent, rapid, and impressive speaker, and was liberal, but not heterodox in his religious views. In consequence of a disagreement with his colleague, he went in 1790 to Cambridge, where, by his elaborate composition and vivid eloquence, he rose to the highest rank of British orators. He is not less distinguished for his writings and published discourses, than as a pulpit orator. His *Apology for the Freedom of the Press*, 1793, and sermon on *Modern Infidelity*, extended his reputation. In 1806, he settled in Leicester; married in 1808, after a whimsical courtship; returned to Bristol in 1825, and died February 21, 1831. He was an indefatigable student, learning Italian at 60, that he might enjoy Dante, and full of wit, fun, and a spontaneous eloquence, so that the style of his improvisations was superior to that of his writings. Nearly all his life he suffered the tortures of an obscure disease of the spine; he had at times attacks of insanity, and his death was preceded by great agony, caused by a large calculus in one of his kidneys; yet few men have performed more intellectual labour. A complete edition of his works, with a memoir by Dr O. Gregory, and Observations on his Character as a Preacher by John Forster, was published at London, in 6 vols., 1831—1833; 11th edition, 1853.

HALL, MRS ANNA MARIA, an eminent novelist, the daughter of a gentleman named Fielding, who died when she was very young, was born in Dublin in 1802. In her 15th year she left Ireland with her mother, and went to reside in London, where her education was completed. In 1824 she married Mr S. C. Hall, a gentleman well known for his works connected with the fine arts, and was thus led to become an authoress. Her first work, *Sketches of Irish Character*, published in 1828, at once established her reputation. In 1832 she brought out her first novel, *The Bucaneer*, a story of the time of the Commonwealth, in which Cromwell's character is vindicated. Her other works rapidly followed—*Tales of Woman's Trials*, in 1834; *The Outlaw*, a novel of the reign of James II., in 1835; *The French Refugee*, a drama, which in 1836 was acted for about fifty nights at the St James's Theatre, London; *Uncle Horace*, 3 vols. 1837; *Lights and Shadows of Irish Character*, 1838; *Marian, or a Young Maid's Trials*, 1839; *The Whiteboy*, 1845, &c. Her *Stories of the Irish Peasantry* appeared originally in *Chambers's Edinburgh Journal*, and were afterwards published in a collected form. She is also the authoress of a graceful fairy tale of love, *Midsummer Eve*, originally contributed to the *Art Journal*, and of a pleasant illustrated series of descriptive sketches, inserted in the same publication, and subsequently published separately under the title of *Pilgrimages to English Shrines*. The last two, with some others of her writings, have been translated into German. Besides assisting her husband in his illustrated work on *Ireland*, &c., she has furnished numerous contributions to the periodicals of the day, and written various books for the young. Of these, *Uncle Sam's Money-box* is one of the best.

HALL, the large principal apartment of the castles and dwelling-houses of the middle ages. The hall is of very ancient origin. The earliest Saxon buildings we have any record of are the palaces of the kings, and these seem to have consisted of one large hall, in which the king, his courtiers or 'hearth-men,' and all his retainers dwelt together, eating at the same table, and sitting round the same fire; and one other chamber, in which the king and his hearth-men slept, while his retainers slept in the hall. The Normans built their houses on the same plan—with the hall and one Solar (q. v.) or sleeping apartment. The same arrangement prevailed, with slight modifications, during the 12th and 13th centuries. In the 14th and 15th centuries, when the country was more settled and prosperous, and manners more refined, more numerous apartments became necessary. The hall, however, still retained its place as the chief apartment. In it the king or the lord of the manor gave audience, administered justice, received and entertained his retainers and guests, and performed all the public acts of feudal life.

At one end of the hall was a raised platform or dais, on which the table of the lord of the manor was placed, and where his more honoured guests sat along with him. The retainers sat at a table which ran along the lower part of the hall. This part was not always in the cleanest and sweetest condition, and hence it received the name of 'the marsh.'



The Great Hall of Eltham Palace.

The hall partook of the style of architecture prevailing at the time when it was built, and being a large and important apartment, was generally ornamental in its character. The roofs especially were very carefully and elegantly constructed, as many still remaining shew. The hall of the king's palace, now called 'Westminster Hall,' built by William Rufus, and restored by Richard II., is the finest example in England, being 300 feet long and 100 feet broad. The great hall at Eltham, as shewn in the above cut, is another fine example.

The hall was essentially a part of feudal architecture. When that system gave way, the large common halls were abandoned. Many old ones, however, still remain, but their use is changed.

HALL, HALLE, AND HALLEIN, are the names of various places in Southern and Middle Germany, possessing *salt-works*. *Hall* is also a general name for a salt manufacture. The Welsh and Armorican word for salt is *hal*, *halen;* hence it is inferred that these names were bestowed by Celtic tribes of the Cymric division (to which the ancient Gauls belonged). The Gaelic for salt is *sal-ann*, agreeing thus with the Lat. *sal*, and the Ger. *salz*. The Greek *hals* (ἅλς) agrees with the Cymric. The names Salza, Salzburg, are clearly of Teutonic origin.

HALL, a small and very old town of Austria, in the Tyrol, is situated on the left bank of the Inn, which is here navigable, six miles east of Innsbruck. Its parish church, built in 1271, with a monument that marks the grave of Spechbacher, the bravest and most skilful leader of the Tyrolese in their struggle for independence; its gymnasium, its Franciscan convent, and its *Münzthurm*, are the chief buildings. About nine miles north of the town is the Salzberg, with salt-mines, from which salt in the form of brine is conveyed to the pans of H. in wooden pipes. Although the demand is not so great as formerly, upwards of 300,000 cwts. of salt are still produced here. H. has also manufactures of sal-ammoniac and chemicals. Pop. (1869) 5022.

HALL, or **SWÄBISCH-HALL,** an old and picturesque town in the kingdom of Würtemberg, is very beautifully situated in the deep valley of the Kocher, 35 miles north-east of Stuttgart. It is surrounded by a ditch and by high walls surmounted with towers. Like other places in whose names the word Hall or Salz occurs, H. has considerable salt-works, which, together with those of Wilhelmsgluck, produce annually nearly 80,000 cwts. There are also tan-works, soap-works, and manufactures of cotton goods and bijouterie. Pop. (1871) 7793.

H. at a very early period was the seat of a mint, and the coins first struck here were called Heller (Häller). The town belonged first to the Counts of Westheim, then later to the Knights Templar. In the 13th c. it became a free imperial town, and such it remained till 1802, when, with its territory of 126 square miles (pop. 16,000), it was added to the kingdom of Würtemberg.

HA'LLA, or **HALA,** a town of Hindustan, in the country of Scinde, is situated on the left bank of the Lower Indus, 35 miles north of Hyderabad. Manufactures of caps, superior coloured earthenwares, and lacquered work, are extensively carried on here. Pop. 11,000, the most of whom are manufacturers. H. is said to be the most ancient city of Scinde.

HALLAM, HENRY, philosophic historian and critic, son of the Dean of Bristol, was born at Windsor in 1777, and educated at Eton and Christchurch, Oxford, where he took his degree of M.A. He was first known by his writings in periodicals, especially by contributing to the *Edinburgh Review* during its early years; afterwards, he was distinguished among the literary men of Europe for his extensive and profound learning, powers of generalisation, taste, judgment, and conscientiousness, exhibited in a succession of great works: *View of the State of Europe during the Middle Ages* (2 vols. 4to, 1818); *The Constitutional History of England from the Accession of Henry VII. to the Death of George II.* (2 vols. 4to, 1827); and *Introduction to the Literature of Europe in the 15th, 16th, and 17th Centuries* (4 vols. 8vo, 1837—1839), and a volume of supplementary notes to his *History of the Middle Ages* (1848). All these works have gone through several editions, and been translated into the languages of the leading European nations. They have procured for their author the enviable reputation of having opened up a new and great field of authorship, and laboured in it with a success that as yet has not been equalled by another. Their wonderful impartiality and veracity are a rebuke to ordinary historians; and it provokes a smile to read, at this distance of time, the strictures of Southey on the acrimony, the arrogance, the injustice, and the ill-temper of their author; for England never produced a man who loved truth more disinterestedly than Hallam. H., while yet a young man, was held in the highest estimation among the literary men of his time, both in London and Edinburgh. During the greater portion of his long life, however, he lived in London in privacy, devoting himself to linguistic and historical studies. In politics, he was a Whig; but for the conflicts of parties he was unsuited by his candour and general temperament, and took no part in them, but he displayed a genuine interest in all questions of social improvement, and acted with the Wilberforce party for the abolition of slavery, as well as in other humane schemes, and was one of the original promoters of the Society for the Diffusion of Useful Knowledge. H. had two sons, both of great promise, and both prematurely cut off; the elder, Arthur Henry, who died in 1833, was the friend of Alfred Tennyson the laureate, and is the subject of *In Memoriam*. Of this son, H. has written a touching memoir. H. died January 1859. He was a Fellow of the Royal and many other societies, and a trustee of the British Museum.

HALLAMSHIRE, a district in the West Riding of Yorkshire (q. v.).

HA'LLÉ, or **HALLEIN,** a town of Austria, in the duchy of Salzburg, and 10 miles south of the town of that name, is situated on the right bank of the river Salza, and is noted for its extensive salt-works and saline baths. Pop. (1869) 3614. It has also important cotton and needle and button factories. The Dürrenberg, a mountain 2388 feet above the level of the sea, from which the brine is obtained, has 34 shafts or rooms, from which the salt is conveyed in large wooden troughs to the works within the town. The annual produce amounts to about 400,000 cwts. Good rock-salt is also obtained from Dürrenberg.

HALLE, a city of Prussian Saxony, in the district of Merseburg, known as *H. an der Saale*, to distinguish it from other places of the same name, is situated on the right bank of the Saale, and on several small islands of the river, 10 miles north of the city of Merseburg, and consists of H. proper, with its five suburbs, and the governmental townships of Glaucha and Neumarkt. It is chiefly celebrated for its university, which was founded in 1694 by Frederick I., king of Prussia; and after having been suppressed by Napoleon when it had attained the summit of its fame, was re-established in 1815, and incorporated with the university of Wittenberg, which had been dissolved during the war. From its earliest foundation, this institution has been regarded as the chief seat of the pietistic school of theology. The roll of its professors shews, however, a long array of names distinguished in every faculty; and, in addition to its theological seminary, it has an academy of the physical sciences, an observatory, a medical school supplied with surgical wards, an anatomical theatre, and botanical garden; and a library containing 60,000 volumes, and various scientific collections. The endowments for the professors and other teachers are liberal, but the attendance has declined of late years, and now only amounts to about 700 students. The Francke Institution is one of the most important establishments of the place. See Francke. The red tower on the market-place, the town-hall, and the remains of the Moritzburg, the ancient residence of the archbishops of Magdeburg, are all interesting to the antiquary. H. is amply provided with benevolent and educational establishments for the poor, and has a well-conducted institution for the blind, deaf and dumb, and insane, with free schools for both sexes; and as the chief town of a district, is the seat of various government offices and courts of jurisdiction. H. has manufactories of woollen and linen fabrics, gloves, buttons, hardware, and starch; but its most important industrial product is salt, obtained from the brine-springs within and near the town, which have been worked from a very early period, and still yield between 200,000 and 300,000 cwts. annually. Those within the town are worked by a private company, while the suburban works are held by government. The men employed at the salt-springs, and known as the 'Hallores,' are a distinct race, supposed by some to be of Wendish, and by others of Celtic descent, who retain the peculiar habits of their forefathers. Pop. (1859) 38,200; (1871) 52,639.

The origin of H. dates back to the earliest periods of the Germanic empire, when it formed an appanage of the Archbishops of Magdeburg, against whom the citizens frequently waged successful war in the middle ages, during which period the city was at the height of its prosperity. As the point of union between various important lines of railway, and in consequence of the improved means of water-communication between the Saale and Elbe, H. has of late years been making rapid advance in commerce and home industry.

HALLECK, Henry Wager, an American general, born in 1816, at Westernville, in the state of New York. He entered Westpoint Military Academy in 1835, graduated in 1839, and for about a year acted as Assistant Professor of Engineering. During the Mexican war, he served on the lower coast of California, and, for his gallant services, was breveted captain in 1847. From 1847 to 1849, he was Secretary of State for California, under the military government of Kearney, Mason, and Riley; and in 1849 was a member of the convention to form and draft the state constitution of that province. He became captain of engineers in 1853, left the service in 1854, and for some time practised law in San Francisco. On the outbreak of the civil war, he joined the Northern army in 1861 as major-general, and in November of the same year was appointed Commander of the Department of the West. In 1862, he became general-in-chief, resigning in 1864, and becoming Chief of the Staff. As a general, he was able and successful. He died at New Orleans in January 1872. He wrote *Elements of Military Art and Science* (1846), *Mining Laws of Spain and Mexico*, &c.

HALLELU'IAH (Heb. *Praise ye the Lord*), one of the forms of doxology used in the ancient church, derived from the Old Testament, and retained, even in the Greek and Latin liturgies, in the original Hebrew. The singing of the doxology in this form dates from the very earliest times; but considerable diversity has prevailed in different churches and at different periods as to the time of using it. In general it may be said that, being in its own nature a canticle of gladness and triumph, it was not used in the penitential seasons, nor in services set apart for occasions of sorrow or humiliation. In the time of St Augustine, the African Church used the Halleluiah only from the feast of Easter to that of Pentecost. In other churches, it was found in most of the services throughout the year, with the exception of the seasons of Lent and Advent and the vigils of the principal festivals. In the Roman Catholic Church, the Halleluiah is introduced both into the mass and into the several hours of the public office, but it is discontinued from Septuagesima Sunday until Easter; and on the contrary, during the interval between Easter and Pentecost, it is introduced more frequently into the services and in circumstances of greater solemnity. It is always omitted in the services for the dead, and on the ember days, at the quarter tense, and on the principal vigils. In the Church of England, the first Prayer-book of Edward VI. retained the Halleluiah in the original Hebrew. In the present Prayer-book, although retained, it is found not in the Hebrew, but in its English equivalent, *Praise ye the Lord*. See Binterim's *Denkwürdigkeiten der Christ-Kathol. Kirche*.

HALLER, Albrecht von, an eminent physiologist, was born at Bern, October 1708, and died in that city, December 1777. In early life, he was feeble and delicate, being affected with rickets, a disease which is not unfrequently accompanied with considerable intellectual precocity. His father, Nicholas Emmanuel von Haller, who was an advocate, and had the reputation of being an able lawyer, intended him for the church; but his own inclinations being in favour of medicine, he proceeded in 1723 (two years after his father's death) to the university of Tübingen, where he became the pupil of the well-known anatomist Duvernoy. In 1725, he removed to Leyden, where he attended with much advantage the lectures of Boerhaave and of Albinus, and obtained the degree of Doctor of Medicine in 1727. He then visited London, where he made the acquaintance of Sloane, Douglas, and Cheselden; whence he proceeded to Oxford, and afterwards to Paris, where for six months he studied anatomy and botany under Winslow and De Jussieu; but one of his neighbours, who was annoyed by his dissections, having threatened to denounce him to the police, he made a rapid retreat to Basel, where he became the pupil of John Bernoulli, the celebrated mathematician. After seven years' study in these different seats of learning, he returned, in his 22d year, to his native city, and commenced practice as a physician. The professor of anatomy, Meig, having fallen ill, H. undertook the duties of his class; he likewise devoted much of his time about this period to the botany of the Alps; and also published a celebrated descriptive poem, entitled *Die Alpen* (The Alps). In 1735, he was appointed physician to the hospital, and shortly afterwards, principal librarian and curator of the cabinet of medals; but these offices he did not hold long, for in 1736, George II. wishing to establish a university at Göttingen, offered him the professorship of medicine, anatomy, botany, and surgery, which, after some hesitation, he accepted. From this time, he gave up the practice of his profession, and for the next 18 years devoted himself wholly to teaching and to original research. He took an active part in the formation of the Royal Academy of Sciences of Göttingen; and the memoirs of the society, which appeared under the title of *Commentarii Societatis Regiæ Scientiarum Gottingensis*, contain many of his papers. During the period that he held the professorship—viz., from 1736 to 1753—he composed and published 86 works on medical subjects, chiefly on physiology and botany; and it is recorded that he contributed upwards of 12,000 notices or reviews of books to the *Göttingische gelehrte Anzeigen*, a monthly periodical work, of which he was editor. In 1753, in consequence of disputes with his colleagues, and probably in part from the delicate state of his health, he resigned his chair, and returned to his native town, where he subsequently held several important and honourable offices. He still, however, retained his position as president of the Royal Academy of Sciences, and other more substantial distinctions, such as a retiring allowance, &c. It was after his retirement from Göttingen that some of his most important writings were published, amongst which must be especially mentioned his *Elementa Physiologiæ Corporis Humani* (Lausanne, 8 vols. 4to, 1757—1766)—by far the most important of his works—and his four *Bibliothecæ*, or critical catalogues of works on botany, surgery, anatomy, and medicine. The increasing maladies of his later days did not distract his mind from the study of his favourite subjects. He recorded all the symptoms of his last illness—a combination of gout and disease of the bladder—and the gradual cessation of his vital functions; and his last words, addressed to his physician, were: 'My friend, the pulse has ceased to beat.'

H.'s eminence as a man of science was duly recognised even in his own lifetime. In 1739, he was appointed physician to the king of Great Britain; he was ennobled by the emperor of Germany in 1748; the universities of Berlin, Oxford, and Utrecht in vain endeavoured to obtain him as their professor; and he was an honorary member of all the scientific societies of Europe. His name is especially connected with the doctrine of muscular irritability, which is noticed in the article Muscle and Muscular Tissue; and if he made but few positive additions to our knowledge, his teaching and writings impressed a new aspect on physiology—a science of which he has deservedly been termed 'The Father.' But, while his name is indelibly recorded in the annals of science, his reputation in his own country as a poet probably exceeds his fame as an anatomist and physiologist, *Die Elegische Gedichte* (Elegiac Poems), &c. being still frequently republished in Germany.

HALLEY, Edmund, a celebrated astronomer and mathematician, son of a London soap-boiler, born at Haggerston, near London, in 1656, educated at St Paul's School, and afterwards at Queen's College, Oxford, which he entered in 1673. He early became an experimenter in physics—before leaving school, he had made observations on the variation of the needle. In 1676, he published a paper (*Philosophical Transactions*) on the orbits of the principal planets; also observations on a spot on the sun, from which he inferred its rotation round its axis. In November of the same year he went to St Helena, where for two years he applied himself to the formation of a catalogue of the stars in the southern hemisphere, which he published in 1679 (*Catalogus Stellarum Australium*). On his return, he was chosen a Fellow of the Royal Society, and deputed by that body to go to Danzig to settle a controversy between Hooke and Helvetius respecting the proper glasses for astronomical observations. In 1680, he made the tour of Europe, during which he made observations with Cassini at Paris on the great comet which goes by his name, and the return of which he predicted. His observations on this comet formed part of the foundation of Newton's calculation of a comet's orbit. H. returned to England in 1681, and in 1683 published (*Phil. Trans.*) his theory of the Variation of the Magnet. The next year, he made the acquaintance of Newton—the occasion being his desire for a test of a conjecture which he had made that the centripetal force in the solar system was one varying inversely as the square of the distance. He found that Newton had anticipated him, both in conjecturing and in demonstrating this fact. For an account of H.'s connection with the publication of the *Principia*, see Newton. In 1686, H. published an account of the trade-winds and monsoons on seas near and between the tropics, which he followed by some other chemico-meteorological papers. In 1692, he published his hypothesis relative to the change in the Variations of the Needle, to test the truth of which, by obtaining measures of the variations in different parts of the world, he was sent in 1698 in command of a ship to the western ocean; but his crew mutinied, and he was obliged to return. The next year, however, he sailed again on the same expedition, and the result of his observations was given to the world in a general chart, for which he was rewarded by the rank of captain in the navy with half-pay for life. Soon after, he made a chart of the tides in the Channel, and surveyed the coast of Dalmatia for the emperor of Austria. On the death of Dr Wallis in 1703, he was appointed Savillian professor of geometry at Oxford. In 1705 he published his researches on the orbits of the comets. In 1713, on the death of Sir Hans Sloane, he became secretary of the Royal Society; in 1716 he made valuable experiments with the diving-bell, which were afterwards published; and in 1720, after the death of Flamsteed, he became astronomer-royal, and continued without assistance to conduct the operations at the Observatory with unremitting energy. In this office, and engaged especially in studying the moon's motions, he passed the rest of his life. In 1729 he was chosen a foreign member of the Academy of Sciences, Paris. He died at Greenwich, 14th January 1742, 86 years old. H. had married, in 1686, a daughter of Mr Tooke, auditor of Exchequer, by whom he had several children. Besides the writings mentioned, H. wrote many others. His *Tabulæ Astronomicæ* did not appear till 1749. Among his principal discoveries may be mentioned that of the long inequality of Jupiter and Saturn, and that of the slow acceleration of the moon's mean motion. He has the honour of having been the first who predicted the return of a comet, and also of having recommended the observation of the transits of Venus with a view to determining the sun's parallax—a method of ascertaining the parallax first suggested by James Gregory.

HALLEY'S COMET. See Comet.

HA'LLOWELL, a city in Maine, United States, on the river Kennebec, 2 miles south of Augusta. It has a town-hall, 7 churches, 3 banks, 1 newspaper office, a cotton-factory, &c. It is best known abroad from the fine quality of granite in the neighbourhood. Steam-boats and vessels of nine feet draught can load. Pop. in 1870, 3007.

HALLOW-EVEN, or **HALLOWEEN**, the name popularly given to the eve or vigil of All Hallows, or festival of All Saints, which being the 1st of November, Halloween is the evening of the 31st of October. In England, it was long customary to crack nuts, duck for apples in a tub of water, and perform other harmless fireside revelries. While the same thing can be said of Scotland, the Halloween ceremonies of that country partook more of a superstitious character; taking, among rustics, the form of a charm to discover who should be his or her partner for life. Of these now almost exploded customs, the best summary is that contained in Burns's well-known poem *Halloween*. We refer to Brand's *Popular Antiquities* for some notice of old Hallow-even practices.

HALLUCINA'TIONS are morbid conditions of mind in which perception takes place where no impression has been made upon the external organs of the special senses, and where the object is believed to be real and existing. A picture is presented to the imagination when no ray of light has fallen upon the eye; a voice is heard when all around is silent; a pleasant smell fills the nostril when neither flowers nor feast give forth their fragrance. Delusions, on the other hand, originate at the other extremity of the chain of consciousness in the mind itself, and consist in erroneous interpretations of real sensations. A form passes across the vision, and it is regarded as a phantom, or a demon, or what is not and cannot be; a voice may address the listener in accents of tenderness and friendship, which before they reach the mind have assumed the shape of insults and calumnies; and the fresh odour of a rose may suggest notions of poison and pollution. But hallucinations may involve internal experiences as well as the reports from the outer world; nor is it invariably possible or necessary to distinguish hallucinations from delusions. There is a composite state in which the external impression is imaginary, and the interpretation from such an impression, had it been real, is erroneous. A clock is heard by a patient to strike where not a sound is audible by others, and the chime is held to be the announcement of the crack of doom. In all these cases, the sensorium itself must be held to be at fault, whether the nerves of seeing, hearing, &c., be structurally affected or not. These phenomena are observed in connection with all the senses, but in different proportions; the frequency being perhaps in relation to the number of healthy sensations of which the organ is the natural channel, and to the degree of excitement and cultivation to which it is ordinarily subjected. According to one authority, hallucinations of hearing constitute two-thirds of the whole observed; but, upon a more careful analysis, the following tabular expression of frequency appears to be correct: hallucinations of hearing, 49; of vision, 48; of taste, 8; of touch, 3; of smell, 1. These conditions are detectable in all mental diseases; but the proportion varies according to the form and the intensity of the alienation. All are more frequent in mania than in monomania and fatuity; and errors of vision are more numerous than those of hearing in mania. Lord Brougham at one time held that the presence of hallucinations should be elected into a crucial test of the existence of insanity. Practical men, however, demonstrate that derangement is not necessarily conjoined with such a symptom. Esquirol held that of 100 lunatics, four-fifths would be affected with hallucinations. Of 145 individuals in Bicêtre, Baudry found that 56 presented hallucinations; and the subsequent researches of Thore and Aubanel in the same hospital shewed 122 affected out of 443 maniacs, monomaniacs, laments, &c. Brière de Boismont, *Des Hallucinations* (Paris, 1845); Aubanel and Thore, *Recherches Statistiques faites à l'Hospice de Bicêtre;* Michéa, *Du Délire des Sensations* (Paris, 1848).

Hallucinations of Sane Men.—In a great majority of cases, hallucinations can readily be traced to mental alienation, which is cognizable by other signs, or to conditions of the nervous system, which impair or pervert without overthrowing the mind; or to general constitutional states, or positive diseases, such as in the case of Nicolai, which involve disturbance of the functions of the external senses. There is, however, a class of phenomena which cannot be included under any of these categories; where objects appear; voices tempt, threaten, soothe, or where a series of impressions are received by the mind, without any corresponding sensation; where the system is perfectly healthy, and where the individual affected is conscious that what he sees or hears is unreal. Medical experience, however, goes to shew that under such circumstances the nerve, or some organ connected with the development of special sensation, or the brain itself, is in an abnormal or excited condition, which falls short of disease, not interfering with the regular discharge of the ordinary functions of these parts of the economy, and not being detectable in any other way, and which is sometimes compatible with great intelligence, and even genius. As illustrative of the latter proposition, and of the least morbid aspect of such phantasmata, it may be mentioned that the late Earl Grey was haunted by a gory head, which he could exorcise at will. Swedenborg, while at the head of the government, saw members of the heavenly hierarchy seated among the ministers at the council board, and bowed reverentially to them. Bernadotte encountered a woman in a red cloak in his rides; and a patient has been described who was followed first by a cat, then by a tatterdemalion beggar, and then by a skeleton which never left him, walked side by side, joined his family circle, and peered through his curtains at night. Yet Swedenborg knew that it was not flesh and blood realities he acknowledged; the king shrunk from, but repudiated the red cloak; and the patient disbelieved the skeleton, and detected its true nature and origin.

HALMALILLE (*Berrya amonilla*), a tree of the natural order *Tiliaceæ*, closely allied to the Lime or Linden tree of Europe, and much resembling it, but larger; a native of Ceylon, much valued for its timber, which is a favourite house-building wood in that island, and is employed also for carts, casks, and all household purposes, and also for boat-building, as it is believed to resist the attacks of marine worms, and in virtue of a certain unctuosity, to preserve the ironwork from rust. It is exported to Madras—where, from the principal port of exportation, it is known as *Trincomali Wood*—and the Masula boats, which brave the formidable surf there, are made of it. It is a light wood.

HA'LOGENS. This term, which is equivalent to 'salt-producers,' is derived from the Greek word *hals*, salt, and includes a very distinct and well-characterised group of non-metallic elements—viz., chlorine, bromine, iodine, and fluorine, which form with metals compounds analogous to sea-salt.

The following are their most important characteristics:

1. They combine directly and at an ordinary temperature with the metals, for which they exhibit a very strong affinity; and their combinations with the metals present those properties which pertain to Salts (q. v.). No elements excepting these four possess the property of entering into direct combination with metals, and of thus forming salt-like compounds. When united with the same metal, the salts which the different halogens form are isomorphous; thus, for example, the chloride, iodide, bromide, and fluoride of potassium all crystallise in cubes.

2. They all have a very energetic affinity for hydrogen, with which they all unite in one definite proportion—viz., 2 volumes of the gas or vapour of the halogen with 2 volumes of hydrogen, the union occurring without change of bulk, that is to say, being represented by 4 volumes, and the resulting gaseous compound being intensely acid, and very soluble in water. The acids thus formed are hydrochloric, hydrobromic, hydriodic, and hydrofluoric acids. Moreover, all these halogens (except fluorine) form powerful acids with five atoms of oxygen—viz., chloric, bromic, and iodic acids; and their salts present numerous points of resemblance.

HA'LOID SALTS. These are the compounds formed by the union of one of the Halogens (q. v.) with a metal. We may mention chloride of sodium

($NaCl$), bromide of silver ($AgBr$), fluoride of calcium (CaF), and iodide of potassium (KI), as examples.

HALORAGIA'CEÆ, or **HALORA'GEÆ**, a natural order of exogenous plants, closely allied to *Onagraceæ* (q. v.).—There are about seventy known species, herbaceous or half-shrubby; pretty much scattered over the world, but almost all aquatic, or growing in wet places. The stems and leaves often have large air-cavities. The flowers are generally small, and the plants insignificant in appearance. Nor have any of them any important uses, except those of the genus *Trapa* (q. v.). The only British species are the Mare's Tail (*Hippuris vulgaris*) and the Watermilfoils (*Myriophyllum*).

HA'LOS, PARHE'LIA, CORO'NÆ, &c. It would not be easy even to enumerate the various distinct phenomena which belong to the above classes; we must, therefore, be content to consider a few only of the principal varieties; and, in fact, if the causes of these be thoroughly understood, those of the others present no further difficulties, except such as are of a purely mathematical nature.

The first class we have to consider is very common. When the sun or moon is partially obscured by a mist or cloud, the latter *not* being of the species called cirrus (see CLOUD), it is almost invariably surrounded by coloured rings of a few degrees only in diameter, called *Coronæ* (crowns). Those surrounding the sun cannot always be seen directly; but by reflection at the surface of still water, or of a glass-plate blackened at the back, the glare of the sun-light is sufficiently diminished to permit the corona to be seen. This meteor depends on the DIFFRACTION (q. v.) of light, caused by the small spheres or vesicles of water which compose the cloud, and can easily be imitated by looking at a bright object through a piece of glass which has been breathed upon, or dusted with Lycopodium seed. If the diffracting particles be all of the same size, the rings are very well marked; but since they become smaller as the particles increase in size, ordinary fogs and clouds, which generally contain particles of very different dimensions, give a composite effect, which spoils the distinctness, and greatly limits the number of the rings. Thus, no general rule can be given for the number or colours of the coronæ, but it may be observed that their diminution in diameter is a sign of the increase in size of the watery spheres which cause them, and therefore in general betokens approaching rain, which comes when the particles are no longer able, on account of their size, to float in the air without sensibly falling. As before mentioned, this appearance is very common, and, in fact, we scarcely see a fragment of a cloud near the sun which does not give traces of colour, depending on the average size of the particles of which it consists, and its angular distance from the sun.

A different form of corona is sometimes seen to surround the shadow of the spectator's head, when cast by the sun on a bank of fog—in this case it is sometimes called a *glory*. To this class belong the colours generally seen about the famous 'Spectre of the Brocken.' See BROCKEN. The same appearances are very frequently seen round the shadow of the spectator when thrown on muddy water, or water carrying numerous small particles of sand. The optical explanation, founded mainly upon reflection and interference, is complete, but not suited to our pages.

So far the phenomena depend merely on the cloud or fog consisting of small particles; nothing has yet been said about the *shape* of the particles. Spherical *drops* of water produce Rainbows (q. v.), and upon the vesicular form that moisture often assumes in the air, probably depend the blue of the sky and the gorgeous tints of sunrise and sunset. But halos (Gr.) and parhelia (Gr. false or mock suns) depend upon the presence in the air of innumerable *crystals* of ice, generally forming a light cirrus cloud. We cannot enter upon a complete explanation of these phenomena, but we shall give a general idea of their origin, referring the student who wishes a thorough knowledge of the subject to a memoir by Bravais (*Journal de l'Ecole Polytechnique*, xviii.), who has himself repeatedly witnessed and carefully measured the various appearances in question.

The theory of halos was first roughly attempted by Huyghens; but although his explanations are in the main correct (at all events, as regards the very simplest of the appearances), they are based on the utterly inadmissible supposition, that the halo-producing clouds are formed of cylinders of water, each having an opaque, frozen nucleus. It will be seen that the results of this supposition agree with those of the correct one in a few cases only. Further progress was impossible until the crystalline form and the refractive index of ice were observed. Both of these observations are of great difficulty; but they have been carried out by Wollaston and others with considerable accuracy. After Huyghens, Mariotte, admitting the crystalline form of ice-particles, made some great steps in advance, and much of what he left unexplained was successfully supplied by Young, and after him by Kaemtz. The most complete and systematic explanation of the whole subject, however, is that of Bravais, already referred to. There, references are given to nearly all the accurately recorded observations of halos and parhelia—the great mass of which, of course, are due to arctic voyagers, especially Scoresby and Parry.

Water crystallises in the form of regular hexagonal prisms, sometimes with plane ends perpendicular to the sides (as in fig. 1), sometimes with hexagonal pyramids as terminals (fig. 2). There is also an immense variety of much more complex forms; but upon the simpler and more common ones already mentioned, depend the ordinary cases of the phenomena we are about to describe. Now, if we consider any two non-parallel faces of one of the above crystals, it is clear that their combination must act as a prism, decomposing white light, which passes through them, into its constituent colours. Every such crystal, then, placed somewhere near the line joining the eye and sun, must in general send to the former some definitely coloured ray from each effective pair of surfaces. The refractive index, however, of ice is such that no ray can pass through a prism of it whose angle is greater than about 99°·5; and we are therefore limited to pairs of faces whose inclination is not superior to this. The most important pairs are two *alternate* faces of the prism (fig. 1), where the inclination is 60°, and a face with a terminal plane (fig. 1), the angle being 90°.

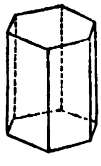


Fig. 1.

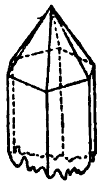


Fig. 2.

Halo of 22° Radius.—We may now suppose prisms of ice, with refracting angles of 60°, to be distributed (with every possible position of their axes) nearly between the sun and the spectator, and it is evident that the appearances produced must be symmetrical with regard to the line joining the eye and sun, and must therefore consist of coloured circles with the sun as centre. To attain a more exact idea of the nature of these circles, suppose that we are dealing with light of one colour only (say red). Now (see PRISM), if a beam of homogeneous light falls on a prism, it is refracted without separation. If the prism be turned gradually and uniformly about its axis, the refracted ray also turns, but *not* uniformly—at first rapidly, then slower, till it reaches a point at which it appears to be stationary for a little; then, on further turning the prism, the refracted ray *retrogrades*, at first slowly, then faster. There is therefore a position of the prism, called that of *minimum deviation*, for which a slight alteration of the prism produces none in the direction of the refracted ray. Hence, as we have supposed prisms to be in the cloud in every possible position, those which are near the position of minimum deviation will conspire to refract light in the *same* direction, and their effects will be added. All the others will cause a *greater* deviation of the light, but few will conspire to send the light in any given direction. The appearance will therefore be a bright circle of red light surrounding the sun as centre, its angular radius being the angle of minimum deviation, which, for a prism of ice of 60° angle, is about 21° 50′. Inside this circle there will be *no* light; outside, a feeble illumination only, becoming fainter as we go further from the sun. With orange light alone, there would be a somewhat larger circle, and so on. Hence, when white light falls on such a system, the effect is a circular halo, dark within, red on its inner edge, and with a mixture of more or less of the colours of the spectrum from inside outwards; so that, like the rainbow, which it much resembles, it differs from the ordinary Spectrum (q. v.).

If we consider next the light *reflected* from the surfaces of the prisms, this will be *white*, and diffused with approximate uniformity all about the sun.

But the prisms of fig. 1 are not likely to be suspended in the air in all positions alike. If the prism be long and fine, it will have a tendency to fall end foremost, i. e., with its axis vertical, or (it may be) horizontal. If it be a flat hexagonal cake (a frequent form of snow), it will tend in the main to fall edgeways, so that, in addition to the halo which depends upon the ice-crystals having every possible position, there are distinct phenomena depending on an excess of the crystals having their axes vertical or horizontal. If we consider the sun as just rising or setting, it is plain that the right and left hand portions of the halo will be much more strongly marked than the others, as these parts are formed by crystals whose axes are vertical, and which form the majority. There are therefore to right and left of the sun, and on the halo, bright-coloured images of the sun, which are called *parhelia*, or mock-suns.

It is perhaps a little more difficult to explain to the non-mathematical reader the formation of parhelia when the sun is not on the horizon, and to shew why they then separate from the halo, and are formed externally to it, still, however, at the same altitude as the sun. We may, however, make the attempt as follows: Suppose an indefinitely long vertical prism; rays of sunlight falling on this are separated, as before, but if the sun be not on the horizon, they no longer fall on the prism perpendicularly to its edge. Optics, however, shews us that for this oblique incidence also there is a position of minimum deviation, and therefore one angular distance from the sun at which the effects of a great number of prisms conspire, while far fewer conspire at any other angle. It is also shewn that this minimum angle is greater as the incidence is more oblique. Also the inclination of the incident and refracted rays to the edge of a prism is always the same, however the ray may fall. Hence, as the edges of the prisms in question are vertical, the refracted rays appear to come from a point at the same altitude as the sun, and, by what was remarked above, further from the sun as the sun is higher. Hence the formation of the parhelia consisting of two coloured images of the sun, at the same altitude as that body, and further beyond the halo as the sun is higher. Accurate measurements of their distance from the sun for different altitudes have been found to accord exactly with the results of calculation from the optical data. See PP (fig. 3).

The light *reflected* from the surfaces of the vertical prisms, of course appears to come from an image of the sun in a vertical mirror, which, by optical laws, must have the same altitude as the sun itself. Such images then form a *white* horizontal small circle, passing through the sun and the parhelia. This is often observed, and helps to corroborate the above theory of the coloured appearances. See the dotted line PSP (fig. 3).

The light reflected from the horizontal terminals of these prisms must evidently produce a single white image of the sun, as much below the horizon as he is above it, and *vice versâ*. This appearance is also common enough.

Tangent Arcs to the Halo of 22°.—We have seen that in many cases the prisms of ice are so short as to be hexagonal plates. Their natural position in falling will be edge foremost, or there will be a multitude of snow-crystals whose axes are nearly horizontal, but of course arranged in all directions in the horizontal plane. Let us consider first all those whose axes are perpendicular to the line joining the spectator with the sun; these evidently (by an explanation similar to that of the parhelia given above) form parhelia *on* the halo at its upper and lower points. Another set, whose axes are also nearly horizontal and parallel, but slightly inclined to the former, will form parhelia to one or other side of the vertical plane passing through the sun, and on account of the obliquity of the incidence, the angle of deviation is increased, and these are *outside* the halo. They are further to the right or left of the sun's vertical plane, and further outside the halo as the crystals are more and more turned in their horizontal plane. The complete result is a brightly coloured pair of arcs, which *touch* the halo at its upper and lower points, and lie completely outside. For certain elevations of the sun, these combine, forming a curve like an ellipse, whose centre is the sun, whose larger axis is horizontal, and which touches the halo externally at its upper and lower points.

Halo of 46°.—This depends upon the right-angled prisms, formed by combining a terminal plane with one of the faces of the hexagonal prism; and with the single exception of a different refracting angle, and its consequent greater dimensions, its explanation and its appearance are the same as those of the halo of 22°.

Perhaps the most magnificent, both for brightness and separation of colours, of all the halos, is the coloured arc which touches the halo of 46° at its upper point. This depends entirely upon the refraction of light through the upper edges of prisms similar to fig. 1, and whose axes are *vertical*. It is therefore due to the same cause as the parhelia of the halo of 22°; and it is a remarkable proof of the truth of this, that there is but one instance recorded in which the former appeared without the latter; and its absence was then easily accounted for by there being no cloud of ice-crystals near enough the sun to produce the parhelia. See fig. 3.

There are also sometimes seen brightly coloured arcs touching one on each side the lower half of the halo of 46°. They are explained by the right angles of prisms whose axes are horizontal. Again, a parhelion being itself a source of light, sometimes very intense, may have *its* surrounding halos of 22°, &c. All phenomena of the latter class are termed *secondary*. They are in general, as might be expected, much fainter than the *primary* ones, but in favourable circumstances have been distinctly observed.

In addition to our very imperfect sketch of the results of the prisms of 60° and 90°, we might consider shortly those due to various combinations of planes of the hexagonal pyramid (fig. 2) with each other, or with planes of the prism; but the phenomena depending on these, though easily enough predicted mathematically, are not well suited for verbal explanation.

We conclude with a rough geometrical sketch of a tolerably complete set of halos, observed by Bravais in Sweden in 1839. The marks on the sketch will be sufficient to inform the reader to which of the classes above mentioned the various portions belong.

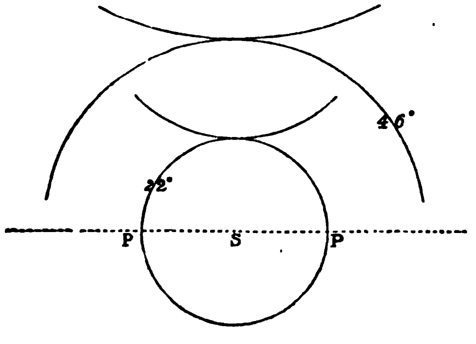


Fig. 3.

HA'LOSCOPE, the name of a beautiful optical instrument invented by M. Bravais of France, for the exhibition of all the phenomena connected with halos, parhelia, &c. It consists of a vertical axis with a clock movement, for the purpose of giving it a rapid rotation; two glass prisms, one hollow to contain water; two opaque plates of glass to obscure one or two sides of the prisms, as required in different experiments; a quadrangular prism; and a small arm carrying a mirror: this last and the three prisms are all adapted for mounting on the axis. To imitate the parhelion, the vertical axis with the solid glass prism is set in rapid rotation in a darkened chamber, with a candle ten or twelve feet distant, but with the flame on the same plane as the rotating prism; two sides of the prism are to be obscured with the movable opaque slides of glass. The spectator then looks horizontally at the revolving instrument, and sees the parhelion circle. Different dispositions of the apparatus produce the allied phenomena.

HALSTEAD, a market-town of England, in the county of Essex, is agreeably situated on both banks of the Colne, about 43 miles north-east of London, and on the high-road from that city to Norwich. Its parish church, one of the finest in the county, is in the perpendicular style, with a decorated chancel. The chief educational institution is Lady Mary Ramsey's Grammar School, with a small endowment, founded in 1594. The manufactures are crape, silk, velvet, and paper; brick-making and straw-plaiting are also carried on. Pop. (1871) 5783.

HA'LYARDS, the smaller ropes and tackle used in hoisting sails or other portions of a ship's equipment. The signal halyards are running cords of the best white hemp, passing through a pulley in the truck at the mast-head, or gaff-point, and thence to the deck; the flags when attached to them are rolled up, and then hoisted and expanded to the wind by a jerk when the proper moment arrives.

HALYBURTON, THOMAS, a Scotch divine, born 1674, died 1712. He was the author of several works, including *Natural Religion insufficient, and Revealed necessary to Man's Happiness; The Great Concern of Salvation;* and *Ten Sermons preached before and after the Celebration of the Lord's Supper.* The works, especially the autobiographic memoir, of the 'Holy Halyburton' were once very popular among the people of Scotland; and even at the present day they are greatly relished by persons of a serious disposition. They were published, together with an Essay on his Life and Writings, by Robert Burns, D.D. (London, 1835).

HAM, according to the writer of Genesis, was one of the three sons of Noah, and the brother of Shem and Japheth. The word is derived by Gesenius from the Heb. *Hamam*, 'to be hot.' His descendants are represented in the biblical narrative as peopling the southern regions of the earth, Arabia, the Persian Gulf, Egypt, Ethiopia, Libya, &c. Both he and his son Mizraim appear to have given their name to Egypt in particular. The Coptic or native name of Egypt is *Kem* or *Chem*, supposed to be the same word as Ham, and signifying both black and hot. In the hieroglyphic language, the name of Egypt is expressed by the two letters K. M. In the Rosetta Inscription, the word occurs more than ten times, and is read by Champollion, *Chmè*. It is a curious, and somewhat perplexing circumstance, that Ham should have received a name that must have been more appropriate to his descendants than to himself, for we are not told, and there is no reason to believe, that he was more sun-burned or blacker than his brothers. In explanation of this, it is customarily urged that the names of Noah and his sons had 'prophetic significations'—an hypothesis which few feel to be altogether satisfactory.

HAM, a small town and fortress of France, in the department of Somme, and situated on the river of that name, is distant 36 miles east-south-east of Amiens, and about 70 miles north-north-east of Paris. It is of ancient origin; coins were struck here in the reign of Charles the Bald (840—877). The seigniory or lordship of Ham, erected into a duchy in 1407, was held by the families of Courcy, Orleans, Luxembourg, and Vendome. The town is chiefly noteworthy on account of its old fortress or castle, built by the Constable de Saint Pol in 1470, and now used as a state prison. Its walls are 39 feet thick, and its principal tower is 108 feet in height, and the same in diameter. It is memorable as the place of confinement of Marbœuf, Moncey, and others; and subsequently of Polignac, Chantelauze, Peyronnet, and Guernon Ranville from 1831 to 1836; and of Louis Napoleon, the late Emperor, from 1840 till 1846. After the *coup d'état* of the 2d December 1851, the republican Generals Cavaignac, Lamoricière, Changarnier, and others were kept here for some time. Pop. (1872) 2674.

HAM, properly the hind part or angle of the knee; but usually applied to the cured thigh of the ox, sheep, or hog, more especially the last. Ham-curing, or, what is the same thing, bacon-curing, is performed in a variety of methods, each country or district having its own peculiar treatment; these, however, relate to minor points. The essential operations are as follows: The meat is first well rubbed with bay-salt, and either left on a bench that the brine may drain away, or covered up in a close vessel; after a few days it is rubbed again, this time with a mixture of salt and saltpetre, to which sugar is sometimes added, or with a mixture of salt and sugar alone. It is then consigned to the bench or tub for at least a week longer, after which it is generally ready for drying. *Wet salting* requires, on the whole, about three weeks; *dry salting*, a week longer. Mutton-hams should not be kept in pickle longer than 12 or 14 days. Some hams are merely hung up to dry without being smoked; others are removed to the smoking-house, which consists of two and sometimes three stories; the fire is kindled in the lowest, and the meat is hung up in the second and third stories, to which the smoke ascends through holes in the flooring. The fire is kept up with supplies of oak or beech chips, though in some districts, as in Westphalia, twigs of juniper, and in many parts of Great Britain peat, are used. Fir, larch, and such kinds of wood, on account of the unpleasant flavour they impart, are on no account to be used. The fire must be kept, night and day, in a smouldering state for about six weeks, at the end of which time, if the ham be not more than five or six inches deep, it is perfectly cured. As cold weather is preferable for this operation, it is chiefly carried on during winter. Many of the country-people in those parts of England where wood and peat are used for fuel, smoke hams by hanging them up inside large wide chimneys, a method common in Westmoreland. The curing of beef and mutton hams is carried on chiefly in the north of England and Dumfriesshire in Scotland; that of pork-hams, on the other hand, forms a large and important item in the industry of various countries. Westphalia, in particular, is celebrated for the delicacy and flavour of its smoked hams. The efficiency of wood-smoke in preserving meat, is due to the presence of pyroligneous acid. See Pyroligneous Acid and Creasote.

HAMADA'N, an important town of Persia, in the province of Irak Ajemi, is agreeably situated at the northern base of Mount Elwund, 180 miles west-south-west of Teheran, in lat. 34° 50′ N., and long. 48° 28′ E. Its streets are narrow and dirty; but the trade and manufactures carried on impart to it a lively and bustling air. It contains numerous caravansaries, excellent and well-furnished bazaars, gardens, baths, and mosques, as well as two notable tombs, one that of the famous Arabian philosopher and physician Avicenna (q. v.), which draws numerous pilgrims to the town; and the other affirmed to be that of Mordecai and Esther. During four months in winter, the cold here is excessive, and fuel with difficulty procured; throughout the rest of the year, however, the climate is delightful. Being the centre of converging routes from Bagdad, Erivan, Teheran, and Ispahan, it is the seat of a large transit trade. H. carries on extensive manufactures of leather; coarse carpets, woollen and cotton fabrics, are also made to some extent. Pop. variously estimated at from 10,000 to 40,000. Recent explorers have concluded, from historical evidence, and from the coins, inscriptions, and other remains found here, that H. occupies the site of the Median Ecbatana. See Ecbatana.

HA'MADRYADS. See Nymphs.

HAMAMELI'DEÆ. See Witch Hazel.

HAMANN, Johann Georg, a very original thinker and author, who, on the title-page of some of his writings, called himself the 'Magician of the North,' was born at Königsberg, in Prussia, August 27, 1730. His early life was somewhat checkered; and a failure to acquit himself creditably in some business with which a merchant of Riga had intrusted him, induced him to abandon himself to dissipation, from which he was rescued by reading the Bible. He now devoted himself to the study of the ancient languages and of Oriental literature, and made the acquaintance of many eminent authors. He died at Münster, June 21, 1788. As an author, H. was little esteemed by his contemporaries, as he opposed the tendencies of the age, and defended the dignity of revelation against the attacks of the Rationalists, and was thus placed in opposition to the multitude of scholars. His language, besides, was figurative and symbolical in the highest degree, and frequently concealed, rather than revealed the depth of his thinking. But his unmistakable genius, and the rich suggestiveness of his ideas, were appreciated highly by Herder, Goethe, Jacobi, Jean Paul, and other great men. The influence which he exercised upon Herder's views was very great. All his writings exhibit a deeply spiritual faith in the unseen and the eternal. Fragments of them were published by Cramer, under the title *Sibyllinische Blätter des Magus aus Norden* (Leip. 1819), and his *Sämmtliche Werke*, by F. Roth (7 vols. Berlin, 1821—1825; an 8th vol., published by G. A. Wiener, Berlin, 1843, contains additions and explanations). His biography was published by E. H. Childemeister (*Hamann's Leben und Schriften*, 3 vols., Gotha, 1857).

HAMBA'TO, a town of Ecuador, in South America, stands in lat. 1° 4′ S. and long. 78° 56′ W., at the north-east base of Chimborazo, with Cotopaxi, about 25 miles distant, in front. Its elevation above the sea is 8860 feet. At this altitude, wheat grows even under the equator. Though twice destroyed—by an eruption of Cotopaxi in 1698, and by an earthquake in 1796—H. has still a flourishing trade in grain, sugar, and cochineal, and contains about 12,000 inhabitants.

HA'MBURG, The Republic of, is the largest of the free cities of Germany, and is situated in lat. 53° 32′ N., and long. 9° 58′ E., on the north bank of the Elbe, at its junction with the small streams of the Alster and the Bille, about 75 miles from the German Ocean. H. was founded by Charlemagne in 804, but its commercial history began in the 13th c., when the Emperor Frederick I. granted it the free navigation of the Elbe from the city to the sea, with the right of levying a toll on foreign shipping. These privileges were confirmed by his son, Otho IV., who raised H. to the rank of a free city. In 1241, H. joined with Lübeck in the formation of the Hanseatic League (q. v.), and from that time increased rapidly in wealth and commercial importance, augmenting its territory by the purchase of the township of Ritzebüttel, at the mouth of the Elbe (where the harbour of Cuxhaven is now situated), and several villages and islands in the vicinity of the town. Under the protection of the German emperors, H. soon became powerful enough to defend itself and its commerce both by sea and land, and carried on war for a considerable period against the Dutch and the Danes, though with varying success. It early embraced the doctrines of the Reformation, and in consequence of the vigorous administration of its affairs, never had an enemy within its walls during the stormy period of the Thirty Years' War. The frequently recurring disputes with Denmark ceased in 1768, when that power renounced all claim to any portion of the Hamburg territory. The prosperity of the city continued to increase until 1799, when a great commercial crisis occurred, followed in 1806 by its occupation by the French, which, with a few interruptions, lasted till 1814. During this period the town was strongly fortified, it being Napoleon's intention to make H. the stronghold of his power in Northern Germany. The sufferings of the citizens were very great, and their losses were estimated at £10,500,000. Their miseries culminated in the siege which the French under Davout sustained from the Russians in the winter of 1813—1814, when 30,000 people were driven out of the town, many of whom perished of cold and hunger. In 1815, H. joined the German Confederation, and enjoyed a return of its former prosperity until the terrible fire of 1842, by which, within three days, one-third of the city was destroyed, and great loss of life and property took place. The fire was, however, not an unmixed evil, for advantage was taken of the opportunity to reconstruct that portion of the town, which by its broad, well-lighted, and well-drained streets, and fine and lofty houses, offers a striking contrast to the remaining part, much of which is devoted to wholesale business, and intersected by canals communicating with each other and with the river, by which goods are conveyed in lighters to and from the warehouses. The old ramparts have been converted into gardens and walks, and the beauty of the city is greatly increased by two large sheets of water formed by the Alster, and surrounded by good hotels and private houses, many of which in the suburb of Uhlenhorst, about two miles from H., are very charming.

There are several fine buildings, of which the exchange—where 4000 merchants and others meet daily—and the picture gallery are the principal. Among the churches the principal are—St Nicholas's, built from designs by Sir Gilbert Scott, at a cost of £200,000, as a memorial of the fire of 1842, a very fine Gothic building, with one of the loftiest spires in Europe (483 feet high); St Michael's, built in the 18th c., in the Renaissance style, and also distinguished by a lofty spire (432 feet high); and St Catharine's, which is interesting from its age, being one of the few churches that escaped the fire.

H. is the commercial emporium of Northern Europe, and has recently been connected by bridges across the northern and southern branches of the Elbe with Harburg in Hanover, by which direct railway communication has been obtained with the free city of Bremen, and the route to Paris shortened by several hours. Great facilities have been given for the loading and discharging of steamers by the recent construction of extensive quays furnished with steam-cranes, warehouses, and communication by rail with the whole of the continent. Constant efforts are made to deepen the bed of the river, and under favourable circumstances vessels drawing 18 feet can go up to the harbour at high tide. The number of sea-going ships that entered the port in 1873 was 5263, with a burden of 1,887,000 tons, including 2532 steamers of 1,404,500 tons, the total crews being 75,250. The annual imports have trebled within the last 21 years. The goods received by sea, land, and river, on an average of the five years 1869—1873, amounted to 62,624,000 cwts., with a value of £78,680,000 per annum, of which 24,270,000 cwts., valued at 28,806,000, were from the United Kingdom. The average weight of the outward cargoes in the same period was about 12,000 cwts., and those shipped to British ports were valued at about £10,000,000.

H. is one of the largest coffee-marts, and next to London, has the largest money-exchange transactions in Europe. It is also one of the principal emigration ports of Germany, above a quarter of a million persons having left during the last five years, chiefly for the United States. There are several large joint-stock banks; marine insurance is also carried on extensively, the value of the ships and cargoes insured in 1872 having been £100,500,000. The sea-going ships belonging to H. in 1873 were 411, with 204,671 tonnage, including 45 ocean-going steamers, with a burden of 110,000 tons, belonging to five companies, and maintaining communication with North and South America and the East Indies. The manufactures of H. are of little consequence, and are not estimated to exceed £2,500,000 in value per annum. The principal are cigar-making, spirit and sugar refining, brewing, meat curing, engineering, and ship-building.

The charitable institutions of H. are numerous and well endowed. The most important are the almshouses founded recently by Schroeder and Laeisz, and the Jewish hospital founded by the late Solomon Heine. There are a great many societies and asylums for the relief or reception of various classes, and the poor in general are well cared for. The general hospital has accommodation for 1800 patients, and there is a smaller hospital in connection with the sailors' home. The Rauhe Haus, at Horn, near H., founded by Dr Wichern in 1833, is worthy of notice as a very successful attempt to reform depraved and neglected children. Education is well attended to, and there are several large and excellent private schools, and a school of art, in addition to the Johanneum, a public grammar-school founded in 1528. There are two large public libraries, an observatory, botanical and zoological gardens, the latter being large and laid out with great taste; there are also two large and several small theatres, and a greater number of public gardens and places of amusement than in any other city of the same population.

The constitution of H. is democratic. The executive power is vested in a senate of eighteen members chosen for life, with the assent of the municipal council, one-half of whom must have studied law; the legislative power being confined to the municipal council, consisting of 192 members, who are elected for six years, one-half retiring every three years. There is a very good tribunal of commerce, in addition to the ordinary courts of justice. Appeals can be carried in commercial cases to the supreme court of commerce at Leipsic, and in other cases to a court of appeal for the three Hanse towns at Lübeck. In 1866, H. became a member of the North German Confederation, and is now one of the states of the empire, sending three members to the imperial parliament at Berlin. The township of Bergedorf, 10 miles south-east from Hamburg, formerly held jointly with Lübeck, became the sole property of H. in 1868, and the whole territory covers an area of 173 English square miles, the population being about 340,000, of whom 14,000 are Jews, 7800 Catholics, and the remainder Protestants. H. is a free port outside of the German Zollverein, the only charges on goods imported being about one-eighth per cent. on certain articles received for local consumption, while many raw materials and all goods in transit are free. Exemption from the customs and regulations of the Zollverein is secured by the payment of about £100,000 annually to the Zollverein treasury. Although retaining the management of its local affairs, the independent position formerly enjoyed by H. ceased in 1866, the most noticeable consequence of which was the abolition of the Hamburg flag on board merchant-ships, and the withdrawal of its numerous consular and diplomatic representatives in foreign countries, in addition to compulsory service for three years in the army or navy by all young men liable to military duty. The estimated revenue of H. in 1874 was £1,100,000.

HA'MELN, an interesting town, and formerly a fortress of Hanover, in the province of the same name, is beautifully situated on a commanding position on the Weser, at the confluence of the Hamel with that river, 25 miles south-west of Hanover. It is surrounded by a wall, formerly surmounted by 20 towers, and defended by a fort, which, however, was blown up by the French in 1806. It is irregularly built, and is full of wooden houses in the old German style; has three churches, including the Münster, a fine old edifice, dating from 1127, and now falling into ruin; and a large educational institution built in 1827. The chain-bridge at H., crossing the Weser, was completed in 1839, and is about 780 English feet in length. Pop. (1871) 8530, chiefly employed in brewing; in the manufacture of paper, cement, woollen goods, and carpets; and in agriculture, salmon-fishing, and general trade. In the earliest times, H. belonged to the Abbey of Fulda, and was a member of the Hanseatic Confederation.

HAMI'LCAR was a name borne by several distinguished Carthaginians, the most celebrated of whom were—1. The commander of the great Sicilian expedition, 480 B.C.; 2. One of the commanders of a Carthaginian army, defeated by Timoleon, the Corinthian general, at the Crimissus, 339 B.C.; 3. (surnamed Rhodanus), the ambassador to Alexander the Great after the fall of Tyre; 4. The governor of Sicily, 317 B.C.; 5. The son of Gisco, who succeeded the preceding, and carried on military operations against the Syracusans and other states with great success, but was at length taken prisoner, and put to death; 6. A commander during the first Punic War, who was very successful against the Romans by land in Sicily, but was afterwards defeated in a sea-fight off Ecnomus, and was thereafter recalled to Africa to oppose Regulus.

But the greatest of all was H. surnamed Barca or *Barak*, i.e., 'lightning.' While very young, he was appointed to the command of the Carthaginian forces in Sicily, in 247 B.C., at which time the Romans had possession of almost all the island. H.'s first care was to discipline his infantry thoroughly; he then established himself on Mount Ercte (now *Pellegrino*, near Palermo), and from this point made pillaging excursions in all directions, sending his privateers along the coast of Italy as far north as Cumæ, thus obtaining abundant supplies for his troops. From this position the Romans endeavoured to dislodge him, but in vain. After three years, he left Ercte, and established himself on Mount Eryx, keeping up his communication with Drepanum and the sea, where the same tactics were repeated on both sides, and with the same want of success on the part of the Romans. But the Carthaginian admiral having been totally defeated off the Aegates Islands, 241 B.C., H. was compelled to abandon his fortress, and evacuate Sicily. While H. was engaged in Sicily, he had made large promises to his mercenary troops, which he was unable to perform; they revolted in consequence, and were joined by some of the African tribes. Hanno endeavoured to suppress the revolt, but failed; H. was accordingly appointed to the command, and succeeded in utterly defeating the rebels, capturing all their towns, and putting to death their leaders. H. was next appointed commander-in-chief of the Carthaginian army, and was engaged for some time in wars with the neighbouring tribes, which were abruptly ended by H.'s entering upon his Spanish campaign in (probably) 236 B.C. His great aim was to found a new empire in Spain, from which, as his basis, he might assail the Romans. Such a kingdom he saw would increase the power and wealth of his native country, and atone to her for the loss of Sicily and Sardinia. This his great purpose Hasdrubal and Hannibal endeavoured to accomplish. He marched westward, while the fleet under his son-in-law, Hasdrubal, cruised along the coast; he then crossed over at the Strait of Gibraltar, and made war on the natives of Spain, in the course of which he penetrated to the very heart of the country, subdued many tribes and cities, and amassed immense wealth. He spent nine years in Spain, and at length, in 228 B.C., met his death on the field of battle while fighting against the Vettones. His military genius is considered scarcely inferior to that of his son Hannibal.

HA'MILTON, a city of Canada in the province of Ontario, is situated at the west end of Lake Ontario, or rather of that detached section of it which, under the name of Burlington Bay, is connected with the main body of the lake by the Burlington Canal. H. is 45 miles from the Falls of Niagara, 38 from Toronto, and 378 from Montreal. It is situated in the very centre of the finest grain-producing country in America, and it is also an important centre of the chief Canada railways, the Great Western, the Hamilton and Toronto, and the Hamilton and Port Dover lines. The rapid increase of its population is remarkable. In 1841, it was about 3500; in 1850, 10,312; in 1861, 19,096; and at the time of the last census (1871) it amounted to 26,716. The Great Western Railway and its branches have done much to advance its prosperity. The manufacturing establishments of H. are extensive; the principal are locomotive-works, foundries, and car-works. The city returns one member to the legislative assembly.

HAMILTON, a parliamentary and municipal burgh, and market-town of Scotland, in the county of Lanark, is beautifully situated on the left bank of the Clyde, in the centre of a finely wooded district, about 11 miles south-east of Glasgow, with which it is connected by railway. It has a straggling, but at the same time a pleasant rural appearance, many of the houses having a piece of garden-ground attached. The town contains some fine churches; numerous good schools—of which the Academy and St John's Grammar School are the most important; the county-hall, a noticeable Grecian structure; a new town-hall; and extensive cavalry barracks. Many of the females are employed in *tambouring* for the sewed muslin manufacturers of Glasgow. Pop. (1871) 11,299.—Close to the town is Hamilton Palace, the seat of the Duke of Hamilton and Brandon, with the family mausoleum, in the midst of extensive pleasure-grounds bordered by the Clyde. The palace is a large and noble structure, and contains an excellent collection of paintings. On certain days the grounds are open to the public. Cadzow Castle, and the remains of Cadzow Forest, in which a herd of the famous aboriginal breed of wild cattle are kept, are in the vicinity.

HAMILTON, The Family of. This great historical family is known to be of English origin, but when or how it took root in Scotland has not been clearly ascertained. Some genealogists have sought to trace its lineage to Robert, surnamed Blanchmains, third Earl of Leicester, who died in 1190. There is nothing improbable in the claim —the earl's second son was Bishop of St Andrews, he had other relations beyond the Tweed, and the cinquefoil on a bloody shield, which was the heraldic bearing of his house, seems from an early period to have been the heraldic bearing of the Scottish Hamiltons. But however probable such a descent may be, it wants proof. The name of the family, obviously territorial, was doubtless taken from some one of the many English manors called Hamilton, scattered through Buckinghamshire, Hampshire, Surrey, Lancashire, Rutlandshire, Yorkshire, and Leicestershire. In the 17th c., the Leicestershire Hamilton—a petty manor in the parish of Barkby, containing only a shepherd's cottage—was shewn as the cradle of the house. Several persons of the name of Hamilton appear both in English and in Scottish records about the middle of the 13th c., and one of them seems to have held the Yorkshire manor of Hamilton, together with lands in the parish of Oxnam, in Scotland. But the pedigree of the family cannot be carried beyond (1), 'Walter Fitz-Gilbert (or Gilbertson) of Hamilton,' who, in 1296, held lands in Lanarkshire, and swore fealty to King Edward I. of England as Overlord of Scotland, and in 1314 kept the castle of Bothwell, on the Clyde, for the English. His early surrender of this strong fortress, and of the English knights and nobles who had fled to it from the field of Bannockburn, was rewarded by King Robert Bruce by grants of the lands and baronies of Cadyow and Machanshire in Clydesdale, Kinneil and Larbert in West Lothian, Kirkinner and Kirkowen in Galloway, and other lands forfeited by the Cumyns and other adherents of England. He attained the rank of knighthood, and married Mary, daughter of Sir Adam of Gordon of Huntly, by whom he left two sons. The elder (2), 'Sir David Fitz-Walter Fitz-Gilbert,' or, as he was sometimes more shortly called, 'Sir David Fitz-Walter,' or 'Sir David of Hamilton,' was taken prisoner by the English at the battle of Neville's Cross in 1346, founded a chantry in the cathedral of Glasgow in 1361, and appears among the barons in the Scottish parliaments of 1368, 1371, and 1373. His eldest son (3), 'Sir David of Hamilton of Cadyow,' died before 1392, leaving by his wife, Janet of Keith, only daughter and heiress of Sir William of Keith of Galston, five sons and a daughter. The eldest son (4), 'Sir John of Hamilton of Cadyow,' married Janet, daughter of Sir James of Douglas of Dalkeith, by whom he was the father of (5) 'Sir James of Hamilton of Cadyow,' who, about 1422, married Janet, daughter of Alexander of Livingston of Callander, by whom he had (6) 'Sir James of Hamilton of Cadyow,' and four other sons.

Lords Hamilton, Earls of Arran, Dukes of Chatelherault, Marquises of Hamilton, Dukes of Hamilton, Dukes of Brandon, &c.—Hitherto the family had been only knightly. It was ennobled in its sixth generation, in Sir James of Hamilton of Cadyow, who, in 1445, was created Lord Hamilton by a charter which erected his manor place of 'the Orchard,' in the barony of Cadyow, into his chief messuage, and gave it the name of Hamilton, which it still bears. It is to the praise of the first Lord Hamilton that, in 1460, he founded a college in the university of Glasgow—the first college in Scotland founded by a layman. Allied both by marriage and by descent to the Douglases, he followed their banner in the beginning of their great struggle with the crown. But he forsook them at a critical moment in 1454, and his seasonable loyalty was rewarded by large grants of their forfeited lands, and, at a later period, when he must have been well advanced in years, by the hand of the Princess Mary, the eldest daughter of King James II., and the widow or divorced wife of Thomas Boyd, the attainted Earl of Arran. Lord Hamilton survived his marriage only five years, dying in 1479. His only son, James, second Lord Hamilton, was, in 1503, made Earl of Arran, and had a grant of that island, the dowry of his mother on her first marriage. After playing an important part in public affairs during the minority of King James V., he died in 1529, being succeeded by the eldest son of his third wife (a niece of Cardinal Beaton), James, third Lord Hamilton, second Earl of Arran. The death of King James V. in 1542 left only an infant of five days old between him and the throne. He was at once chosen regent of the kingdom and tutor to the young queen, and declared to be 'second person in the realm'—a position which carried with it something of royal style. He signed or superscribed his name as 'James G.,' or simply 'James,' and wrote himself 'James, by the grace of God, Earl of Arran and Lord Hamilton, Governor and Prince of Scotland.' He held his high offices till 1554, when he resigned them in favour of the queen-mother, Mary of Guise, receiving in return, from King Henry II. of France, a grant of the duchy of Chatelherault. His nearness to the throne, his great following, and large possessions, left him still a person of such mark that his eldest son, the Earl of Arran, as he was called, was proposed at one time as the husband of Queen Mary of Scotland, and at another time as the husband of Queen Elizabeth of England. The career which opened with such high aspirations came to a sad and untimely end; the earl was afflicted with madness in 1562, and never recovered his reason, although he lived till 1609. His father, the first Duke of Chatelherault, dying in 1575, his second son, Lord John Hamilton, the lay-abbot or commendator of Arbroath, became virtual head of the house, and as such was, in 1599, created Marquis of Hamilton. He died in 1604, being succeeded by his son James, the second marquis, who, in 1619, was created Earl of Cambridge in England, and died in 1625. He was succeeded by his eldest son James, the third marquis, who led an army of 6000 men to the support of King Gustavus Adolphus of Sweden in 1631—1632, and a few years later acted a conspicuous part in the great contest between King Charles I. and the Scottish Covenanters. That king, in 1643, created him Duke of Hamilton, with remainder to the heirs-female of his body, in the event of the death of himself and his brother without male issue. In 1648, he led a Scottish army into England for the king's relief, but was encountered and defeated by Cromwell at Preston, in Lancashire. He escaped from the field of battle, but soon afterwards was forced to surrender himself prisoner to the parliamentary forces. He was beheaded at Westminster in March 1649, when he was succeeded by his brother William, who, in 1639, had been created Earl of Lanark. He died in 1651 of the wounds which he had received at the battle of Worcester. The duchy of Hamilton, in terms of the patent of creation, now devolved on the daughter of the first duke, Lady Anne, whose husband, Lord William Douglas, Earl of Selkirk, was, in 1660, created Duke of Hamilton for life. He died in 1694. The Duchess Anne, who survived till 1716, had, in 1698, resigned her titles in the king's hands in favour of her eldest son, James, Earl of Arran, who was anew created Duke of Hamilton with the precedency of 1643. In 1711, he was created Duke of Brandon in England, but the House of Lords refused him a seat or vote in parliament, on the ground that the crown was disabled by the Act of Union from granting a peerage of Great Britain to any person who was a peer of Scotland before the Union. The duke was killed in a duel in Hyde Park with Lord Mohun in 1712. He was succeeded by his eldest son, James, who, dying in 1743, was succeeded by his eldest son, James, who, in 1752, married the famous beauty, Elizabeth Gunning, and died in 1758, being succeeded by his eldest son, James George, an infant of three years old. On the death of the Duke of

Douglas in 1761, the male representation of the 'red' or Angus branch of the Douglases, with the titles of Marquis of Douglas, Earl of Angus, &c., devolved on the Dukes of Hamilton, as descendants of the Duchess Anne's husband, William, Earl of Selkirk, third son of the first Marquis of Douglas. Dying in 1769, in his 15th year, James George, seventh Duke of Hamilton, was succeeded by his only brother, Douglas, who, in 1782, took his seat in parliament as Duke of Brandon, the House of Lords being now satisfied, after consultation with the twelve judges, that the Act of Union did not prohibit the crown from making a peer of Scotland a peer of Great Britain. Duke Douglas died without issue in 1799, when the titles and estates passed to his uncle, Archibald, the second son of James, the fifth duke. Duke Archibald, dying in 1819, was succeeded by his eldest son, Alexander, who, in 1810, married a daughter of Mr Beckford of Fonthill, and died in 1852, when he was succeeded by his only son, William Alexander Anthony Archibald, eleventh Duke of Hamilton in the peerage of Scotland. He died in 1863, and was succeeded by William Alexander Louis Stephen Douglas Hamilton, the present duke, who was born in 1845.

Lords Paisley, Lords Abercorn, Earls of Abercorn, Lords Strabane, Viscounts Strabane, Viscounts Hamilton, Marquises of Abercorn, Duke of Abercorn, &c.—Lord Claud Hamilton, fourth son of the first Duke of Chatelherault, was appointed commendator of the abbey of Paisley in 1553, created Lord Paisley in 1587, and died in 1622. During his life, his eldest son, James, was made Lord Abercorn in 1603, and Earl of Abercorn in 1606. He had large grants of lands in Ulster; and dying in 1618, was succeeded by his eldest son, James, who in 1616 had been created Lord Strabane in the Irish Peerage. The sixth Earl of Abercorn was, in 1701, created Viscount Strabane in the peerage of Ireland. The eighth Earl of Abercorn, then one of the 16 Scottish representative peers, was, in 1786, created Viscount Hamilton, in the peerage of Great Britain; when the House of Lords found, by a vote of 52 to 38, that a peer of Scotland who had been created a peer of Great Britain, could not sit in parliament as a representative of the peerage of Scotland. His nephew, the ninth Earl of Abercorn, was, in 1790, created Marquis of Abercorn. It was ruled in his case, by the House of Lords, in 1793, that a peer of Scotland, who had been created a peer of Great Britain, was entitled to vote in the election of the Scottish representative peers. On the death of the second Duke of Hamilton in 1651, the second Earl of Abercorn had claimed the male representation of the House of Hamilton; and in 1861, the second Marquis and tenth Earl of Abercorn (created Duke of Abercorn in 1868), was served heir-male of the first Duke of Chatelherault, in the Sheriff Court of Chancery at Edinburgh, under protest by the Duke of Hamilton, Brandon, and Chatelherault. The Duke of Abercorn is one of three peers who hold peerages in Scotland, in Ireland, and in Great Britain; the others being the Marquis of Hastings (Earl of Loudoun in Scotland, Lord Grey de Ruthyn, &c. in England, Earl of Moira in Ireland, Lord Rawdon in Great Britain); and the Earl of Verulam (Lord Forrester of Corstorphine in Scotland, Viscount Grimstone in Ireland, Lord Verulam in Great Britain). The House of Abercorn gave birth, in 1646, to Anthony Hamilton (q. v.), the author of the charming *Mémoires du Comte de Gramont*. He was the grandson of the first Earl of Abercorn.

Earls of Selkirk.—Lord Charles Hamilton, third son of Anne, Duchess of Hamilton, was, in 1688, on his father's resignation of the title, created Earl of Selkirk, with the precedency of 1646. Dying childless in 1739, he was succeeded by his brother, Lord John Hamilton, Earl of Ruglen, who died without male issue in 1744, when the title of Earl of Selkirk passed to his grand-nephew, Dunbar Hamilton of Baldoon (the grandson of Lord Basil Hamilton, sixth son of Anne, Duchess of Hamilton). He died in 1799, and was succeeded by his son Thomas, who, dying in 1820, was succeeded by his son Dunbar James, the present and sixth earl.

Earls of Orkney.—Lord George Hamilton, fifth son of Anne, Duchess of Hamilton, was, in 1696, created Earl of Orkney, with remainder to the heirs whatsoever of his body. Dying in 1737, he was succeeded by his eldest daughter, whose great-great-grandson, Thomas John Hamilton Fitzmaurice, is now fifth Earl of Orkney.

Earls of Ruglen.—Lord John Hamilton, fourth son of Anne, Duchess of Hamilton, was, in 1697, created Earl of Ruglen, with remainder to the heirs whatsoever of his body. He succeeded to the title of Earl of Selkirk on the death of his brother in 1739, and died in 1744, when the title of Earl of Selkirk went to his grand-nephew, and the title of Earl of Ruglen went to his eldest daughter, Anne, the widow of William, second Earl of March. On her death in 1748, the earldom of Ruglen devolved on her son, William, Earl of March, afterwards fourth Duke of Queensberry; and on his death in 1810, the title of Earl of Ruglen became extinct.

Earls of Haddington.—Sir Walter Fitz-Gilbert, the first ascertained ancestor of the House of Hamilton, had a brother, Sir John of Hamilton of Rossaven, the progenitor of the family of Fingalton and Preston, which, in 1788, gave birth to Sir William Hamilton, the famous scholar and philosopher; and of the family of Innerwick, which, in 1563, gave birth to Sir Thomas Hamilton, nicknamed 'Tam of the Cowgate,' one of the ablest and most learned of Scottish lawyers. He was created Lord Binning and Byres in 1613, and Earl of Melrose (a title afterwards changed into Haddington) in 1619. His descendant, George Arden Baillie Hamilton, is now eleventh Earl of Haddington.

Lords Bargeny.—Sir John Hamilton of Bargeny and Carriden, the illegitimate grandson of the first Marquis of Hamilton, was, in 1639, created Lord Bargeny. The title became dormant or extinct on the death of the fourth lord in 1736.

Lords Belhaven and Stentoun.—Sir James Hamilton of Biel married a natural daughter of the second Marquis of Hamilton, and was, in 1647, created Lord Belhaven and Stentoun, with remainder to his heirs-male whatever. He resigned the title in 1675, when he had a new patent creating him Lord Belhaven and Stentoun for life, with remainder after his death to the husband of one of his granddaughters, John Hamilton (son of Robert Hamilton of Barncluith, a judge of the Court of Session). This gentleman, who succeeded to the title and estates in 1679, distinguished himself by his wild but eloquent speeches against the Union. He died in 1708, and was succeeded by his son John, who, being drowned in 1721, was succeeded by his son John, who died in 1764, and was succeeded by his brother James, who died in 1777. On his death, the great estates of the family passed to Mrs Mary Hamilton-Nisbet, wife of Mr Nisbet of Dirleton, and are now possessed by her granddaughter, Lady Mary Bruce-Nisbet-Hamilton. The titles were, in 1799, adjudged by the House of Lords to William Hamilton of Wishaw (as descended from the House of Barncluith). His son, Robert Montgomery Hamilton, 7th Lord Belhaven and Stentoun, was, in 1831, created Lord Hamilton of Wishaw in the peerage of the United Kingdom. The title became dormant in 1868, but was adjudged in 1875 to James Hamilton, who thus became the 9th lord.

VISCOUNTS BOYNE.—Gustavus Hamilton, the grandson of Lord Claud Hamilton, first Lord Paisley, was, in 1715, created Lord Hamilton of Stackallan, and, in 1717, Viscount Boyne, in the peerage of Ireland. His descendant, Gustavus Frederick Russell Hamilton Russell, created in 1866 Baron Brancepeth in the peerage of the United Kingdom, is now the 8th viscount.

VISCOUNTS OF CLANBOY, EARLS OF CLANBRASSIL, &c.—James Hamilton, son of Hans Hamilton (a natural son of Archibald Hamilton of Raploch), vicar of Dunlop, in Ayrshire, settled in Ireland about 1587, and, in 1622, was created Viscount of Clanboy. His son James was created Earl of Clanbrassil, and dying in 1659, was succeeded by his son Henry, on whose death, in 1675, the title became extinct. It was revived, nearly a century afterwards, in favour of his kinsman, James Hamilton of Tullimore (the grandson of Hans Hamilton, vicar of Dunlop), who in 1719 had been created Viscount Limerick and Lord Clanboy, and in 1756 was made Earl of Clanbrassil in the peerage of Ireland. On the death of his son James in 1799, the titles became extinct. His estates went to his sister Anne, Countess of Roden, whose grandson, Robert, Earl of Roden, was, in 1821, created Lord Clanbrassil in the peerage of the United Kingdom.

A *Briefe Account of the Family of Hamilton*, written by Dr James Baillie of Carnbroe, during the first half of the 17th c., is preserved among the MSS. in the Advocates' Library at Edinburgh. A *History of the House of Hamilton*, written about sixty years afterwards by Hamilton of Wishaw, is not now known to be extant. *Memoirs of the Lives and Actions of James and William, Dukes of Hamilton and Chatelherault*, by Gilbert Burnet, afterwards Bishop of Salisbury, were published in 1677. Mr John Anderson, surgeon at Hamilton, published *Historical and Genealogical Memoirs of the House of Hamilton* in 1825, in 1 vol. 4to.

HAMILTON, ALEXANDER, a celebrated American statesman, born January 1757, in the West Indian island of Nevis, was the son of a Scotch merchant who had married a young French widow. His father soon failed in business, and Alexander, at the age of twelve, had to enter the counting-house of a rich American merchant, named Cruger. His extraordinary abilities, however, induced some of his friends to procure for him a better education than could be got at home. He was accordingly sent to a grammar-school at Elizabethtown, New Jersey; and shortly afterwards entered Columbia College, New York. On the first appearance of disagreement between Great Britain and her colonies, H., still a schoolboy, and barely 18, wrote a series of papers in defence of the rights of the latter, which were at first taken for the production of the eminent statesman Jay, and which secured for the writer the notice and consideration of the popular leaders. On the outbreak of the war, he obtained a commission as captain of artillery, gained the confidence of Washington, was made his aide-de-camp in 1777, and acquired the greatest influence with him as his friend and adviser.

In 1780, he married a daughter of General Schuyler, who was a member of a very old family. On the termination of the war, he left the service with the rank of colonel, and, betaking himself to legal studies, soon became one of the most eminent lawyers in New York. In 1782, he was elected by the state of New York a representative at the Continental Congress; in 1786, he became a member of the New York legislature; and in 1787, he was appointed one of the delegates to the convention which met at Philadelphia, for the purpose of revising the Articles of Confederation. In conjunction with Madison, he had the most important share in drawing up the constitution afterwards adopted. He was a strong supporter of the federal, as opposed to the democratic party; and, along with Jay and Madison, defended the constitution against all attacks, by a series of letters in the *Daily Advertiser* of New York, afterwards collected and published under the title of *The Federalist*. Fifty-one out of the 85 numbers of which the work is composed were written by H. On the establishment of the new government in 1789, with Washington as president, H. was appointed secretary of the treasury. The disorder of the public credit, and the deficiency of official accounts of the state treasure, rendered this office one of peculiar difficulty. In order to re-establish public credit, he carried, in spite of much opposition, a measure for the funding of the domestic debt, founded a national bank, rearranged the system of duties, and altogether shewed himself one of the very greatest of American financiers. In 1795, he resigned his office, and resumed the practice of law in New York. When the war with France broke out in 1798, he was, according to the wish of Washington, made major-general of the United States army; and, on the death of Washington, he succeeded to the chief command. When peace was restored, he returned to his civil duties, but became involved in a political quarrel with Aaron Burr. This difference unhappily culminated in a duel, in which H. received a wound, of which he died the following day (July 12, 1804).

His writings, exclusive of *The Federalist*, have been published in 7 vols. by his son, John C. Hamilton.

HAMILTON, ANTHONY, COUNT DE, descended from the Scottish ducal family of that name, was born in Ireland in the year 1646. After the execution of Charles I., he, with his parents, followed the royal family to France. On the accession of Charles II. in 1660, he returned to England, but was excluded from office as being a Catholic. James II. gave him a regiment of infantry in Ireland, and made him governor of Limerick; but after the abdication of that monarch, H. returned to France, where he passed the rest of his life, and died at St Germain-en-Laye in 1720. His writings are full of wit and talent, particularly his *Contes de Féerie* (3 vols. Paris, 1805). His *Mémoires de Grammont* is a lively and spirited production, exhibiting a free and faithful delineation of the court of Charles II. It has been often translated into English. The last edition is that in Bohn's Series, with Scott's notes and illustrations. One of the best editions of his collective works is that published by Renouard (3 vols. Paris, 1812).

HAMILTON, PATRICK, one of the most prominent precursors of the Scottish Reformation, was a younger son of Sir Patrick Hamilton of Kincavel and Stanehouse, and of Catherine Stewart, daughter of Alexander, Duke of Albany, second son of King James II., and, in all probability, was born in the year 1504, and in the city of Glasgow. He was educated at the university of Paris, where he took his degree in 1520, after which he proceeded to Louvain, where he remained for some time, and thence removed to Basel in 1521.

When H. settled in St Andrews in 1523, he brought with him the new tastes and interests which he had learned to cherish. For some time, his opinions attracted no particular attention. He quietly pursued his theological studies, and did not as yet venture to put himself forward as a reformer. He had been appointed in his boyhood Abbot of Ferne, and although he never went into residence or lived as a monk, he was content to enjoy the advantages and dignity of his ecclesiastical position. But gradually his convictions matured. From agreeing with Erasmus, he came to agree with Luther; and about 1526 he appears to have announced his new views in such a manner as to draw the notice of the Archbishop Beaton. Early in 1527, Beaton made 'inquisition' into the grounds of the rumour against him, and found that he was 'infamed with being disputing, holding and maintaining diverse heresies of Martin Luther and his followers, repugnant to the faith,' and thereupon proceeded to 'desire' him to be formally summoned and put to trial. In the following year, he carried out his summons by a professed trial and conviction, declaring him to be worthy of death. In the meantime, H. had fled to Germany, where he became familiar with Luther and Melancthon. The Protestant education of H. was in this manner very complete. Such a man, while he became a reformer, became one in no sectarian sense. His doctrinal opinions were characterised by something of the cosmopolitan breadth which marked his training, and by a scriptural simplicity befitting his honest and persevering spirit of inquiry. The substance of his doctrines has been fortunately preserved by his own pen under the title of *Patrick's Places;* and simplicity, combined with comprehension and aphoristic brevity, may be said to be the chief characteristics of them.

After a residence of six months, H. returned to his native country. He repaired to the family mansion at Kincavel, and there, in the neighbourhood of Linlithgow, openly preached the gospel. What is more remarkable, he is supposed, during this brief period of quiet and retirement at Kincavel, to have married. It is somewhat strange that, following such an event, he should have been induced to quit his retirement, where he was in comparative safety, and proceed to St Andrews. Beaton, however, contrived to allure him within his grasp. He 'travailed with the said Mr Patrick,' Knox says, 'that he got him to St Andrews.' Hopes seem to have been held out of some good being effected by a conference with him as to the state of the church and its need of reformation; for 'reformation' of some kind was a common talk at this time in the church, and many plans were considered, and some attempted for carrying it out.

H. arrived at St Andrews in January 1528, and took up his abode in a lodging provided for him by the archbishop. A conference was held, in which his opponents shewed a conciliatory spirit, and even to some extent expressed concurrence in his views. No advantage appears to have been taken of his former summons and condemnation. He was allowed openly, for some time, to promulgate his sentiments in the city and university. With all visitors he freely conversed, and among these, with Alexander Alane or Alesius, at this time one of the canons in the priory, and with Alexander Campbell, one of the Dominican friars, 'a young man of good wit and learning,' suborned, it is alleged, by Beaton, to entrap him into avowals of heretical opinion. After a month or so (*plus minus mensem*, says Alesius), he was summoned to answer before Beaton to a charge of heresy. The trial took place on the last day of February, and the result, in spite of his luminous and unanswerable argument was, that H. was condemned for divers heresies and 'detestable opinions'—deprived of all dignities and benefices in the church, and delivered over to the secular power to be punished. The sentence was carried out without delay. The warrant of the secular power must have been already secured, for on the very same day on the morning of which he was tried, H. was consigned to the stake in the front of the gate of St Salvador's College. He died as he had lived, a humble, earnest, heroic man. His character, if it scarcely attained to greatness in his brief lifetime, yet shines with a chastened and magnanimous lustre through the fires of his early martyrdom. His death probably did more to extend the Reformation in Scotland than even his life could have done. The 'reik of Mr Patrick Hamilton,' said one of Beaton's own retainers, 'has infected as many as it did blow upon.'

HAMILTON, Sir William, of Preston, Bart., the most learned and scientific philosopher of the Scottish school, was born March 8, 1788, at Glasgow, where his father, Dr William Hamilton, and his grandfather, Dr Thomas Hamilton, held in succession the chairs of Anatomy and Botany. Though the Hamiltons of Preston (Haddingtonshire), who were raised to a baronetcy in 1673, had not assumed their title since the death of Sir William Hamilton in November 1688, when his brother and heir, Sir Robert, the Covenanter, refused to take the oath of allegiance, the philosopher made good his claim to represent them, and therefore to be descended from the leader of the Covenanters at Drumclog and Bothwell Bridge. After gaining high distinction, especially in the philosophical classes, at Glasgow, he went in 1809 to Balliol College, Oxford, as a Snell exhibitioner, and there, notwithstanding the unusually high standard of scholarship at the time, the position which he took never had, nor has been surpassed. It was at this time, moreover, that he laid the basis of his vast erudition in medieval and modern, as well as in ancient literature, and he himself felt that his residence in Balliol was the most important period of his life in determining the drift of his subsequent speculations and studies (see *Discussions*, 2d ed., p. 750, *note*). He left Oxford in 1812, and entered the Scotch bar in 1813, but he seems never to have had any practice in his profession except what became incumbent on him afterwards, on being appointed crown-solicitor of the court of teinds. In 1820, on the death of Dr Brown, he was an unsuccessful competitor for the chair of Moral Philosophy in Edinburgh. In the following year, however, H. was appointed to the professorship of History by its patrons, the Faculty of Advocates.

H. had now reached his 30th year, without giving to the world any indication of those speculations which he had been silently and slowly maturing. But in 1829 there appeared in the *Edinburgh Review* a critique of Cousin's *Cours de Philosophie* of the previous year, in which was developed that philosopher's doctrine of the Infinite. The critique immediately excited admiration not only among the few in our island who comprehended it, but much more extensively on the continent, Cousin himself being among the first to acknowledge that his reviewer at once understood thoroughly the theory which he opposed, and combated it with a speculative power, with a knowledge of philosophical systems, and a command of philosophical expression, which he had not expected to find existing in Britain. For some years after this, H. was a regular contributor to the *Edinburgh Review*. Besides other philosophical articles, two of which, on the Philosophy of Perception, and on Recent Publications in Logical Science, are especially celebrated, he contributed several on education and university reform. Many of these contributions, besides being republished in Mr Cross's *Selections from the*

Edinburgh Review, were translated into German, French, and Italian, the French collection, *Fragments de Philosophie*, being especially valuable for the introduction, appendix, and notes of its editor, M. Peisse. In 1852, they were all edited by H. himself, with large notes and appendices, under the title of *Discussions in Philosophy and Literature, Education, and University Reform*. In 1836, after a severe contest, H. was elected to the chair of Logic and Metaphysics in Edinburgh. During his first session, he delivered a course of lectures on Metaphysics, which was followed in the succeeding session by a course on Logic; and these two courses he continued to read on each alternate year till the close of his life. His influence soon began to shew itself in the university among the young men who were attracted thither from different parts of Scotland, and other countries, in many cases chiefly for the sake of hearing H.; and many of his pupils, now rising to distinction in various professions, trace to the impulses which issued from his class the most valuable element of their education. Extensive notes of his lectures were taken by his students, and numerous copies of them, transcribed from short-hand reports, were in circulation during the later years of his life. Since his death, they have been published under the editorship of Professors Mansel and Veitch (*Sir William Hamilton's Lectures*, 4 vols. 1859—1861). These lectures, which were mostly written during the currency of the sessions in which they were first delivered, want the exactness of thought and expression which render the works revised by himself for publication models of philosophical composition; but this may be said to convey higher value to them as introductory works. Still it is to be regretted that the materials embodied in these volumes were never, as was intended, wrought into another work which H. had already planned at the time of his appointment. This was his edition of the works of Reid, with notes and supplementary dissertations. It is perhaps impossible to adduce any writings which have received the same amount of editorial care. The general aim of H.'s whole philosophy is, in fact, but the special aim of this edition of Reid. His conviction was, that the philosophy of common sense represents the highest reaches of human speculation, and he sought, accordingly, in his annotations of Reid's writings, as in his independent works, to point out the relation of the Scottish philosophy to the systems of other countries, as well as to translate it into a more scientific expression, that he might bring into clearer view at once its true character and the real basis on which it rests. In this, therefore, more than in any of his other works, he betrays his fondness for eliciting his own theories from the hints of previous thinkers; his peculiar doctrines of perception, of the conditioned, of mental reproduction, &c., are traced to the writings of Aristotle. Valuable, however, as this work is, its latest edition contains references to numerous dissertations beyond that, in the middle of which it abruptly stops. This is undoubtedly to be attributed to the decay of H.'s health. By the paralysis of his whole right side, though his mind continued unimpaired, his power of work was seriously curtailed during the later years of his life. He was, however, generally able, with an assistant, to perform the duties of his class till the close of session 1855—1856, when his health suddenly became worse, and he died 6th May.

The time has scarcely come for estimating the position of H. in the history of philosophy. Though his system professes to be merely an explication of the Scottish philosophy, he seems to be already creating an independent school, and, indeed, it may be questioned whether all his exegetical skill has vindicated the position claimed for Reid, whether, therefore, it would not have been better for H. had he struck into a separate path. For while his philosophy is distinguished in general from previous Scottish speculations by its more rigorously systematic character, it ventures, as in his doctrine of the conditioned, into realms of thought, whose existence had been scarcely surmised by any of his countrymen. This doctrine, which limits positive thought to the conditioned sphere between the contradictory poles of the infinite and the absolute, has attracted more attention than any of his other doctrines, especially since the publication of Mr. Mansel's *Bampton Lectures* in 1858; and though H.'s discussion is confined to the metaphysical aspects of the question, and is perhaps incompatible with a consideration of the ethical ideas which must be embraced in our conception of the Infinite Being, it is likely for some time to gather round it the higher efforts of British speculation. H. is also worthy of being distinguished by his important contributions to logic. These may be reduced to the two principles (1) of distinguishing reasoning in the quantity of extension from reasoning in that of comprehension, and (2) of stating explicitly what is thought implicitly; from the former of which issues his twofold determination of major, minor and middle terms, as of major and minor premises; from the latter the quantification of the predicate, the reduction of the modes of conversion to one, and his numerous simplifications in the laws of syllogism.

HAMILTON, Sir William, grandson of William, third Duke of Hamilton, born in Scotland in 1730, was, in 1764, appointed English ambassador to the court of Naples. During his residence there, he took an active part in the excavation of the ruins of Herculaneum and Pompeii, and collected a rare assortment of art-relics, consisting chiefly of Greek and Etruscan antiquities, which was afterwards purchased for the British Museum. He was recalled to England in 1800; but while on his way home the vessel in which he sailed was unfortunately wrecked, and a great part of his collection of antiques lost. Drawings of these had, however, been preserved, which were afterwards published in his *Antiquités Etrusques, Grecques, et Romaines, tirées du Cabinet de M. Hamilton* (4 vols. Naples, 1766). He also published *Observations on Mount Vesuvius, Mount Etna*, &c. (Lond. 1772); *Campi Phlegraei* (Naples, 1776—1777), &c.; besides some papers in the *Philosophical Transactions* (Lond. 1767—1795). H.'s claim on the British government for special services was disallowed, and he died at London in comparative poverty, 6th April 1803.—The wife of H. was the notorious Lady Hamilton, whose name figures unpleasantly in the biography of Lord Nelson. She died at Calais in 1816, and her Memoirs have been published.

HAMILTON, Sir William Rowan, LL.D., one of the few really great mathematicians of the present century, was born in Dublin in August 1805. From his infancy he displayed extraordinary talents, having at the age of 13 a good knowledge of thirteen languages. Having at an unusually early age taken to the study of mathematics, in his 15th year he had mastered thoroughly all the ordinary university course, and commenced original investigations of so promising a kind, that Dr Brinkley, himself a very good mathematician, took him under his especial patronage. His earlier essays, connected with contact of curves, and caustics, grew by degrees into an elaborate treatise on the *Theory of Systems of Rays*, published by the Royal Irish Academy in 1828. To this he added various supplements, in the last of which, published in 1833, he predicted the existence of the two kinds of conical refraction (see Refraction), the experimental verification of which by Lloyd still forms one of the most convincing proofs of the truth of the Undulatory Theory of Light. See Light. The great feature of his *Systems of Rays* is the employment of a single function, upon whose differential coefficients (taken on various hypotheses) the whole of any optical problem is made to depend. He seems to have been led by this to his next great work, *A General Method in Dynamics*, published in the *Philosophical Transactions* for 1834. Here, again, the whole of any dynamical problem is made to depend upon a single function and its differential coefficients. This paper produced a profound sensation, especially among continental mathematicians. Jacobi of Königsberg took up the purely mathematical part of H.'s method, and considerably extended it; and of late years the dynamical part has been richly commented on and elaborated by several French mathematicians, all uniting in their admiration of the genius displayed in the original papers. For these researches, H. was elected an honorary member of the Academy of St Petersburg, a rare and coveted distinction. The principle of *varying action*, which forms the main feature of the memoirs, is hardly capable, at all events in few words, of popular explanation. Among H.'s other works, which are very numerous, we may mention particularly a very general *Theorem in the Separation of Symbols in Finite Differences*, and his *Examination of Abel's Argument concerning the Impossibility of solving the General Equation of the Fifth Degree*.

We may also particularly allude to his memoir on *Algebra as the Science of Pure Time*, one of the first steps to his grand invention of quaternions. The steps by which he was led to this latter investigation, which will certainly, when better known, give him even a greater reputation than conical refraction or varying action has done, will be more properly treated under Quaternions. On the latter subject, he published, in 1853, a large volume of *Lectures*, which, as the unaided work of a single man in a few years, has perhaps hardly been surpassed. Another volume of a more elementary character on the same subject, containing in addition his more recent improvements and extensions of his calculus, was published after his death, which took place 2d September 1865.

While yet an undergraduate of Trinity College, Dublin, he was appointed, in 1827, successor to Dr Brinkley in the Andrews' chair of astronomy in the university of Dublin, to which is attached the astronomer-royalship of Ireland. In 1835, he was knighted on his delivering the address as secretary to the British Association for its Dublin meeting. He occupied for many years the post of president of the Royal Irish Academy, and was a member of most of the great scientific academies of Europe. He held during his life, not in Dublin alone, but in the world of science, a position as merited as it was distinguished.

HAMILTONIAN SYSTEM, a method of teaching languages, so called from the inventor, an English merchant of the name of James Hamilton, born about 1769. Having removed to Hamburg in 1798, he took lessons in German, on the understanding that he was not to be troubled with the grammar of the language. He and his teacher read together a German book of anecdotes, the pupil translating word for word after his teacher; and after twelve lessons, Hamilton found himself—so at least we are told—able to read an easy German book. His attention was thus drawn to the subject of learning foreign languages; and finding himself, after a life of vicissitudes, in the city of New York, about the year 1815, he wrote a treatise expounding his views, and commenced putting them in practice. He undertook to teach adults in fifteen lessons to translate the Gospel of St John from French into English, but found, we are told, ten lessons sufficient. After teaching for a time with great success in America, he returned in 1823 to England, and visited the chief cities, everywhere attracting crowds of pupils, notwithstanding that his system was denounced by many as quackery. He died in Dublin in 1831.

The Hamiltonian method was only one stage in the reaction—begun as early as the time of Comenius (q. v.), and carried on, among others, by Milton and Locke—against the pedantic method of beginning to teach a foreign or dead language by making the learner commit to memory a complete set of grammar rules before he had acquired sufficient practical acquaintance with the language itself in its concrete form, to give the rules any meaning. Hamilton's method of procedure may be shortly summed up as follows: Supposing Latin to be the language to be learned, Hamilton put into the pupil's hands the Gospel of St John in Latin, with an interlinear version, so literal as to shew the gender as well as the number of nouns, &c., and the mood, person, and tense of the verbs. The idioms were not translated by corresponding idioms, but each word by its literal equivalent in English. A fundamental point with Hamilton was to give the primitive, and not the derivative signification of the word, and to give the same signification to the same word in whatever connection it might stand. When the pupil had by this practice got a considerable knowledge of the vocables and accidence of the language, he was practised in turning the English version back into the Latin. Hamilton undertook in this way to give boys of eleven as much knowledge of Latin in six months as they usually learn at our public schools in six years. One obvious defect of this method is, that no language admits of a word-for-word and uniform translation into another; the method is in this respect misleading. Besides, one great use of learning languages is as a mental discipline, and in this point of view the Hamiltonian system is useless. It may be useful in the case of adults who wish to acquire, with as little labour as possible, a limited power of reading and speaking a language; and in any case, a language once begun to be learned on Hamilton's principles, may be afterwards prosecuted on a better method, thus avoiding the painful initiatory stages of the grammatical method. The necessity, however, of having recourse to the crude method of Hamilton, is superseded in the practice of most modern teachers, who contrive to make the practical and grammatical knowledge of a language go hand in hand.

HAMM, a town of Prussia, in the province of Westphalia, is situated on the left bank of the Lippe, 22 miles north-north-west of Arnsberg. It is surrounded by an old wall now converted into a promenade, and by a ditch; contains a castle, gymnasium, and college, and carries on the manufacture of linen extensively. Iron is also produced. H. was formerly one of the Hanse towns. Pop. (1871) 16,914.

HAMMER—STEAM-HAMMER—a tool used for applying the force of impact, either for the purpose of beating malleable materials into a required form, or for driving nails, wedges, &c. The common hand-hammer consists of an iron head, usually faced with steel, fixed crosswise upon a wooden handle. When one side of the head is thinned out of a wedge form or to a point, this is called the *pane* of the hammer. The *face* is the flat disc which strikes the work. Carpenters' and joiners' hammers have a bent pane with a V-shaped notch, which is used as a bent lever for drawing nails, &c. The pane is sometimes sharpened so as to form an adze or chisel. A multitude of other modifications in the form of hammers are made to suit different kinds of work. Some of the more important of these are treated under the heads of the various operations, such as FORGING, FILE-CUTTING, GOLD-BEATING, &c.

For many purposes, hammers are required of greater weight than a man can wield; and a great variety of power-hammers are used. These, for the most part, are masses of iron raised by steam or other power, and then allowed to fall by their own gravity upon the work. The *helve* or *shingling hammer*, used for compressing the mass of iron drawn from the puddling furnace, and the *tilt-hammer*, used in the manufacture of shear-steel, are important examples of such hammers. The first is a heavy bar of cast iron about ten feet long, weighing three or four tons and upwards, to which is attached a head of wrought iron faced with steel, weighing nearly half a ton more. It works upon an axis at the end of the bar furthest from the head, and is raised by cams attached to a heavy wheel set in motion by steam or water power; these cams strike or 'lick' a projection extending beyond the head, and thus raise it about 18 or 20 inches at the rate of from 70 to 100 times per minute. The tilt-hammer is similar, but much lighter, and is adapted for striking above 300 blows per minute. In order to obtain this velocity, a short 'tail' extends with a downward inclination beyond the axis, and the cams strike this downwards, and thus lift the longer arm of the lever to which the head is attached. These, when worked by steam, as they usually are in this country, are, of course, steam-hammers; but when the term steam-hammer is used without qualification, it applies to another and more elaborate machine of very different construction, invented by Mr James Nasmyth in 1842, and subsequently modified and improved in some of its minor details. In this, the hammer is attached to the bottom of a heavy mass of iron, the 'hammer-block,' capable of rising and falling between upright bars or 'guides;' this, again, is fixed to the rod of a piston, which works in a cylinder placed perpendicularly over the hammer-block, hammer, and anvil. As the piston rises in the cylinder, it lifts the attached mass, which is then allowed to fall from varying heights, according to an adjustment which can be made by an attendant simply touching a handle. The adjustments are so perfect that it may be made to crush a mass of iron, and at the next blow to crack a nut held in the fingers without damaging either kernel or fingers, or to crack the top of an egg in an egg-cup, as might be done with the bowl of a spoon. The mechanism by which this is effected is too elaborate to be described here in detail. One novel contrivance, viz., the 'latch,' which reverses the action of the steam-valves at the precise moment required, is of remarkable ingenuity.

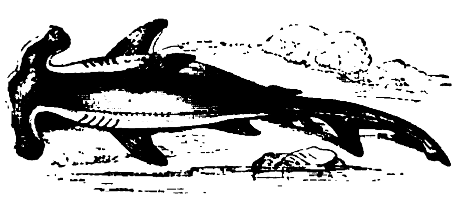
In the first 'Nasmyths' that were used, the weight of the descending mass—viz., the hammer-block, hammer, &c.—was from thirty to sixty cwts., and they were justly regarded as mechanical marvels. Steam-hammers with a descending mass of twenty to thirty tons have since been constructed. In order to compare the power of these with the 'helve' or other hammers, which descend by angular motion on a pivot, it must be remembered that these latter, when formed of a straight bar, are only effective to the extent of a body of one-third of their weight falling directly from a corresponding height, on account of the fact that the whole bar forming the hammer is moving with a velocity varying from nothing at the axis, to a maximum at the end of the bar, where the hammer-face is fixed.

HAMMER-BEAM, a portion of an open timber roof, forming a truss at the foot of the rafter, which gives strength and elegance to the construction. It looks as if there had been a tie right across, and the centre part being cut out, the remnants at each end form the hammer-beam. The end next the apartment is usually ornamented with shields, heads, pendants, &c.

HAMMER-CLOTH, a cloth which covers the driver's seat in some kinds of gentlemen's carriages. The term is believed to be a corruption of hammock-cloth, the seat which the cloth covers being formed of straps or webbing stretched between two crutches, as a sailor's hammock is suspended. Ease of motion, as in the case of springs, is the cause of this arrangement. Hammer-cloths are usually ornamented with fringes, and bear the arms of the proprietor of the carriage. They are old-fashioned, and now more seldom seen than formerly.

HA'MMERFEST, the principal town and trading port of Finmark (q. v.), in Norway, and the most northern town of Europe, is situated in 70° 40′ N. lat., and 23° 30′ E. long. Pop. about 1200. H. is situated in a barren treeless district, in the rocky island of Qualoe ('Whale Island'), and consists of one long street skirting a wall of rock. The harbour is good, and presents a busy appearance during summer, when it is visited by some 200 vessels, which bring hemp, meal, potatoes, and other provisions, in exchange for oil and fish (the staple commodities of the island), reindeer hides, eider-down, and fox-skins. During the two summer months the sun is continually above the horizon, and the heat is very great, yet the winter, singular to say, is mild enough to allow of the fisheries being carried on. Copper from the works at Kaafiord, which have been in the hands of an English company since 1847, is also sent to England from Hammerfest. H. is the northern limit of the birch.

HAMMER-HEAD, or **HAMMER-HEADED SHARK** (*Zygæna* or *Sphyrna*), a genus of fishes of the great family of Sharks; having the general form and characters of the family; but distinguished from all other fishes by the extraordinary form of the head, which, in the adults, resembles a double-headed hammer, being extended on both sides to a considerable length, and having the eyes at the ends of the lateral extensions. The mouth is below the centre of the head. The hammer-headed form is not nearly so perfect in the young as in the adults. It is supposed to be intended for enlargement of the sphere of vision. In the fœtal state, the lateral extensions are doubled upon themselves. The hammer-heads are ovo-viviparous, and produce many (about forty) young at a birth. They are most abundant in tropical seas. In the Bight of Benin, 'they may often be seen ascending from the clear blue depths of the ocean

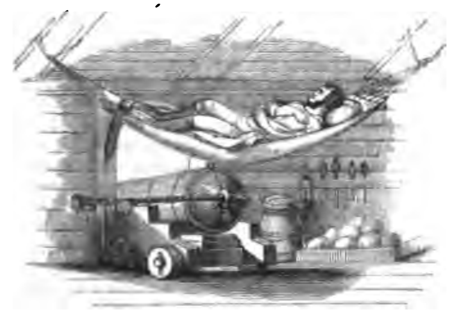


Hammer-headed Shark (*Zygæna malleus*).

like a great cloud.' They are very voracious. Some of them attain a great size. One species (*Z. malleus*) has been taken on the British coasts. It attains a length of twelve feet or upwards. It chiefly belongs to the warmer parts of the Atlantic Ocean.

HA'MMERSMITH, a village of England, in the county of Middlesex, about six miles west-south-west of the London post-office, is situated on the Thames, which is here crossed by an elegant suspension bridge, completed in 1827, at a cost of £80,000. The grounds in the vicinity are occupied as nurseries and market-gardens, from which a large supply of flowers and vegetables is sent to the city. The parish church, a plain brick building with a low tower, was erected in 1631, and consecrated by Laud, then Bishop of London. H. contains also the convent of the Good Shepherd, and, in connection with it, an asylum for penitent women. Near the Broadway stands the West-London Hospital, supported by voluntary contributions. There is also a large endowed school, founded by a Mr William Godolphin, and which takes his name. The premises and grounds of the school-room cover upwards of four acres. Formerly, a detached village, and connected with London only in a commercial sense, H. is now joined to that city by continuous lines of street, and forms essentially a portion of it. The parish of H. is traversed by six very important railways, two of which terminate here. Pop. of the parish in 1871, 42,691.

HA'MMOCK, the apparatus in which a sailor slings his bed, derives its name through the Spanish *hamac*, from a Peruvian word; the custom of thus suspending a bed having been derived from Peru, where the natives fasten the two ends of a piece of canvas, or of a netting of grass twist, to the branches of a tree, and lie suspended on it in luxurious ease. A sailor's hammock consists of a rectangular piece of hempen cloth, about six feet long and three in width, gathered together at each end by means of cords and a clew, and hung to hooks under the deck. The hammock thus suspended forms a sort of bag capable of containing the sailor's mattress, his blankets, and himself, as soon as he has acquired the far from easy knack of climbing into it. The hammocks are taken below at sunset, and hung in rows, about two feet apart, in the men's portion of the ship. When done with in the morning, the bedding is carefully tied up within each, and the whole stowed in the hammock-netting, which is generally in the bulwarks of the waist. If the weather be not sufficiently dry, however, to allow of this, the hammocks are left below. Stowed thus in the netting, the hammocks form a strong barrier against small shot.



Hammock.

HAMMOND, HENRY, D.D., a learned English divine and able controversial writer, the youngest son of Dr John Hammond, a physician, was born at Chertsey, Surrey, August 18, 1605. Educated at Eton, he was, in 1618, sent to Magdalen College, Oxford, where he sedulously applied himself to classical studies. In July 1625, he became a Fellow of his college, and in 1629 entered into holy orders. In 1633 he was presented to the rectory of Penshurst, in Kent, and in 1643 he became Archdeacon of Chichester. H. followed the unfortunate Charles to the Isle of Wight, and continued with the king as his chaplain till his attendants were dismissed, in 1647; he then returned to Oxford, and was chosen sub-dean of Christchurch. In 1648, he was deprived of his college offices by the parliamentary commissioners, and shortly after retired to Westwood, in Worcestershire, the seat of Sir John Packwood, where the remainder of his life was spent in literary labour. He died April 25, 1660. His celebrated work, the *Paraphrase and Annotations on the New Testament*, was published in 1653. A new and enlarged edition came out in 1656, but the best edition is that of 1702. His collected works were published, in 4 vols. folio, in 1674—1684. His sermons and minor works are reprinted in the Oxford *Library of Anglo-Catholic Theology*.

HAMOO'N. See SEISTAN, LAKE OF.

HAMPDEN, JOHN, a celebrated English patriot, said to have been born in London in 1594, was the son of William Hampden of Hampden, Buckinghamshire, and Elizabeth, daughter of Sir Henry Cromwell of Hinchingbrooke, Huntingdonshire, aunt of Oliver Cromwell. His father died in 1597, when he was only three years old. In 1609, he was entered a gentleman commoner at Magdalen College, Oxford, and in 1613 was admitted to the Inner Temple, where he made considerable progress in the study of law. On January 30, 1621, he first entered the House of Commons as member for the now disfranchised borough of Grampound. He attached himself to the party of St John, Selden, Coke, Pym, and those who opposed the arbitrary encroachments of the crown, but at first took no very forward part in public business, and spoke but seldom. In the first three parliaments of Charles I., he sat for Wendover. In 1627, for refusing to pay his proportion of the general loan which the king attempted to raise on his own authority, H. was committed to close imprisonment in the Gatehouse. Subsequently, he was removed to Hampshire, but, with seventy-six others, unconditionally liberated by an order of council. His activity and industry in parliament now rendered him one of its leading and most useful members; he was on most of its committees; but after the dissolution of the parliament of 1628—1629, he retired to his estate, and devoted himself to study and to country sports and occupations. Claiming the power to tax the country in any way he thought proper, in 1634, Charles had recourse to the impost of ship-money. At first limited to London and the maritime towns, and levied only in time of war, it was, in 1636, extended to inland places in time of peace, when H. resolutely refused to pay it, and his example was followed by nearly the whole county of Buckingham. In 1637, he was prosecuted before the Court of Exchequer for non-payment, when a majority of the judges gave a verdict against him. In the short parliament of 1640, H. took a prominent part in the great contest between the crown and the House of Commons. To the Long Parliament he was returned both for Wendover and the county of Buckingham, and made his election for the latter. For his resistance to the king's proceedings, he was one of the five members whom Charles, on January 4, 1642, rashly attempted in person to seize in the House of Commons; and on the breaking out of the civil war, he raised and became colonel of a regiment in the parliamentary army under the Earl of Essex. He was also a member of the Committee of Public Safety, and in the prosecution of the war, constantly advised prompt and energetic measures. He was present at the repulse of the royalists at Southam, at their defeat near Aylesbury, at the fight at Edgehill, and at the assault and capture of Reading. Prince Rupert having attacked a parliamentary force at Chinnor, near Thame, H. put himself at the head of a few cavalry that were rallied in haste to oppose him, and in the fight that ensued at Chalgrove Field, received in the first charge a wound, of which he died six days after, on June 24, 1643. He was twice married, and by his first wife had three sons and six daughters.

HA'MPSHIRE, SOUTHA'MPTON, or familiarly, **HANTS**, a maritime county in the south of England, is bounded on the W. by Dorset and Wilts, on the N. by Berks, on the E. by Surrey and Sussex, and on the S. by the English Channel. The county, including the Isle of Wight, has an area of 1,070,216 acres, 900,000 of which are estimated to be under culture. Its population in 1861 was 481,495; and in 1871, 544,684. The surface is irregular, being traversed by the North and South Downs. The south-western portion of the county, almost wholly detached from the main portion by the Southampton Water, is occupied mainly by the New Forest. This tract is 64,000 acres in extent, is the property of the crown, and is valuable for the oak and beech timber obtained from it for the use of the British navy. Within the forest, an aboriginal breed of pony is still found. Besides that called the New Forest, there are also remains of those of Bére, Alice Holt, Woolmer, &c. The principal rivers are the Anton or the Test, and the Itchen, which flow southward through the county into the Southampton Water, and the Avon, also flowing southward, and forming the western boundary of the New Forest. The climate of the county is in general mild, and favourable to vegetation; indeed, the climate in the south of the Isle of Wight is supposed to be milder than that of any other portion of Great Britain. The soil consists in part of poor sands and gravel, and of a mixture of stiff clay and chalk. All the usual crops are produced, hops are cultivated, and the bacon cured here is famous. The manufactures of the county are inconsiderable. Southampton and Portsmouth, both termini of important railways, are the chief centres of trade. The county, exclusive of the boroughs and the Isle of Wight, sends four members to the House of Commons. The New Forest seems to have been fatal to the family of William the Conqueror; there two of his sons, and his grandson, met with sudden and violent deaths. Of the early ages of English history, H. contains many interesting relics: of these the chief are Porchester Castle, at the head of Portsmouth Harbour; Calshot and Hurst Castles, now occupied as coast-guard stations, erected in the time of Henry VIII., and Netley and Beaulieu Abbeys, and the Priory of St Dionysius, all in the neighbourhood of Southampton. The county is exceedingly rich in Roman remains, as coins, urns, pottery, &c. For further information on the antiquities and history of the towns of H., see articles Wight, Isle of; Winchester, &c.

HA'MPSTEAD, a village of England, in the county of Middlesex, is finely situated on a range of hills four miles north-north-west of London. It was formerly famous for its medicinal springs, and is still a favourite place of residence and of holiday resort among Londoners, who are attracted to it by the beauty of its situation and the purity of its air. On the summit of the hill, above the village, is the Heath, which affords extensive and pleasant prospects of the surrounding country. On the Hampstead road, and in the vicinity of the village, many handsome villas have been erected. Pop. (1871) 32,281. A house on the Heath, formerly called the Upper Flask Inn, and now a private residence, was at one time the place of resort of the famous Kit-Kat Club, at which Steele, Addison, Richardson, and others used to assemble. The village of H. was much frequented by Pope, Gay, Johnson, and Akenside, and later by Byron, Leigh Hunt, and Johanna Baillie.

HA'MPTON, a small village on the Chesapeake Bay, in Virginia, United States, America, giving its name to Hampton Roads, a southerly branch of Chesapeake Bay, and mouth of James River, one of the best harbours on the American coast, defended by Fortress Monroe and Fort Calhoun. These Roads were the scene of important events in the American revolution, the war of 1812, and the civil war of Secession, especially of the first naval battle between iron-clad vessels, the *Virginia* or *Merrimac* and the *Monitor*. Pop. (1870) 2300.

HA'MPTON, a village of England, in the county of Middlesex, is pleasantly situated on the left bank of the Thames, about twelve miles south-west of London. The streets are narrow, and the houses irregularly built; in the vicinity, however, there are many noble mansions and beautiful villas. Pop. (1871) 2207.

Hampton Court Palace, long a royal residence, and now usually occupied by persons of rank, reduced in circumstances, stands about a mile from the village in the midst of grounds that extend to the Thames. The original palace was erected by Cardinal Wolsey, and came afterwards into the possession of Henry VIII., who enlarged it, and formed around it a royal park or chase, which he stocked with deer. Here Edward VI. was born, and here his mother, Queen Jane Seymour, died. Charles I. underwent a portion of his confinement at this palace, and it was the occasional residence of Cromwell, Charles II., and James II. A considerable portion of it was rebuilt by William III., and by him the park and gardens were laid out in the formal Dutch style. The palace, as it at present stands, consists of three quadrangles with some smaller courts; the great eastern and southern fronts having been erected by Sir Christopher Wren. The picture-gallery comprises Lely's Beauties of the Court of Charles II., valuable specimens of Holbein, Kneller, West, &c., and above all, seven unequalled cartoons by Raphael. The gardens, which are about 44 acres in extent, and have not been materially altered since they were laid out by William III., present a series of curious raised terraces, formal flower-plots, and long shady and trim arcades. Among other attractions of the gardens is a 'maze' or labyrinth, which furnishes much amusement to youthful visitors.

HAMPTON COURT CONFERENCE, a conference which took place at Hampton Court, shortly after the accession of James I. to the throne of England, in order to the settlement of ecclesiastical disputes. The king presided and took a principal part in the conference. He was attended by some of the nobility and highest officers of state, but no one seems to have been permitted to take any part in the proceedings except the king himself and the divines whom he had summoned. Of these, the representatives of the Episcopalian party were more numerous than the Puritans; and the Puritans, although men of known worth and learning, were among the least extreme of their party. Archbishop Whitgift, with eight bishops, six deans, and an archdeacon, appeared on the Episcopalian side; two Oxford professors of divinity, two divines from Cambridge, and along with them Mr Patrick Galloway, minister of Perth, in Scotland, maintained the Puritan cause. On the king's accession, the Puritans, entertaining great hopes of release from the rigid enforcement of ceremonies which galled their consciences, and of the reformation of abuses in the church, had addressed a petition to the king, known as the *Millenary Petition*, because it was signed by nearly one thousand ministers in all parts of the country. But the king's intention was not to comply with their wishes, and the Hampton Court Conference seems to have been merely a device for making it appear that their demands had been considered and found unreasonable. On the first day of the conference (12th January 1604), the Episcopalians alone were admitted to the presence of the king, who demanded their opinion, which they gave, on the third day after, in favour of the existing system in all the parts complained of. The king debated with them on some points; and in the end, decided against them in a few minor particulars, thus maintaining the assertion of his own ecclesiastical supremacy, as well as finding an opportunity for the display of his attainments in theology, although in all that was most important, his verdict was in their favour. On the 16th of January, the Puritans were called to the king's presence, but along with them some of the Episcopalians, when James debated keenly against the Puritans, using language very unworthy of a king or of a Christian, and according to his own account of the matter, 'peppered them soundly.' On the 18th of January, both parties were called in, and the royal judgment intimated, which was afterwards announced in a proclamation very adverse to the Puritans.

HAMSTER (*Cricetus*), a genus of rodent quadrupeds of the family *Muridæ*, resembling the true mice and rats in their dentition, but having cheek-pouches, and a short hairy tail. The COMMON H. (*Cricetus vulgaris*) is a native of the north of Europe and of Asia, abundant in many parts of Germany and Poland, but not found in Britain, and rare to the west of the Rhine. It is of variable colour; although generally reddish gray above, the belly black, the feet white, and large white spots on the sides, throat, and breast. It is larger and of stouter form than the common rat, the tail only about three inches long. It burrows in dry soils, each individual making a burrow for itself, to which there are more entrances than one, and which also contains several holes or compartments, one of them lined with straw or hay, in which it sleeps, and some of them capacious enough for the storing of large quantities of grain or other provisions—to the amount of 60 pounds of corn or a hundredweight of beans—which the animal carries thither in its cheek-pouches, and on which it feeds during the milder parts of winter, spending the most severe part of that season in a state of torpid hybernation. It is a great pest to the farmers of the countries in which it abounds, and the object of their unceasing hostility; but it is very prolific, producing two or three broods in the year, and sixteen or eighteen at a birth. It feeds generally on vegetable food, as leaves, seeds, &c., although it is said also sometimes to devour small quadrupeds, birds, lizards, frogs, &c. The H. carries away pease and other legumes in pod, but shells them, and deposits only the edible portion in its store. Its labours and depredations are all carried on by night. It is an extremely fierce and pugnacious animal, and exhibits more than the pertinacity of the bull-dog. The skins of hamsters are of some value.—There are several other smaller species of the genus, mostly Asiatic.

Hamster (*Cricetus vulgaris*).

HAN, the name of the most celebrated of the twenty-six dynasties of China (206 B.C. to 220 A.D.), founded by Kau-tsu, whose accession to the empire is regarded as the commencement of Chinese modern history. The number and character of its heroes and literati are superior to most other periods, and to this day the term *Sons of Han* is the favourite appellation of the Chinese to themselves—the most common term for Chinamen.

HA'NAPER OFFICE, a branch-office of the Court of Chancery, from which certain writs are issued. The name is derived from the fact that the papers and writs used to be kept in a hamper (*in hanaperio*).

HA'NAU, a flourishing town in the electorate of Hesse-Nassau (q. v.), capital of a province of the same name, is situated at the confluence of the Kinzig and the Main, 12 miles east-north-east of Frankfurt. It is divided into the Old and New Town, the latter of which was founded, in 1597, by Protestant refugees from Belgium, who introduced the manufacture of woollen and silken goods, which still flourishes. The town of H. stands pre-eminent in Germany for its jewellery, and gold and silver wares, while it also carries on extensive manufactories of carpets, gloves, leather, cards, paper, hats, cutlery, tobacco, and cigars. H. has broad and straight streets; the buildings most worthy of note are the ancient castle; a gymnasium, in which the Wetterau Library is located; and the electoral palace of Philippsruhe, famed for its orangeries, and once the property of Napoleon's sister, Princess Pauline Borghese. Pop. (1871) 20,278. In the neighbourhood of the town, and on the left bank of the Main, are the baths of Wilhelmsbad and the village of Rumpenheim, with its palace and gardens. H. is celebrated as the scene of the last battles which Napoleon fought in Germany, October 30 and 31, 1813, when, in his retreat from Leipsic, after a hard-fought battle, he totally defeated the allies.

HA'NCHINOL (*Heimia salicifolia*), a plant of the natural order *Lythaceæ*, with lanceolate, frequently ternate leaves, and flowers on one-flowered stalks. It is a native of Mexico, and is much esteemed as a medicine for its very powerful sudorific and diuretic properties. It is highly extolled as an antisyphilitic.

HAND, THE. The genus *Homo*, or MAN, takes rank in the classification of mammals as a distinct order, BIMANA, in consequence of man being the only animal possessing *two hands*. At first sight, it might be considered that four-handed animals—the monkeys, apes, and their allies, which are placed by zoologists in the order QUADRUMANA—were superior to those which possess only two hands, but this is far from being the case. None of these four hands are adapted to the variety of actions which the human hand is capable of performing, and they are all, to some degree, required for support and locomotion; so that while in the higher forms of the quadrumana the extremities present an approximation in structure to those of man, in the lower they gradually tend to resemble the ordinary quadrupedal type. 'That,' says Cuvier, 'which constitutes the *hand*, properly so called, is the faculty of opposing the thumb to the other fingers, so as to seize upon the most minute objects—a faculty which is carried to its highest degree of perfection in man, in whom the whole anterior extremity is free, and can be employed in prehension.' The peculiar prehensile power of the human hand is chiefly dependent upon the length, power, and mobility of the thumb, which can be brought into exact opposition to the extremities of all the fingers, whether separately or grouped together.

Before describing the hand itself, we must say a few words on the upper extremity generally, of which the hand may be regarded as the essential part.

The general arrangement of the bones of the arm will be readily understood by a reference to fig. 1. The general plan of the osseous framework of the upper and lower limb is very similar. The *humerus* or arm-bone corresponds to the *femur* or thigh-bone; the lower end of the humerus is connected with the two bones of the forearm, the *radius* and the *ulna*, which correspond with the two bones of the leg. Then come the *carpal* bones, the *metacarpal* bones, and the *phalanges*, just as we have *tarsal* bones, *metatarsal* bones, and *phalanges* in the foot.

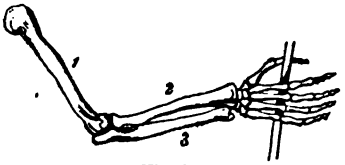


Fig. 1.

1, the humerus; 2, the radius; 3, the ulna. Beyond the distal ends of the radius and ulna come the carpal bones, the metacarpal bones, and the phalanges.

In fig. 2 (which we copy from Humphry's *Human Foot and Human Hand*) we have a diagram shewing the way in which the bones of the hand are arranged. The carpal bones (3 to 10 in the figure) are eight in number, and are arranged in the wrist in two rows. The first or upper row consists practically of three bones (3, 4, 5), the fourth (6) being regarded as belonging to the class of *Sesamoid Bones* (q. v.), and the second row of four bones (7, 8, 9, 10); so that, excluding the pisiform bone (6), the carpal and the tarsal bones correspond in number. As we commonly term the palm the *front* of the hand, the thumb becomes conventionally the *outer*, and the little-finger the *inner* digit; but according to the rules of comparative anatomy, and in order to compare the hand and foot, we ought to reverse these terms. The outer (3) of the carpal bones of the first row supports (through the intervention of 7 and 8) the bones of the thumb and forefinger (I and II), and constitutes with them the *outer* division of the hand. The inner (5) of the carpal bones bears the little, and the next (the ring) finger (V and IV), and constitutes with them the *inner* division of the hand, while the middle one (4) bears the middle-finger (III), and belongs to the *middle* division of the hand. We likewise see from this figure, and likewise from fig. 1, that the two outer bones (3 and 4) are connected with the radius, while the inner bone (5) is connected (indirectly by a thick ligament) with the ulna.

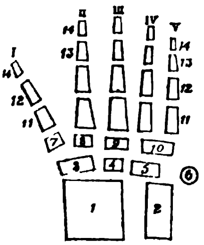


Fig. 2.

Diagram of the bones of the hand, with the ends of the radius and ulna.

1, end of radius; 2, end of ulna; 3, scaphoid; 4, semilunar; 5, cuneiform; 6, pisiform; 7, trapezium; 8, trapezoid; 9, magnum; 10, unciform; 11, 11, metacarpal bones; 12, 12, first row of phalanges; 13, 13, second row; 14, 14, third row; I, thumb; II, forefinger, &c.; V, little-finger.

It is unnecessary for us to enter into any anatomical details regarding the individual carpal bones. Collectively, they are so arranged that the carpus presents a dorsal convex surface, upon which the tendons of the extensor muscles of the fingers play, and a palmar concave surface on which the tendons of the flexor muscles lie. The several bones are joined to one another—each bone being united to three or more others—by a large extent of surface, and are girded together by strong ligamentous bands. The wrist is thus as strong as if it had been constructed of one solid piece of bone, while the slight gliding movements which occur between the several bones give it an elasticity which serves to break the shocks that result from falls upon the hand. The uppermost surface of the first row of carpal bones is convex, and this convex surface is received into a wide cup or socket, formed by the lower articular surface of the radius, and by a ligament passing from that bone to the ulna.

The metacarpal bones and the phalanges require no special description. Like the great-toe, the thumb has only two phalanges, while each of the other digits has three.

We shall now notice the various movements of which the hand is capable. They may be divided into (1) the different directions in which the hand collectively can be moved; and (2) the movements of which the hand itself, without reference to the arm, is capable.

The *scapula* or shoulder-blade, with which the principal arm-bone articulates, is itself movable to a very considerable extent on the surface of the ribs on which it rests. Again, the socket in which the nearly spherical head of the *humerus* or arm-bone lies is very shallow—not unlike the cup in the well-known toy *cup-and-ball*—and the arrangements of the shoulder-joint generally are such as to permit so great a variety, and so extensive a range of movements, that we are able to apply the hand to every part of the body. This freedom of motion is due in a great degree to the clavicles or collar-bones, which, by steadying the shoulder-blades, and keeping the shoulders apart, afford a fixed point for the various muscles which we employ in raising the arms, in folding them over the chest, in the act of hugging, &c. The movement at the next junction of bones, the elbow-joint, is very different from that at the shoulder. The latter is termed, from its construction, a ball-and-socket joint, and admits of motion in all directions, within definite limits; while the elbow is a hinge-joint, and merely admits of bending and straightening, or, in other words, of motion in one plane. We have next to consider a class of movements of the forearm and hand, to which there is nothing analogous (at least to any material extent) in the leg. The movements in question are called 'pronation and supination.' In *pronation* (derived from *pronus*, with the face downwards), we turn the palm of the hand downwards, as in picking up any substance from the table; in *supination* (derived from *supinus*, with the face upwards), we turn the palm upwards, as for the purpose of receiving anything that may be placed in it.

These movements of pronation and supination are so important to the usefulness of the hand, that we must notice the three muscles by which they are chiefly affected. One of the three muscles (A, fig. 3) passes from a projecting process on the inner side of the arm-bone, at its lower end, to the outer edge of the middle of the radius. Its contraction causes the radius to roll over, or in front of, the ulna. It thus pronates the hand, and is called a *pronator* muscle. Another muscle (B, fig. 4) passes from a projecting process on the outer side of the arm-bone to the inner edge of the radius near its upper part. It runs therefore in an opposite direction to the former muscle, and produces an opposite effect, rolling the radius and the hand back into the position of supination. Hence it is called a *supinator* muscle. The third is a very powerful muscle, termed the *Biceps* (q. v.), which not only bends the elbow, but from the mode in which its tendon is inserted into the inner side of the radius (see fig. 5), 'also rotates the radius so as to supinate the hand; and it gives great power to that movement. When we turn a screw, or drive a gimlet, or draw a cork, we always employ the *supinating* movement of the hand for the purpose; and all screws, gimlets, and implements of the like kind are made to turn in a manner suited to that movement of the right hand; because mechanicians have observed that we have more power to supinate the hand than to pronate it.' Supination can only be performed to its full extent by man, and even in man it is not the natural or habitual position; monkeys can partially effect the movement, and in most of the lower animals the part corresponding anatomically to the hand is constantly in a state of pronation.

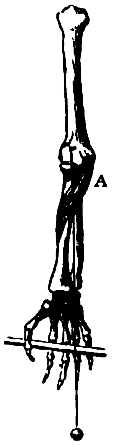


Fig. 3.

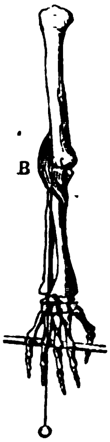


Fig. 4.

Fig. 3.

The upper limb, with the forearm and hand in the state of supination.

A, the long supinator muscle.

Fig. 4.

The same in a state of pronation.

B, the short supinator muscle.

In both figures, a plumb-line from the outer condyle of the humerus is found to traverse the lower end of the ulna and the ring-finger.

(From Humphry, *Op. cit.*)

The movements of which the hand itself, without reference to the arm, are capable, are very numerous, and in this respect differ considerably from the corresponding movements of the foot. Thus we can bend the fingers down upon the palm, or we can extend them beyond the straight line; we can separate them from one another to a considerable extent, and we can close them with considerable force. The wrist and hand are bent forwards or flexed upon the forearm by three muscles which pass downwards from the inner condyle or expanded end of the humerus, and are termed the *radial flexor*, the *ulnar flexor*, and the *long palmar* muscles. The first two of these muscles are inserted into wrist-bones on the radial and ulnar sides respectively, while the third expands into a fan-like *fascia* or membrane in the palm of the hand, and thus serves both to support the skin of the palm and to protect the nerves and vessels which lie below it. Beneath the palmar fascia lie two sets of *flexor* muscles of the fingers, and they present so beautiful a mechanical arrangement as to merit special notice.

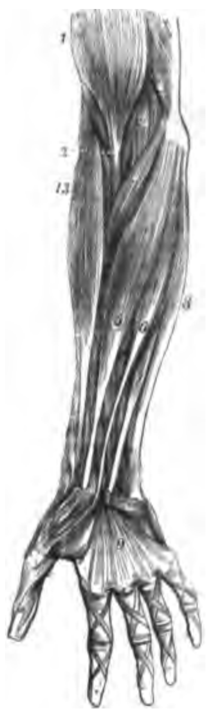


Fig. 5.

The superficial muscles of the forearm.

1, the lower part of the biceps; 2, its tendon, a little above its insertion into the radius; 5, the radial flexor of the wrist; 6, the long palmar muscle, spreading out (at 9) into the palmar fascia; 8, the ulnar flexor of the wrist; 13, the long supinator muscle.

The *superficial* or *perforated flexor* muscle passes down the front of the forearm and divides into four tendons, which become apparent after the removal of the palmar fascia, and are inserted into the second phalanges of the fingers, each tendon splitting at its termination, to give passage to the similar tendons of the *deep* or *perforating flexor* muscle, which passes from the upper part of the ulna to be inserted into the last phalanx of each finger. This arrangement of the tendons of the superficial and deep flexor muscles is shewn in fig. 6. These *flexor* muscles are antagonised by the *common extensor* muscle of the fingers, which, like the flexors, divides into four tendons, one for each finger. Besides these, there is a special *extensor* of the index-finger, a series of muscles forming the ball of the thumb, which move that organ in almost every direction, and various small slips giving lateral and other movements to the fingers.

It is sufficient to observe that the hand is very richly supplied with blood-vessels and nerves, without entering into any anatomical details on these points. There is no part of the body where the sense of touch is so acute as at the tips of the fingers; but we shall defer to the article TOUCH, ORGANS AND SENSE OF, the consideration of the special arrangements which make this part of the hand peculiarly important in relation to our knowledge of external objects.

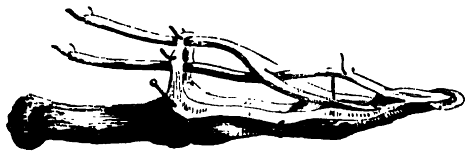


Fig. 6.

To shew the perforation of one of the tendons of the superficial flexor muscle (which is inserted into the second phalanx), in order to allow the corresponding tendon of the deep flexor to pass onwards to be inserted in the last phalanx.

Our notice of the comparative anatomy of the Foot (q. v.) renders it unnecessary to trace the modifications presented in the lower animals by the bones corresponding to those of the human hand; as the carpal and metacarpal bones with their phalanges undergo adaptations of form to meet the individual wants of the animal, very much in the same manner as the tarsal and metatarsal bones and their phalanges. Thus, the reader will readily see that the so-called knee of the horse, for example, is the carpus, and he will have no difficulty in tracing the metacarpal bones and phalanges. See the articles BROKEN KNEES and HORSE; and Humphry, *On the Human Foot and Human Hand.*

HÄNDEL, GEORGE FREDERICK, one of the greatest of musical composers and musicians, though a native of Germany, spent so large a portion of his life in England, where he composed his greatest works, that Britain may almost claim him as her own. He was born at Halle, Upper Saxony, February 23, 1685. He manifested in infancy an extraordinary passion for music, and at the age of seven, having accompanied his father on a visit to the Duke of Saxe-Weissenfels, he found his way to an organ, where he was heard by the duke, who remonstrated with his father against further opposition to a genius of so decided a character. He was now placed under a music-teacher, Zachau, where he remained until he was 13, composing every week cantatas for the church-service, and learning all instruments, especially the organ. In 1698, he was sent to Berlin, where the Elector of Brandenburg was so impressed with his talents, that he wished to send him to Italy. As his father would not accept this offer, he returned to Halle, whence, on the death of his father, he went to Hamburg in 1703. Here he played a violin in the orchestra of the opera. He was soon its director, and composed his first opera, *Almira*, which was rapidly followed by *Nero* and *Florinda*. His violent temper involved him in a quarrel with a brother-composer, which resulted in a duel; the sword of his adversary was stopped by a button or a music score. He next visited Italy. In Florence, he composed *Rodrigo*, 1707. His *Agrippina*, composed in Venice, had a run of thirty nights. At Rome, he was received at Cardinal Ottoboni's where he heard Corelli, and beat him with his own violin, for not playing to suit him in his *Il Trionfo del Tempo*. In 1710, he returned to Germany, where he was appointed chapel-master to the Elector of Hanover, afterwards George I. At the close of the same year he went to England, where he was patronised by Queen Anne and the nobility. He composed *Rinaldo*, *Pastor Fido*, *Theseus*, and in 1715, *Amadis da Gaula*, in which Nicolini and Valentini first sung in England. In 1718 he undertook the direction of the Duke of Chandos's chapel at Cannons, where he wrote *Acis and Galatea*, *Esther*, the first English oratorio, and numerous concertos, anthems, fugues, &c. A Royal Academy of Music for the cultivation of the opera, was formed in 1720, and, after some competition, was placed under H.'s management. This undertaking, and other opera speculations, in which H. was engaged, proved very unsuccessful. H. lost £10,000, and was compelled to retire to Aix-la-Chapelle on account of his health. The oratorio *Deborah* was composed in 1733, and was followed by *Alexander's Feast*, *Saul*, *Israel in Egypt*, and (1740) *L'Allegro e Penseroso*. In the end of 1741 he went to Dublin, where his *Messiah*, composed in that year, was produced for charitable purposes. He remained in Dublin about nine months, and received a generous support. From this time success attended all his undertakings. On his return to London, he composed his *Samson;* and the *Messiah* was performed for the benefit of the Foundling Hospital. It was repeated annually for the same purpose, and from 1749 to 1777 brought to that charity £10,300. H. became blind, but he still composed, and played on the organ, being led to his seat, and forward to receive the plaudits of the audience. He assisted at the performance of one of his oratorios on the 6th of April, and he died as he wished, on Good Friday, the 13th of April 1759, 'in hopes,' he said, 'of meeting his good God, his sweet Lord and Saviour, on the day of his resurrection.' Among his works, which are in the Queen's Library, are 50 operas—8 German, 26 Italian, 16 English; 20 oratorios, a great quantity of church-music, cantatas, songs, and instrumental pieces. He was a wonderful musician, and his compositions are often full of grandeur and sublimity. His operas are seldom performed, but his oratorios hold the same place in music that in the English drama is accorded to the plays of Shakspeare; and the Handel Festivals, lasting several days, in which they are performed by thousands of singers and musicians, are the grandest musical exhibitions of our times.

HAND-FASTING, the ancient term for betrothment, now disused.

HAND-GLASSES are very useful implements of gardening, for the protection of tender plants. They are of various kinds, some of them simple bells of glass, with a knob at top, for convenience of lifting them, chiefly used for covering cuttings in the green-house or stove, until they *strike* or send forth roots; whilst others consist of metal frames—zinc, lead, iron, or copper—filled up with panes of glass, and sometimes of a size large enough to be used for covering tree-pæonies, acacias, and other tender shrubs.

HAND-TREE (*Cheirostemon platanoides*), a large tree of the natural order *Sterculiaceæ*, which receives its name from the peculiar appearance of its flowers. These have no corolla, but a large 5-lobed and angular coloured calyx—bright red within—from which project the five stamens, united by their filaments into a column, and separating and curving at the summit, where they bear the anthers, so as to have some resemblance to a hand or claw. It is not merely this, however, which makes the tree an object of interest, but the circumstance that it is an object of superstitious veneration to the Mexicans; a single tree near Toluca, which is mentioned in the earliest histories, being asserted by them to be the only one in the world, and their eager gathering of its flowers always preventing its multiplication by seed. It was not till 1801 that cuttings were obtained from it for the Botanic Garden of Mexico, where the young plants have since produced seed abundantly. The tree has also been found in great abundance in Guatemala. It is a lofty tree with a thick trunk, a habit similar to that of a plane, and broad maple-like leaves.

HANDS, Imposition of, a ceremony which has been employed both in ancient and modern religious use as symbolising the conferring of certain interior, and, generally speaking, spiritual gifts. In the consecration of Aaron and his sons, they are directed to lay their hands upon the heads of the victims which were to be offered in sacrifice (Ex. xxix. 10, 15, 19). Moses set Joshua apart as the leader of the people by 'laying his hands upon his head' (Num. xxvii. 23). Our Lord is entreated to heal the ruler's daughter (Matt. ix. 18) by the same ceremony. This is the rite which He himself adopts in blessing the little children (Matt. xix. 15). The gift of the Holy Ghost was imparted by the same ceremony (Acts viii. 17), and the ministers placed by the apostles in the newly founded churches were similarly installed (1 Tim. iv. 14). In the early church, the rite of imposition of hands was employed in the receiving of catechumens and the reconciliation of penitents. From its use in confirmation, that rite is commonly designated by the Fathers under the name of Imposition of Hands. In the ancient church, this rite existed in two forms: the actual laying on of hands, which was called *chirothesia;* and the extending the hand over or towards the person, which was styled *chirotonia.* In the Roman Catholic Church, the former is retained as an essential part of the sacraments of confirmation and holy orders; the latter is employed in the administration of the priestly absolution. Both forms are familiarly used in blessing. In the mass, also, previous to the consecration of the elements of bread and wine, the priest extends his hands over them, repeating at the same time the preparatory prayer of blessing. See Wetser's *Kirchen-Lexicon*, vol. iv. 853. The rite of imposition of hands is used both by the Episcopalian and Presbyterian churches in the ordination of ministers. It also forms part of the ceremony of confirmation in the Anglican and in the Lutheran church. See Palmer's *Antiquities of the English Ritual*, Keeling's *Liturgiæ Britannicæ.*

HANDSEL, sometimes used to denote earnest-money, or part-payment, by way of binding a bargain. In Scotland, it popularly signifies a first transaction in trade, as, for example, the first sale effected in the day or week; and is likewise employed to signify a present in the nature of a New Year's gift on the first Monday in the year—hence called Handsel Monday.

HANDWRITING, in Law, is proved by calling a witness who either saw the individual write the identical words, or who by correspondence, or by having previously at other times seen the same person write other papers, can swear that he believes the paper is the handwriting of the individual to whom it is attributed. Sometimes, where no direct evidence can be had, engravers and others accustomed to compare the niceties of handwriting are allowed to give their evidence, or rather state their belief as to the writing; but this kind of evidence is looked upon with great suspicion, and is much discountenanced. In cases where a jury are called upon to determine a disputed question of handwriting, they are now allowed in England to form their own opinion by comparing the disputed writing with other writings admitted to be by the same party. But this could not be done before 1854, and it can only be done now in civil cases. In Scotland, a jury are not yet allowed to judge of the handwriting in this way in any case. In some countries—as, for example, in Scotland—a will, if written in the testator's handwriting, is admitted to be genuine without the attestation of witnesses, being then called a Holograph (q. v.) instrument; but there is no such privilege in England or Ireland, as all wills, by whomsoever written, must be attested by witnesses.

HANG-CHOW-FOO, the capital of the province of Che-keang, in China, on the left bank of the Tsien-tang, where that river disembogues into the Bay of Hang-chow-foo, is situated at the commencement of the Grand Canal, in lat. 30° 18′ N., long. 120° 15′ E. It is about 150 miles south-east of Nankin. H. is the most magnificent city of China—a Chinese proverb makes it a heaven upon earth. It was the capital of the empire during the rule of the Mongols, when it was visited by the celebrated Marco Polo early in the 14th century. There are ten gates through its lofty walls, which are 20 miles in circumference, but there are more inhabitants without the *enciente* than within. The population is estimated by Dr Macgowan at 800,000. The streets, which are of greater width than is usual in Chinese cities, are well paved, and in some directions lined for miles with elegant shops and extensive warehouses. The terminal ramifications of the Grand Canal are spanned by countless elegant bridges. H. is celebrated for its silk manufactures, and its embroidery excels that of any part of China. Mulberry-trees occupy every vacant spot within and without the walls. No city in China, unless it be that of Suchau, possesses wealth to compare with that of this remarkable place, which, moreover, is the most literary and most religious part of the empire. Colleges and temples, *literati* and priests, abound and flourish in Hang-chow-foo. The imperial library in the palace of Kienlung, and the literary institutions, appear, however, to be going to decay, and could not at any period have had much educational influence. One cause of the celebrity of the city is found in the beauty of its environs. The tower of the Thundering Winds, although in ruins, is still an imposing edifice; while monumental gateways, light airy bridges, and temples of the size of villages, render the natural beauties of the city highly picturesque. One of the temples possesses 500 images of the Io-han (Buddhist saints), of the size of life, richly covered with gold. Nothing can exceed the beauty of the valleys opening into the lake, richly adorned as they are with trees, chiefly the camphor and tallow trees, and the arbor vitæ. From a remote period, these scenes have been the resort of pilgrims, and every spot is hallowed by some legendary incident. At one place there is an image of Buddha, cut out of the solid rock, measuring 48 feet from shoulder to shoulder. The nose is seven feet long, and the other parts are of a proportional size; it is gilt over like wooden and clay images of the same personage. The protruding rocks are profusely carved with religious inscriptions and images of mythological characters. The north-eastern section of the city of H. is called the Tartar city, being exclusively devoted to the Mantchu garrison or military colony. It is separated from the Chinese city by a low wall. About 25 miles below the city is Kanpoo, once a mart of considerable importance, the port of H., when that city was the metropolis of China, described by Marco Polo as an extremely flourishing place; fluvial changes have rendered it inaccessible to any but small flat-bottomed vessels. Chapoo is now the port of H., situated on the north side of the bay, about 50 miles from the capital. Chapoo has also a Tartar city; it communicates by branches of the Grand Canal with H. and Shanghai. It is the port to which Chinese trade with Japan is restricted.

The configuration of the Bay of Hang-chow-foo and the embouchure of the Tsien-tang river, which empties into it near the provincial capital, favours the formation of the tidal phenomenon designated an eagre or bore. See Bore. Dr Macgowan, the first European who has witnessed this magnificent spectacle, has published an account of it in the *Proceedings of the Asiatic Society of Hong-kong.* As the tide rushes into the mouth of the river, it becomes elevated to a lofty wave, which attains its greatest magnitude opposite the city of Hang-chow-foo. Generally, there is nothing remarkable in its aspect, except at the period of the vernal and autumnal equinoxes, the maximum being at the latter season. As the hour of flood-tide approaches, crowds gather in the streets running at right angles with the river, but at safe distances; boatmen stop lading and unlading their vessels, and put out into the middle of the stream. The centre of the river teems with craft. Loud shouting from the fleet announces the appearance of the flood, which seems like a glistening white cable stretched athwart the bay as far down as the eye can reach. Its noise, compared by native poets to that of thunder, speedily drowns that of the boatmen; and as it advances with prodigious velocity, it assumes the appearance of an alabaster wall, or rather of an advancing cataract four or five miles across, and about 30 feet high. As the foaming wall of water dashes impetuously onward, one trembles for the safety of the floating multitude. They cease shouting, and devote their energies to the steadying of the prows of their vessels toward the advancing wave, which threatens to submerge everything afloat; but they all vault as it were to the summit with perfect safety. This grand and exciting season is but of a moment's duration; the wave passes up the river in an instant, but from this point with gradually decreasing force, volume, and velocity, disappearing entirely a few miles above the city. From ebb to flood tide, the change is almost instantaneous; a slight flood continues after the passage of the wave, but it soon begins to ebb. Within the historic period, numerous changes have been effected by the action of this wave, the most noted being the removal of a rocky islet from the centre of the river opposite Hang-chow-foo. Chinese ingenuity has been long exerted, with imperfect success, in preserving the alluvial plain from the wasting action of the eagre. The history of the dykes that have been successively erected, of failures and disasters, found in the local annals, shew that, like the Yellow River, this part of the Tsien-tang has been a constant source of anxiety and expense to the government, costing about 130,000 dollars per annum.

HANGED, DRAWN, AND QUARTERED, the description of the capital sentence on a traitor, which consisted of drawing him on a hurdle to the place of execution, and after hanging him, dividing the body into quarters. This punishment was substituted by the stat. 54 Geo. III. c. 146, for the ancient more barbarous sentence of disembowelling alive, but the crown has power to reduce the sentence to simple beheading. See also Hanging.

HANGING is the mode by which capital punishment is carried out in the United Kingdom. In England, formerly, in atrocious cases, it was usual for the court to direct a murderer to be hung upon a gibbet in chains near the place where the crime was committed—also at a later period to order the body to be dissected—and the execution to take place on the next day but one after the sentence was passed. But these useless severities were abolished by the stat. 6 and 7 Will. IV. c. 30.

The mode of punishing by hanging was first adopted in England in 1241, when Maurice, a nobleman's son, was hanged for piracy. Other more barbarous modes of inflicting death were long in use, being prescribed by statute, but have been abolished, and hanging has long been the ordinary, because the most humane, mode of executing capital punishment. In treason, hanging is part of the statutory punishment, coupled with mangling the body, though the crown may change the sentence into simple beheading, except in the case of women, who are only hanged, in deference to their sex. Formerly, in Scotland, on the other hand, a capital sentence pronounced south of the Firth of Forth could not be executed within less than 30 days; and if pronounced north of the Firth, within less than 40 days after it was pronounced. But now, in both cases, the day of execution must not be less than 15, nor more than 21 days, south of the Firth; nor less than 20, nor more than 27 days, if north of the Firth, after sentence passed. Until recently, the hanging or execution took place in public. See Execution.

The cause of death in hanging is complex. The compression of the windpipe by the cord, the obstruction of the return of venous blood from the head, and of the flow of arterial blood to the brain, the stretching or tearing of the nervous structures of the neck, and in some instances dislocation or fracture of the vertebræ, may concur in the production of the fatal effect, which, though attended with violent struggles in some cases, is probably as nearly instantaneous as possible. The subject, in its relations to medical jurisprudence, will be more fully considered under the title Strangulation.

HANGING GARDENS. The Hanging Gardens of Babylon were anciently reckoned among the wonders of the world. Their construction is variously ascribed to Queen Semiramis, and to Nebuchadnezzar—seven centuries later, but still more than five centuries B.C.—who is said to have made them for the gratification of his Median queen, Amytis, because the Babylonian plain seemed dreary to her in comparison with the varied and romantic scenery of her native land. Diodorus and Strabo have given particular descriptions of them; and although it is remarkable that they are not mentioned by Herodotus, whilst Quintus Curtius speaks of them as 'fabulous wonders of the Greeks'—an opinion which some of the learned in modern times have adopted, denying their very existence—yet the probability seems to be in favour of the general accuracy of the descriptions, and even that the ruins of this celebrated structure are to be recognised among the mounds which mark the site of Babylon. See Babylon. The Hanging Gardens are said to have formed a square, with an area of nearly four acres; but rising in terraces curiously constructed with stone pillars, across which were placed stones, covered with reeds and bitumen, and again with bricks united by cement; above these, sheets of lead, to prevent moisture from flowing down, and finally a sufficient layer of earth; the summit being elevated three hundred feet above the base, so that at a distance the whole presented the appearance of a pyramidal wooded hill. There was a large reservoir at the summit, which was filled with water by pumping from the Euphrates, for the irrigation of the gardens, and the supply of their numerous fountains. Fountains and banqueting rooms were distributed throughout the numerous terraces; groves and avenues of trees, as well as parterres of flowers, diversified the scene; whilst the view of the city and neighbourhood was extensive and magnificent.

HANKOW', in lat. about 30° 30' N., and long. 114° E., a port of China, at the junction of the Han river with the Yang-tze-kiang, 600 miles from its mouth. It consists of three cities, the principal being Wu-chang-foo, on one side of the Han river, and Han-yang-foo on the opposite side. Strictly speaking, H. is a suburb of the former. It was destroyed during the Tae-ping rebellion, but has since been rebuilt, and has a population of from 500,000 to 1,000,000. English and American steamers ply regularly and frequently between H. and Shanghai. Vessels of large size can reach the city; the river is navigable 360 miles higher up, to the city of Ichang. Powerful flat-bottomed steamers are requisite for navigating this part of the Yang-tze-kiang, the current running at from seven to eight knots per hour. The principal export is tea. Other native products exported are silk, oil, tallow, tobacco, and wax. The chief imports are cotton piece-goods, woollens, metals, Straits and Japanese produce. The total value of the exports amounted, in 1870, to £4,434,129; and in 1871, to £5,578,258; of the imports, in 1870, to £5,938,314; and in 1871, to £6,756,631. The increase in 1871 of gray shirtings is noticeable; it was £183,393 in value more than that of 1870.

HANNIBAL (*the gift of Baal*) was a common name among the Carthaginians, the list of those famed in history extending to fourteen or fifteen. But the greatest of all the Hannibals was the famous son of Hamilcar Barca. He was born in 247 B.C. When he was nine years old, he accompanied his father on his Spanish expedition; and before starting, swore that oath of eternal hatred to the Roman name, which he kept so faithfully throughout his whole life. After the death of Hamilcar, he was employed by Hasdrubal, his brother-in-law, in most of the military operations which he undertook. Such was the esteem in which he was held by the soldiers, and such a reputation for bravery and strategic skill had he gained, that when Hasdrubal was assassinated, the army with one voice elected him commander-in-chief, an appointment which the authorities at Carthage at once ratified. H., at this time in his 29th year, undertook the command with ready zeal, for he longed to realise the legacy left him by his father, and to strike a death-blow at his country's rival by attacking her on her own soil. But before he entered on a task of such magnitude, he deemed it prudent to complete the subjugation of Spain, and accordingly spent two years in contests with some tribes hitherto independent of Carthage. Saguntum, a city in alliance with Rome, was attacked by him on the ground that its inhabitants were making aggressions on the Torboletes, subjects of Carthage. After a siege of eight months, the city was taken; and the Romans, after an embassy had unsuccessfully demanded the surrender of the general who had thus wantonly violated the treaty, declared war in 218 B.C. Having taken measures for the defence of Africa and Spain during his absence, he started from New Carthage in 218 B.C., with 90,000 foot, and 12,000 horse. This force was very much thinned by his contests with the tribes between the Iberus and the Pyrenees, by the necessity of leaving Hanno with 11,000 men to keep them in subjection, by desertion in the passage of the Pyrenees, and by his sending home a portion of his Spanish troops. His object in this last act was to inspire the soldiers with thorough confidence in themselves and their general. From the Pyrenees he marched to the Rhone without opposition, since Scipio was at Massilia (Marseille), four days' march from the point where H. crossed the river in the face of the Celtic hordes who sided with the Romans. His next great difficulty was the passage of the Alps, which he effected in fifteen days, in spite of the attacks of the mountain tribes, the snows, storms, and other difficulties. Much discussion has taken place among learned men whether H. crossed the Cottian Alps by the pass of Mont Genevre (or Cenis), or the Graian Alps by the pass of Little St Bernard. For the former route, Michelet, Thierry, and most French writers argue; and for the latter, with better reasons, Niebuhr, Arnold, Mommsen, &c. After allowing his army (now about 26,000 strong) some time to recruit in the rich villages of the friendly Insubrians, he first subdued the Taurini, a tribe hostile to the Insubrians, and took their chief city after a siege of three days; and thus forced into alliance with him all the Ligurian and Celtic tribes on the upper course of the Po. Scipio, having returned from Massilia, took the command of the army in the north of Italy, and first met H. on the plain near the river Ticinus. The Romans were entirely routed; and Scipio, who was severely wounded, retreated across the Po. The armies again met at the Trebia, with a like result, though the Romans, who had received reinforcements, were much more numerous. These battles were fought in 218 B.C. Having wintered in the neighbourhood of the Po, and levied additional troops among the Gauls, most of whom were now his friends, H. started southward so soon as spring permitted, marching through Liguria and the swamps of the Arno. In this difficult route, immense numbers of his beasts of burden and horses perished, and he himself lost the sight of one eye. He next inflicted a severe defeat, near Lake Thrasymene, on the consul Flaminius: thousands perished by the sword, including the consul, and thousands in the lake, while 15,000 were taken captive, H. losing only 1500. After this victory, he crossed the Apennines to Picenum and Apulia, and thence re-crossed to the fertile Campania, which he ravaged. Thither Fabius was sent with an army to oppose him, but no general engagement took place, the consul endeavouring to lead H. into snares, which he succeeded in doing; but the wily African extricated his army by a stratagem, and returned to Apulia. He wintered at Cannæ, and in June, or, according to others, in August (2d) of 216 B.C., almost annihilated a Roman army of 90,000 men under Terentius Varro and Æmilius Paulus, in the battle, which was fought a little below the town. About 50,000 are said to have fallen, including Æmilius Paulus, and a host of Roman knights, senators, and other distinguished persons. Here H. committed, perhaps, the greatest military error of his life, in not marching direct to Rome; but it is supposed that he refrained, in order to allow the tribes of Italy to declare in his favour. Many in the south of Italy did attach themselves to his interests, but not in such numbers as he had anticipated. After some delay, he marched on Neapolis (Naples), which he did not succeed in taking, but the gates of Capua were opened to him, and here he wintered. The enervating effect which the luxury of Capua is said to have had on his army has been greatly overdrawn, but his residence there forms, in one point of view, the turning-point in the war, which from this time became more of a desultory kind. H.'s great purpose was to arm the Italian nations against Rome, and so to crush her power by means of her own subjects; the Romans, on the contrary, henceforth avoided coming to a pitched battle with the Carthaginians, but sought rather to keep the tribes in awe, and harass H. and his lieutenants by small armies in different parts of the country. H. traversed Italy in all directions, surprised the Roman generals, defeated their armies, captured their towns, such as Casilinum, Arpi, Tarentum, Metapontum, Thurii, Locri, and many others; he defeated Centenius near Capua; Cn. Fulvius at Herdonea; Fulvius Flaccus on the Anio; Crispinus and Marcellus in Lucania; and the besieging army before Locri: in all these cases the armies were almost annihilated. The defeat of Hasdrubal, his brother, at the river Metaurus, and the loss of his army, compelled H. to confine himself to the mountainous peninsula of Brutium, where for four years he resisted all the efforts of the Romans to dislodge him. At length, after having maintained himself in Italy for upwards of fifteen years, he was recalled to Africa, to defend his country against Scipio; but notwithstanding his utmost exertions, and the bravery of his veteran troops, he was defeated by Scipio, near Zama, with a loss of 20,000 men. Peace was concluded in the following year (201 B. C.).

H.'s darling scheme had in the meantime been baffled, but his hatred to Rome was not diminished, and accordingly he set himself with all his zeal to make preparations for a still more deadly struggle at some future day. He turned his attention, in the first place, to political reforms, and some constitutional changes which were loudly called for, by which he placed the finances on a better footing. But his enemies accused him to the Romans of stirring up Antiochus III. of Syria to make war on them; and when ambassadors came to Carthage, H. fled to the court of Antiochus at Ephesus. In the war which followed, he took no conspicuous part, but the king bitterly regretted afterwards that he did not take the advice of H. to carry the war into Italy. When peace was concluded, the surrender of H. was one of the conditions; but foreseeing such a result, he fled to Prusias, king of Bithynia, for whom he gained a naval victory over Eumenes, king of Pergamus. He was at length demanded by the Romans; and seeing no hope of escape, he took poison, which he always carried with him for such an emergency.

Among ancient authorities, the reader may consult, with great profit, Polybius, Dion Cassius, Plutarch, and Appian; and of modern historians, Arnold's *Hist. of Rome*, vol. iii.; Niebuhr's *Lectures on Roman History*, vol. i.; Mommsen's *Hist. of Rome*, vol. ii. (Dickson's translation). For military operations specially, see Vaudoncourt, *Histoire des Campagnes d'Annibal en Italie*.

HA'NNIBAL, a city in Missouri, United States, America, on the west bank of the Mississippi, 132 miles above St Louis. It is the east terminus of the Hannibal and St Joseph Railway, and has steam-boat communication with other towns on the Mississippi. It has a large trade in pork, tobacco, hemp, and grain, with mills, foundries, and machine-shops. Pop. (1870) 10,125.

HANNO (perhaps the father or the son of that Hamilcar who fell at Himera in 480 B. C.) is famed for a voyage of discovery which he made along the west coast of Africa, to found Libyo-phœnician towns. His expedition is said to have consisted of 60 ships and 30,000 men and women. One city was built not far from the Strait of Gibraltar, and others along the coast reaching to Cape Bojador. He went south as far probably as Sierra Leone. On his return to Carthage, he inscribed an account of his voyage on a tablet, and placed it in the temple of Kronos (Saturn), or, according to others, of June. It seems to have been written in the Punic language; the version of it which remains is only a Greek translation. The *Periplus* has been published on the continent by Gelenius, Boecler and Müller, and Berkel, and with an English translation by Falconer (Lond. 1797). Great discussions have taken place among the learned as to the *time* when H.'s voyage was made (the best authorities favouring the period of about 570 B. C.); as to *the* Hanno out of all the many Hannos of history; and as to the facts stated in the *Periplus;* but on these we cannot enter. Some recent writers find evidence in it of the existence of the *gorilla* in those ancient days. For a full discussion of the subject, consult Dodwell's Dissertation (in Hudson's *Geographi Minores*); Bougainville's Essay (*Mém. de l'Acad. des Inscript.* xxvi. p. 10, and xxviii. p. 260); also Falconer, in his edition already referred to.

HA'NOVER, a village in New Hampshire, United States, America, pleasantly situated on the east bank of the Connecticut River, 52 miles north-west from Concord. It is the seat of Dartmouth College, founded by Lord Dartmouth for the education of the Indian youth, and a medical college. Pop. of township (1870), 2080.

HANOVER, formerly a kingdom of Northern Germany, but since 1866 incorporated with Prussia. (The following description refers chiefly to the state of things before the union; for more recent information, see PRUSSIA.) Hanover extends from 51° 18′ to 53° 52′ N. lat., and from 6° 43′ to 11° 35′ E. long. It may be divided into three distinct districts, viz.—1. The eastern, which consists of the duchy of Bremen cum Hadeln, a section of the duchy of Lauenburg, the duchy of Werden, the principalities of Lüneburg, Kalenberg, and Hildesheim, and the countships of Hoya and Diepholz; 2. The western (separated from the former by the duchy of Aldenburg) comprises the duchy of Aremberg-Meppen, the principalities of Osnabrück and East Friesland with the Harlingerlands, the lower countships of Lingen and Bentheim, and the circle of Emsbühren, which formerly belonged to the see of Munster; 3. The southern, which is separated from the other Hanoverian territories by Brunswick, and comprises the principalities of Grubenhagen and Göttingen, together with the districts of Elbingerode and Ilfeld. H. is bounded N. by the German Ocean and the river Elbe, E. by Mecklenburg and Prussian Saxony, S. chiefly by Westphalia and Hesse Cassel, and W. by Holland. The following table shews the divisions, or landrosteien, of H., with their respective areas and populations:

Landrosteien, or Provinces.	S. Area in Sq. Miles.	Population in Dec. 1858.	Chief Towns.	Population.
Hanover, . .	2300·13	354,763	Hanover, with subs.,	61,852
Hildesheim, .	1708·56	360,801	Hildesheim,	16,300
Lüneburg, . .	4293·45	358,701	Lüneburg,	12,600
Stade, . .	2595·60	288,975	Stade, .	6,090
Osnabrück, .	2388·33	258,797	Osnabrück,	12,800
East Friesland, or Aurich,	1144·06	189,068	Aurich, .	4,792
Clausthal, and Mines of Goslar,	241·92	32,946	Clausthal,	14,000

Giving a population in 1858 of 1,844,976, with a superficial area of 14,672·07 square miles. In 1871, the population was 1,957,607.

Physical Character, &c.—The general physical character of H. is that of an extended plain with slight undulations, but in the south the country is mountainous, embracing a considerable part of the Harz, together with the lesser heights of the Eichsfeld, Sollinger, Süntel, Deister-Oster, and Hildesheimer-Wald. From the base of these hills to the sea-coast, the land is one vast plain, only interrupted at certain points by low ranges of hilly ground. The mountains, which abound in minerals, are covered with dense woods, and the valleys lying between them are fertile and well adapted to agriculture; but beyond these valleys the country is traversed from east to west by a sandy tract from 50 to 80 miles in width, known as the Lüneburg Heath, in which the inhabitants with difficulty gain a scanty subsistence by rearing sheep and keeping bees. Great marshes or peat-moors cover the north and north-west districts, but these have in some parts been so successfully drained that they yield good pasture, although the soil generally is unproductive, comprising some of the poorest districts of Germany. The coasts are low, and require to be protected from the overflowing of the sea by embankments and dykes, the land being in many parts below the ordinary level of the sea. Along the banks of the rivers there are fertile districts, even in the north of the country.

The principal rivers are, the Elbe, which forms 120 miles of the north-east boundary-line; the Weser, on whose affluent the Leine, the capital of H., is situated; the Aller, the Ems, and the Vechte, which all fall into the German Ocean. There are numerous small lakes in Hanover. The principal canals are those between Lingen and Meppen, Aurich and Emden, and the Bremen Canal, between the Hamme and the Swinge, which serves to drain the moors, and to transport the turf and peat which they yield.

Climate.—The climate is moist near the ocean, and fogs and heavy winds are frequent; in the south it is dry and colder; and in some parts of the country marsh fevers prevail, although the general character of the climate in H. may be characterised as healthy. The mean annual temperature is 46°·5; winter, 28°·7; and summer, 64°·5. Extremes are rare. The average annual fall of rain is 23 inches.

Soil, Products.—The soil is generally of inferior quality, although it varies considerably in different districts. Agriculture is in a very backward condition, and notwithstanding some improvements which have been made of late years, large tracts of land, which are well adapted for cultivation, lie waste in every part of the country. The great subdivision of the land, and the consequent absence of capital, are the main causes of this imperfect mode of agriculture. The following proportions are given by Marcard for the distribution of the land in Hanover. Arable, meadow, and garden land, 5,833,000 morgen (the morgen is 0·6310 acre); forests, 2,242,000; waste lands, 6,514,000.

The richest corn-growing districts are Hildesheim, Göttingen, and Kalenberg, and the marsh-lands near the Elbe and Weser; rye is grown for the purpose of making bread, and largely used by the rural population. The turf obtained from the peat-moors in the north and north-west districts constitutes the only kind of fuel used in some parts of the country, and is obtained and consumed in very large quantities. Cattle, horses, and geese are extensively reared in East Friesland and the marsh-lands; and barley and oats are raised in sufficient quantity for exportation.

The Lüneburg and other extensive heaths afford good sheep-walks; and when the heather is in blossom, are resorted to by the keepers of bees, who tend their hives with much care and considerable success. In 1857 there were 200,657 hives, chiefly in the Lüneburg district, yielding honey to the value of £40,000. During the same year, it was estimated that there were in H. 209,853 horses (upwards of 3700 stallions); 889,333 horned cattle (of which 750,700 were milch cows); 1,840,774 sheep, 102,051 swine, and 122,721 goats. In East Friesland, large flocks of geese are reared, the flesh of which is salted and exported; while large quantities of butter and cheese are annually exported from the same localities.

The rivers and lakes of H. yield an abundance of fish, and there are upwards of 2500 well-stocked fishponds in the kingdom. Salmon is obtained in large quantities in the Weser. The herring-fishery is principally carried on from Emden, whence it is prosecuted with considerable enterprise, the boats going not unfrequently as far as the coasts of Scotland. The forests on the Harz Mountains and their offshoots yield large quantities of wood, chiefly pine and oak, while the valleys grow tobacco and some good fruits. The mineral resources of H. are rich and varied, including iron, copper, silver, lead, sulphur, zinc, coal, cobalt, vitriol, alum, arsenic, lime, gypsum, marble, pipe-clay, kaolin, freestone, slate for tiles, salt, obtained from 18 works, &c. According to Klöden (1861), the returns for some of the more valuable mineral products were as follows: iron, 508,082 cnt.; lead, 100,000 cnt.; salt, 525,000 cnt.; coal, 1,750,000 cnt. About one-third of the iron and one-fourth of the salt are obtained from the mines of the state, and it is estimated that 35,000 persons are employed in the different mining operations of Hanover.

Commerce, &c.—The trade, which has undergone some augmentation since H. joined the German Zollverein (q. v.) in 1854, is still very unimportant and undeveloped notwithstanding the numerous favourable conditions presented by the navigable rivers of the Hanoverian States, their good ports, well-kept high-roads, and extended railways. Besides mining, agriculture, and the rearing of cattle and other animals, the chief branches of industry are sugar-refineries, and the manufacture of tobacco, paper, hemp, thread and linen, leather, bricks, pipes, &c.

The exports consist mainly of mineral products, coarse linens and canvas, honey and wax, feathers, wood, wool, horses, cattle, wheat and rye, butter, hops, rape and linseed, oil-cakes, hams, and sausages. The imports comprise English manufactured goods, colonial products, wine and spirits, and silk. Emden is the principal trading port, but the chief sea-trade of the country is effected through Hamburg and Bremen, while H. has an extensive commission and transit business with Leipsic and Frankfurt-on-the-Maine. Besides, Emden, Pappenberg, Harburg, Lehe, and Leer, are rising into some note as trading ports. H. has good high-roads, and its postal system is well organised. The length of its post and high-roads is estimated at upwards of 3800 miles, and that of the lines of railway in operation (in 1861) at 500 miles. The latter, together with the telegraph lines (665 miles in extent), belong exclusively to the state.

Revenue.—The revenue amounted, according to the budget for 1861—1862, to 19,588,322 thalers (the thaler = 2*s.* 10¾*d.*), while the expenditure for the same year was 19,763,941 thalers. The national debt had risen, in 1861, to 46,344,836 thalers, including a debt for railways of 30,623,075 thalers.

Army.—The army numbered nearly 27,000 men. The service was for a period of seven years, the last year's service, however, being limited to the reserved corps. The principal fortresses are those of Stade, Harburg, and Fort-William, in the harbour of Bremen. H. furnished 15,230 men to the

German Confederation, and had four votes in the Plenum, or Full Council of the diet.

Religion, Education, &c.—The population of H., in 1867, was 1,937,637. Of these there were—Protestants, 1,693,219; Roman Catholics, 229,740; different Christian sects, 2307; Jews, 12,399. Religious matters are under the direction of Lutheran (Evangelical) and Reformed consistories at Hanover, Stade, Otterndorf, Aurich, Hadeln; the see of Osnabrück, which is held alternately by a Roman Catholic and a secular Protestant bishop; and the Roman Catholic see of Hildesheim.—H., like other countries of Northern Germany, is amply provided with educational institutions. It has one university at Göttingen, 17 high and 13 lower gymnasia, 5 normal and 21 polytechnic schools, a military academy at Hanover, a 'Foundation Padægogium' at Hefeld, schools of surgery and midwifery, of which that at Celle is the most esteemed, schools for the blind, deaf and dumb, and about 3600 free parish schools, which are in most cases dependent upon the local church party, whether Protestant or Catholic. There are also several good mining and forest schools in different parts of the kingdom.

The poor are provided for partly by voluntary subscription and partly by the proceeds of their own labour in the poor-houses erected for the reception of persons in want. There are partially self-supporting reformatories at Emden and Celle, while Hanover, Hameln, Göttingen, Lüneburg, Emden, and Hildesheim have all their separate houses of detention and poor-houses.

Law.—The administration of the law was presided over by a special ministry. Criminal cases have, since 1848, been tried before sworn juries.

Constitution, Government.—H. was a sovereign kingdom from 1814 to 1866. The monarchy was hereditary in the male line, and the administration was conducted by a responsible ministry with two representative chambers, whose concurrence was essential to the exercise of certain prerogatives of the crown. The upper of the two chambers consisted of the princes of the blood-royal; several mediatised princes, and other members of the higher nobility; four members nominated by the king; and fifty other members. Half the number of the elected representatives retired every third year. The lower chamber consisted of 2 of the members of the ministry nominated by the king, 2 deputies appointed by the chamber itself, 38 representatives of towns and boroughs, and 44 members for the country districts. There were, moreover, 7 provincial assemblies, whose concurrence and assent were necessary for the promulgation of laws and the levying of taxes within their several districts.

The highest department of the government was the Council of State. The cabinet which, after 1848, was composed of responsible members, comprised seven ministers, each of whom presided over a special department of the administration. The chambers were summoned every two years, but the diet or landtag was septennial. The monetary system, and the weights and measures of H., were the same as those adopted by the German Zollverein (q. v.).

People.—The Hanoverians are a mixed race: those inhabiting the north-eastern and central provinces are mostly Saxons, but those on the coast are of Frisic origin; those on the west of the Ems, Dutch; and those in the southern provinces, Thuringians and Franconians. Platt-Deutsch, or Low German, is commonly spoken in all the rural districts excepting those bordering upon the Netherlands, in which Dutch is the ordinary form of speech; while High German, as in every other part of Germany, is the language of the educated and higher classes.

History.—The country at present included in the kingdom of H. was occupied in remote ages by Saxon tribes, which after a long-continued struggle under their leader Witikind, submitted to the dominion of Charlemagne, and embraced Christianity. H. continued to form part of the Frankish empire until the time of the Emperor Ludvig the German, when Ludolf of Meissen incorporated it in the duchy of Saxony. In 951, the Emperor Otho I., who had inherited Saxony from his father Henry I., the hereditary duke, bestowed it on Hermann Billing, on the extinction of whose family in 1106, it passed to Lothaire of Supplinburg. By the marriage of Lothaire with Richenza of Nordheim, new territories were added to the duchy, which passed to the family of the Guelphs through their descendant Gertrude, who married Henry the Proud of Bavaria. Henry the Lion, the son of the latter, did much to advance the civilisation and commerce of his subjects by conferring rights and privileges upon various towns which had advocated his cause; but when he fell under the ban of the empire, a period of anarchy and confusion succeeded, which at first threatened the ruin of the country. When Henry lost the duchy of Saxony, he retained his hereditary lands of Brunswick and Lüneburg, through the special favour of the emperor.

The Reformation early found adherents among the burgher and rural populations of H.; but as the new doctrines were strongly opposed by many of the chief magistrates and the majority of the nobles, their formal introduction was made the subject of violent altercations between the opposite parties, until the conversion of Ernest I. of Lüneburg in 1535 gave support and stability to the cause of Protestantism.

The line of Brunswick-Lüneburg began with William the younger, who, in the partition which he and his elder brother Henry (the founder of the reigning Brunswick house) made of the dominions of their father, Ernest I., obtained in 1569 the duchies of Lüneburg and Celle (Zell). William died in 1592, leaving seven sons, who, with a view of avoiding the further dismembering of their patrimony, agreed that the eldest should succeed, but that one only of their number should marry. The lot of marriage fell upon the sixth brother, George, who died in 1641, in the reign of his fourth brother, Duke Frederick, the last survivor of the family. On the death of Frederick in 1648, Christian Lewis, the eldest son of Duke George, succeeded his uncle, and in accordance with a family compact, took, as his portion of the inheritance, Lüneburg, Grubenhagen, Diepholz, and Hoya, with Celle for his residence; while his next brother, George William, obtained Kalenberg and Göttingen, with Hanover for his residence, and thus gave origin to the lines of Celle and Hanover, which were again merged in one after the death of Duke George William, third son of Duke George, who, dying without male heirs, was succeeded by his kinsman and son-in-law, the elector, George Lewis of Hanover, who ascended the throne of England as George I. (q. v.) on the death of Queen Anne in 1714, as the nearest Protestant heir of the deceased sovereign, being son of the electress, Sophia, daughter of Elizabeth, queen of Bohemia, and granddaughter of James I. of England. Duke George William of Celle deserves notice for his warlike and active administration, and for the part which he took in all the momentous affairs of his age: thus he sent auxiliaries to Venice, to aid the republic against the Turks; co-operated with the Duke of Brunswick to reduce his insurgent capital; entered into an alliance with the emperor against France and Sweden; sent an army into Hungary to resist the Turks; and in 1688, lent troops and money to William of Orange against James II. of England.

With George Lewis, king of England, and the second elector of H. or Brunswick-Lüneburg, a brighter epoch opened to the Hanoverians, who, on his accession to the throne of England, were relieved from the burden of maintaining the court and ducal household, while the revenues of the crown were thenceforth appropriated solely to the general purposes of the state. Bremen and Werden were obtained in this reign by purchase from Denmark. George II., who succeeded in 1727, shewed the same care as his father to spare the revenues of H. at the expense of those of England. In his character of elector, he participated in the Austrian War of Succession, 1740—1748; but in the Seven Years' War, when H. suffered materially from the incursions of the French, he sided with Prussia. This king founded the university of Göttingen in 1745. The first thirty years of the reign of George III. (q. v.), who succeeded on the death of his grandfather in 1760, contributed largely towards the prosperity of H., which, like the other states of Northern Germany, profited by the increased English and American trade, for which the Hanoverian ports and rivers formed the regular channels of communication with the rest of Germany. In 1793, Hanoverian troops took part in the wars against the French republic, but the expenses of their maintenance were defrayed by England; and it was not till 1801, when Prussia, refusing to acknowledge the neutrality of H., threw troops into the electorate, that H. suffered from the consequences of the anomalous position in which its relations to England placed it in regard to the other states of Germany. The Prussian troops evacuated H. at the close of the same year, in accordance with the treaty entered into between France and England; but the claims and counter-claims which arose from this occupation, gave rise to protracted discussions, which were not finally settled till 1830, when it was stipulated by treaty that H. was to pay to Prussia an indemnity of 375,000 thalers. In 1803, when war was renewed between England and France, Napoleon threw an army, under the command of Mortier, into H., and the result of this measure was to compel the Hanoverian government to enter into a convention with the French general, by which it bound itself to abstain from serving against France during the pending war; to give up fortresses, arms, and horses to the enemy; to subsidise French troops; and to participate unconditionally in the general costs of the war. A large number of the army, however, having contrived to evade signing these articles of surrender, went over to England, where the men were incorporated into the German legion, which did good service both in the Peninsular war, and in the Belgian campaign of 1815, which terminated in the battle of Waterloo. In 1806, Napoleon, after having ceded H. to Prussia, and again withdrawn it, appropriated a portion of the electorate to complete the newly-formed kingdom of Westphalia, which in 1810 received the whole of the Hanoverian territory. Finally, H. was united with France, and the north-west portion divided into the departments of Bouches de l'Elbe, Bouches du Weser, and Leine, while the south-east portions formed the Westphalian departments of Atter and Harz. After the expulsion of the French, H. was elevated to the rank of a kingdom in 1814. In the same year, the Prince Regent of England convoked the Hanoverian states to deliberate upon the best manner of consolidating the various independent governments of the different provinces into one systematic whole. In 1816, the Duke of Cambridge, the brother of the Prince Regent, was appointed governor-general of H.; and in 1819 a new constitution was granted, in accordance with which the provincial states were retained and enlarged, and two representative chambers associated with them. Very little was done in the time of George IV. towards the amelioration of the administration, and the general disaffection and distrust had risen to the highest pitch, when William IV. ascended the throne. The influence of the French revolution of July (1830) extended to H., and in 1831, disturbances broke out at Osterode and Göttingen. These were speedily put down, but as the national discontent did not abate, the prime minister, Count Munster, who had long been obnoxious to the mass of the people, was dismissed, and the Duke of Cambridge, who had hitherto acted as governor-general, invested with the title of viceroy, and intrusted with very extensive powers. The duke recommended gradual reforms, but as the popular feeling was decidedly in favour of a thoroughly remodelled constitution, the states were again convoked; and finally, in 1833, a draft of the proposed constitution, which had been prepared by a commission appointed by the ministry and the states, was laid before William IV., and after it had been considerably modified in England, it received his signature, September 26, 1833, without having been again submitted to the assembly of the states. The death of William IV. in 1837, placed H. under the rule of the next male heir, Ernest August, Duke of Cumberland. One of the first measures of the new king was to abrogate the constitution of 1833, to which he had from the time of its adoption refused to give his assent, and to restore that of 1819.

When the government demanded the oath of allegiance from all persons holding office under the state, seven of the Göttingen professors—viz. Dahlmann, Gervinus, J. Grimm, F. Grimm, Ewald, Albrecht, and W. Weber—refused to take the required oath, in consequence of which all were deprived, without any preliminary investigation, of their chairs, and the three first named banished from the country.

From this period till 1848, when the success of the French revolution compelled the German rulers to adopt a more liberal policy towards their subjects, the king shewed himself resolutely averse to sanction reform. Liberal measures, however, were at length introduced, and the new constitution of 1848 was more liberal than that of 1833. The king, moreover, organised some useful reforms in the internal administration, and effected great improvements in several of the towns.

The chambers of H. shewed great zeal in the reorganisation of Germany, and King Ernest entered into a triple alliance with Prussia and Saxony, to promote the unity of the German nation. Unlike many of his German contemporaries, King Ernest kept the promises which he had made to his people during the revolutionary crisis of 1848—1849; and although the nobility made the most pressing appeals to him for the recovery of their ancient privileges, and the overthrow of the constitution, he refused to withdraw his pledge that the country should be governed in accordance with constitutional principles; and such confidence was placed in his word, that, notwithstanding his avowed opinions, his death, in 1851, was regarded as a serious blow to the cause of reform, for his son and successor, George V., was known to hold very extreme views in regard to the kingly power and the claims of the aristocracy. The early measures of the new king were not calculated to allay the fears entertained of his policy; but the decisive declaration of the assembly of the states that they were desirous of seeing the reforms completed which had been begun by the late king, and their vote of want of confidence in the new cabinet, prevented any marked retrogressive movement on the part of the ministry, and in 1854 H. joined the Zollverein. In 1855, the constitution underwent various modifications in accordance with the demands of the federal diet, by which it was made to approximate more closely to that of 1840. Although the changes were unpopular, they met with no energetic opposition. After the war of 1866, H. became a province of Prussia. See GERMANY in SUPP., Vol. X.

HANOVER, the capital of the former kingdom, and the chief town of the province of Hanover, is an irregularly built town, situated on the banks of the Leine—which is crossed by ten bridges, and is navigable hence to the ocean—about 100 miles south-south-west of Hamburg. It consists of the old town, and the suburbs Glocksee and Linden, and with these inclusive, it had, in 1871, a population of 88,000 The older parts of the city are mean and unattractive, but since 1837, when by the accession of Ernest-Augustus, Duke of Cumberland, to the throne, it became the residence of the sovereign, H. has undergone very extensive alterations and improvements. In the Waterloo Platz, with its column surmounted by a figure of Victory, are the fine new barracks and arsenal. Besides these, the most interesting buildings are the stately town-hall in the market-place, founded in 1439, with an adjacent public library of 40,000 volumes; the royal library, with its 100,000 volumes and 2000 MSS., its incunabula, archives, and valuable state papers; the theatre, one of the largest in Germany; the king's palace; the museum, with good natural-history collections; a gallery of pictures, &c.; and the royal state palace, built on the site of a monastery of Minorites in 1632, which deserves notice for the magnificence of its internal decorations, and for the number and value of the objects of ancient and modern art which it contains; its fine gallery of paintings; its chapel, in which are preserved numerous relics and antiques, many of which were brought from Palestine by Henry the Lion in 1172; and an altar-piece by L. Cranach. Among the charitable institutions of H. are the orphan asylum, school for the blind, infirmaries, hospitals, and poor-houses, the latter of which are principally supported by private subscription. H. is well provided with educational institutions, the most noteworthy of which are the Georgianum, a collegiate school for the sons of noblemen; a lyceum, and a gymnasium. The city has also polytechnic, normal, and medical schools, and 25 free public schools. H. was the first place in Germany that was lighted with gas (in 1826). The discovery of a rich bed of asphalt in the neighbourhood of the town has been the means of giving the streets better side-pavements than most other German towns possess, while the recent improvements that have been effected in the old system of sewers, which dates from the 16th c., render the drainage particularly good. H. has gained pleasant walks and pleasure-grounds by the levelling and planting of the ramparts, while in the immediate vicinity of the town lie the royal palaces of Herrenhausen and Montbrillant, whose beautiful grounds and gardens are freely opened to the public.

The chief manufactures, none of which are very considerable, are gold and silver wares, wax-cloths, bronze and plated goods, starch, liqueurs, &c. The Egestorff ironworks are especially noted for their engines, and the salt-works, owned by the same proprietor in the neighbourhood of the city, are of considerable importance.

See Leutsch, *Ein Blick auf die Geschichte H.* (1827); Kobbe, *Abriss einer Geschichte d. Königreichs H.* (1823); Bülow, *Beiträge zur Gesch. d. braunschw-luneb-landes* (1829); Stieler's *Atlas* (1861); Klöden's *Erdkunde* (1861), &c.

HANSARD, a well-known name in connection with the printing of the British parliamentary records. The first of the family was Luke H., who was born in 1752 at Norwich, and coming to London, worked for some years as compositor in the office of Hughes the printer to the House of Commons; and in 1800 succeeded Hughes as sole proprietor of the business, which is still carried on by his family. Competition and other causes have led to a division of the parliamentary printing, but the Messrs H. still print the bills before parliament, the reports of committees, and some of the accounts.

The name of H. is connected with an important question of parliamentary privilege. The case was briefly as follows: A bookseller named Stockdale brought an action for libel against the Messrs H., the libel consisting of statements in the parliamentary reports which the latter had printed, and Lord Chief-justice Denman decided in favour of Stockdale. The House of Commons complained of a breach of privilege, and another action was raised in the Court of Queen's Bench, but, as before, the plea of *the orders and privileges of the House* was overruled. After a third action had been brought, with a similar result, an act of parliament was passed, directing that any proceedings against persons for publication of papers printed by order of either House of Parliament are to be stayed by the courts of law, upon delivery of a certificate and affidavit that such publication is by order of either House.

The Hansards are, however, most widely known by the reports of the debates in parliament, which are published by them and bear their name. When charges of inconsistency are made in parliament, they are usually verified by a quotation from *Hansard*, the accuracy of which is seldom or never disputed. An opinion, in consequence, widely prevails that the Messrs H. retain a corps of parliamentary short-hand writers in their service, from whose reports the debates printed in their work are prepared. This popular impression is entirely erroneous. The speeches printed in *Hansard* are taken in the gross from the London morning newspapers. They are usually sent to the peers or members by whom they are spoken for revision and correction, and many important alterations, expurgations, and additions are made in the speeches thus revised, when a speaker has been led away by the heat of debate, or has, on the other hand, failed to say all that was in his mind when he rose. The convenience, however, of possessing some record more or less authentic of parliamentary proceedings, has led the executive government to take a certain number of copies of *Hansard* for distribution among the public offices and departments. Many peers and members of parliament, foreign governments, and public libraries, also subscribe to this work, which is issued at a certain fixed price, which the Messrs H. guarantee, at the commencement of each session, shall not be exceeded.

HANSEATIC LEAGUE, THE, or the **HANSA**, was a trade-union established in the 13th c., by certain cities of Northern Germany, for their mutual safety, and for the protection of their trade, which at that period was exposed to the rapacity of rulers, and the lawless attacks of marauders on land, and pirates at sea; yet, notwithstanding obstacles such as these, and the heavy imposts levied on the German traders by their princes, several towns of Northern Germany, as, for instance, Hamburg, Lübeck, and Bremen, had acquired some commercial importance as early as the 11th century. The fame of the rich cargoes that found their way into their factories had given rise to swarms of pirates, who infested the mouths of the Elbe, and the outlets to the Baltic; and the necessity which the neighbouring ports felt of protecting themselves effectually from such troublesome enemies, led, in 1219, to the settlement of a compact between Hamburg, Ditmarsh, and Hadeln, to protect the course of the river and the adjacent sea. This agreement was followed two years later by a treaty of mutual aid and defence between Hamburg and Lübeck, which was joined, in 1247, by the town of Brunswick; and thus was formed the German League, or Hansa, the name of which indicated, in the Plattdeutsch of the traders, a bond or compact for mutual aid. The progress of the League was so rapid, that, before the year 1260, when the first diet met at Lübeck, which was the central point of the whole association, it had its regularly organised government, with a fixed system of finance and administration.

The entire League, which at one period numbered 85 towns, and included every city of importance between Holland and Livonia, was divided into four classes or circles: 1. The Vandal or Wendic cities of the Baltic; 2. The towns of Westphalia, the Rhineland, and the Netherlands; 3. Those of Saxony and Brandenburg; 4. Those of Prussia and Livonia. The capitals of the respective circles were Lübeck, Cologne, Brunswick, and Danzig.

The cities composing the League were represented by deputies at the general diet, which met every three years, generally at Lübeck, which was considered as the capital of the League, to discuss and settle the current business of the League, and held an extraordinary meeting every ten years, to renew the various unions which constituted the great Hansa. The edicts of the diet were communicated to the masters of the great Circles, who remitted them to the several guilds within their respective jurisdictions.

Four large foreign factories were established at London (1250), Bruges (1252), Novogorod (1272), and Bergen (1278); and besides these and the ordinary members, various cities were connected by treaties of limited alliance with the League; as, for instance, Amsterdam, Antwerp, Bordeaux, Barcelona, Cadiz, Dordrecht, Leghorn, Lisbon, Marseille, Messina, Naples, Ostend, Rotterdam, Rouen, Seville, St Malo.

The Hanseatic League was the first systematic trade-union known in the history of European nations, and the high political influence which it rapidly attained, was due to its development of sounder principles of trade than any that had hitherto been put into practice; while in the earlier periods of its existence, it exerted a beneficial action on the advance of civilisation, which can scarcely be overrated. Its professed object was to protect the commerce of its members by land and by sea, to defend and extend its commercial relations with and among foreigners, and as far as possible to exclude all other competitors in trade, and firmly to maintain, and, if possible, extend, all the rights and immunities that had been granted by various rulers to the corporation. For the promotion of these ends, the League kept ships and armed men in its pay, the charge of whose maintenance was defrayed by a regular system of taxation, and by the funds obtained by the money-fines which the diet levied for enfringements of its laws. In its factories, only unmarried clerks and serving-men were employed, and an almost monastic discipline was enforced; but the by-laws of the League prescribed a system of daily sports and light occupations for the recreation of the men, while sensible regulations for their comfort and cleanliness, and for the celebration of festivals at certain fixed times of the year, bear evidence of the sound sense that influenced the mode of government of the Hansa, and which was further shewn by the injunction to the masters of factories to avoid everything that could hurt the prejudices of the foreigners among whom they were placed, and to conform in all things lawful to the habits of the country.

For many years the Hanseatic League was the undisputed mistress of the Baltic and German Ocean. It created new centres of trade and civilisation in numerous parts of Northern Europe, and contributed to the expansion of agriculture and other industrial arts, by opening new channels of communication by means of the canals and roads with which it connected together the members of its association. The greatest powers dreaded its hostility and sought its alliance, and many of the powerful sovereigns of the middle ages were indebted to it for the most substantial benefits.

In England, since the time of King Ethelred, German traders had enjoyed the same privileges as native-born Englishmen. Henry II. took the Cologne merchants, together with the house which they occupied on the Thames, specially under his protection, allowing to them and their successors the privilege of exporting goods free of duty, and selling their Rhenish wines for the same price at which French wines were then sold in London; and in 1261 these privileges were extended by Henry III. to all the Germans in London who had a share in the Hanseatic Factory, or *Aula Teutonicorum*, which was long known to Londoners as the 'Steelyard.' In 1338, the Hansards gained the goodwill of Edward III. by supplying him with the money necessary to redeem the regalia and coronation jewels of his queen, which he had pledged to Cologne money-lenders, and by allowing him to draw upon their houses for large sums with which to defray the cost of his French wars. Their relations to other sovereigns at that period were equally significant of their power, for they defeated Kings Eric and Hakon of Norway, and King Waldemar III. of Denmark, in 1348, deposed Magnus of Sweden, and bestowed his crown upon Duke Albert of Mecklenburg; and in 1428 equipped a fleet of 248 ships, carrying 12,000 soldiers, against Eric of Denmark.

With the fifteenth century, the League reached at once its culminating point and its decline, for in proportion as the seas and roads were better protected by the states to which they belonged, and rulers learned to comprehend the commercial advantages of their dominions, its supremacy declined; while the discovery of America, and of a new sea-route to India, gave an entirely different direction to the trade of Europe. The Hansa had, moreover, arrogated to itself, in the course of time, presumed rights of imposing the greater and lesser ban, and exercising acts of sovereignty and judicial power, which were incompatible with the supremacy of the rulers in whose states they were enforced, and hence the League was necessarily brought into frequent hostile collision with the local authorities. Thus, in accordance with their system of exclusive policy, the Hansards refused to grant to merchants trading in foreign parts the same privileges in the Hanseatic cities which they themselves had enjoyed for centuries in England, Russia, and Scandinavia, and hence arose dissensions, which not unfrequently ended in a fierce maritime warfare. By way of retaliation for the pertinacity with which the League refused to grant to the English the same immunities which had been accorded to traders of other nations, parliament required that Germans should pay the tax on wool and wine, which was exacted from all other foreigners in the English markets; and although the Hansards strongly resisted, they were at length condemned by the courts, in 1469, to pay a fine of £13,500; and they would probably have lost all they possessed in England, if their cause had not been advocated by Edward IV., who had more than once been indebted to them for money and aid, and who in 1474 secured for them, by a clause in the treaty of Utrecht, a restitution of nearly all their former rights in England. In 1598, their obstinate pertinacity in insisting upon the maintenance of their old prerogatives, notwithstanding the altered condition of the times, drew upon them the anger of Queen Elizabeth, who despatched a fleet under Drake and Norris to seize upon the ships of the Hansa, of which 61 were captured, while she banished the Hansards from their factory in London. These measures had the desired effect of compelling the League to receive English traders on equal conditions, and thenceforward the Hansards were permitted to occupy the Steelyard, as in olden times. The Hansa had, however, outlived its date, and at the diet held at Lübeck in 1630, the majority of the cities formally renounced their alliance. Hamburg, Lübeck, Bremen, and, for a short time, Danzig, remained faithful to their ancient compact, and continued to form an association of free republics, that existed unchanged till 1810, when the first three were incorporated by Napoleon in the French empire. These, in 1813, combined with Frankfurt-on-the-Maine to form a union of the 'Free Hanseatic Cities.' At a convention in July 1870, the powers and privileges of the three free towns were re-established and re-organised.—See Sartorius, *Kundliche Gesch. d. Ursprungs d. deutsch. Hansa* (1802); J. M. Lappenberg, *Urkundl. Gesch. d. Hansisch. Stahlhof. z. London* (1851); R. Pauli, *Pictures of Old England* (1861).

HA'NSI, a town of the district of Hissar, in the province of the Punjab, lies 89 miles to the north-west of Delhi, in lat. 29° 6′ N., and long. 76° 3′ E. It is watered by a branch of the Delhi Canal, made in 1356 by Feroz Toghluk, and cleared in 1825 by the British government. This work, besides its domestic and agricultural uses, is available for navigation. The population of the town, according to the latest census (1868) was 13,563.

HANSTEEN, Christoph, a Norwegian astronomer, was born at Christiania, 26th September 1784. At first intended for the legal profession, he subsequently devoted himself entirely to the study of mathematical science. In 1814, he was appointed to the chair of mathematics in the university of Christiania, and there, in 1819, published his celebrated work on Magnetism, which was afterwards translated into German under the title of *Untersuchungen über den Magnetismus der Erde*, and produced a great sensation, especially in England, so much so, that in almost all the voyages of discovery since undertaken, magnetic observations have been made in conformity to his directions. In 1821, he discovered the 'law of magnetic force.' See Magnetism. After having visited London, Paris, Hamburg, Berlin, and different parts of his native country, he resolved to undertake a journey to Siberia, for the purpose of continuing his magnetic observations, which he accomplished from 1828 to 1830, and returned to Europe with a large collection of facts, which were of much service in aiding to dispel the obscurity which enveloped and still partly envelops this subject. On his return to Christiania, he prevailed upon the government to erect an observatory, fitted also for magnetic observations. Besides his chair in the university, he is professor of mathematics in the school of artillery, and since 1837 has superintended the triangulation of Norway. H.'s other works are, *De Mutationibus quas subit Momentum virgæ Magneticæ partim ob Temporis, partim ob Temperaturæ Mutationis* (Christiania, 1842); besides a work on Mechanics, another on Geometry, and several memoirs, of which the greater part are inserted in the *Magazin for Naturvidenskaberne*.

HANUMÂN, or HANÛMÂN (the nominative of the Sanskrit base *Hanumat* or *Hanûmat*, literally meaning, 'having a jaw,' but understood to imply 'having a broken jaw'), is the name of a fabulous monkey, who plays a great rôle in the legendary history of the second or classical period of Hindu mythology. He is represented there as the strenuous friend and ally of Vishnu, when the latter, in his incarnation as Râma, made his expedition to Ceylon, in order to recover his wife Sîtâ, carried off by the giant Râvana. See Vishnu. In the war between Râma and Râvana, Hanumân, on one occasion, is related to have bridged over the ocean between the continent of India and Ceylon with rocks of a prodigious size, which he and his friends threw into the sea; on another, to have set Lankâ on fire by means of igniting his tail, previously dipped into combustible matter; and when, to restore to life his friends slain in battle by the armies of Râvana, he flew to the Himalaya, where he intended to gather the magical herbs required for his purpose, he grew impatient at not finding them quickly, and tore off the whole peak of the mountain, which he then carried to Lankâ, the capital of Ceylon. Such and many other extraordinary feats are related of this 'chieftain of the monkey tribe,' especially in the great poem *Râmâyana*, which is devoted to the history of Vishnu in his descent on earth as Râma, and in many of its chapters dwells with particular predilection on Hanumat the monkey. Of his origin and his first darings, the older version of this epos gives us the following account: His mother was an Apsaras or nymph, *Punjikasthalâ*, who, through some curse, however, was born as the daughter of a monkey, and under the name of *Anjanâ*, became the wife of the monkey *Kesarin*. Possessing the power of assuming whatever shape she pleased, she once transformed herself into a human being, and walked in splendid attire on the top of a mountain. There, *Vâyu*, the god of wind, caught sight of her, and became bewildered with love. The result of his stormy courtship, though purely ideal, as he at least explained it to her, was the child Hanumat. The later version of the *Râmâyana* adds to this story a prefatory incident to justify, as it were, the liberty which the god took with the wife of Kesarin, by making him act under the promise of a Rishi or saint. When a child, Hanumân, while once lying on the lap of his mother, saw the sun rise, and thinking it was a fruit, conceived the desire of taking it. Up he started, therefore, into the air; but Indra, angry at his presumption, hurled him down with his fiery thunderbolt to the top of the mountain, where in his fall he broke his left jaw.

The numerous pictures and sculptures by which this singular Hindu deity is represented, refer to these and similar episodes of his history. He appears either in a fighting posture, armed with disk, sword, or trident, and trampling on some vanquished foe; or he is carrying the rocks with which he bridged over the sea; or he is in the attitude of a worshipper—which means of Vishnu. Frequently his figure is single; sometimes it is connected with that of Garuda, the sacred bird-vehicle of Vishnu;

and it is never missing in those groups which emblematically represent the principal facts of Râma's life. Those not very familiar with the meaning of Hindu idols, will never fail to recognise him by his prodigious tail.

That Hanumân is the type of the monkeys worshipped by a certain class of Hindus, requires no further remark, nor will it be necessary to say that this monkey-worship, to which so early a writer as Megasthenes bears testimony when he speaks of the numerous monkeys coming to the town Latage—probably in the north of India—and being fed there daily, has its origin in the devotion to the memory of Hanumân, that great friend of Vishnu. The foundation of the myth is probably an historical one. There is no reason to doubt tradition when it tells us that a hero—it calls him Râma—carried Brahmanic institutions from the north of India to Ceylon, and we may believe it also when it couples with this event a cause which transformed this expedition into a war between the Brahmanic population of India and that of Ceylon. Nor is it improbable that Râma, on his march to the south, formed alliances, and that his allies, on account of their barbarous condition, were compared by his followers to monkeys. There, however, all that may be real in the myth of Hanumân seems to end, for its other ingredients are either purely legendary, or represent phenomena of a physical kind. When Râma ceased to be the human hero, and became an incarnation of Vishnu, it followed, as a necessary consequence, that the history of all the circumstances connected with this change also became in part imaginary, and in part influenced by the character which belonged to the god. It is the latter influence which is especially perceivable in the origin ascribed to Hanumân. Vishnu is in the Vedas a deity representing attributes of the sun, and the legends of the birth of his ally are such as would originate in phenomena connected with sunrise. To this the names ascribed to his mother seem to point; for the Apsarasas 'were originally personifications of the vapours which are attracted by the sun, and form into mists or clouds' (see Goldstücker's Sanscrit Dictionary under the word 'Apsaras'); and *Anjanâ*, among other meanings, signifies night.

HA'PSBURG, or HABSBURG, HOUSE OF, of which the imperial family of Austria are the representatives, derived its name from the castle of Habsburg, or Habichtsburg (Hawk's Castle), on the right bank of the Aar, in the Swiss canton of Aargau. The castle was built in the 11th c. by Werner, Bishop of Strasburg, grandson of Gunthrun the Rich, Count of Alsace and Breisgau, who, according to the Austrian chroniclers, was descended from Ethico I., Duke of Alemannia and Alsace in the 7th century. Werner delivered the castle to his brother Kanzeline, whose nephew, Werner II., was the first who assumed the title of Count of Hapsburg. Albrecht or Albert III., the great-grandson of Werner II., assumed the title of Landgraf of Upper Alsace, or Sundgau. This prince possessed a great part of Swabia, Alsace, and the Aargau, to which his son, Rudolf I., added Lauffenburg. On his death in 1232, his sons, Albert IV. and Rudolf II., divided their father's possessions—Rudolf becoming the founder of the Hapsburg-Lauffenburg line. This branch became extinct in 1408 in Germany, but is still represented in England by the Fielding family. The whole possessions of Rudolf's lineage reverted to the Austrian line in 1415. Albert IV. laid the foundation of the future greatness of the House of Hapsburg. He left three sons, the eldest of whom, Rudolf III. (Rudolf I. of Austria), succeeded him, and by appropriating the provinces which, as emperor, he had wrested from Ottocar of Bohemia—viz., Upper and Lower Austria, Styria, Carinthia, and Carniola—greatly increased the power of his family. His son, Albrecht or Albert I. (q. v.), succeeded in 1291 to the family possessions. The further history of the House of H. may be traced in that of Austria (q. v.). It may be noted here that Ernest, surnamed the Iron, one of the sons of Leopold II., and founder of the Styrian line, married Cymburga, daughter of Ziemovitz, Duke of Masovia (now province of Warsaw), and niece of Uladislas Jagellon, king of Poland, celebrated in Austrian history not only for her beauty and accomplishments, but also for her great strength of body, of which latter quality some historians give remarkable instances. From her are said to be derived the thick lips which are a characteristic feature of the Austrian family.

Compare Prince Lieknowski, *Geschichte des Hauses Habsburg* (2 vols. Wien, 1836—1837), also Coxe's *House of Austria*.

HARALD I. (surnamed HAARFAGER, or beautiful-haired), king of Norway (863—930), was a descendant of the ancient race of the Ynglings in Sweden, and the son of Halfdan Svarte, a powerful jarl in Norway, who is noted as the earliest lawgiver of his country. According to the popular saga, H. was induced to attempt the subjugation of the whole of Norway, through his love to a high-born maiden, named Gyda, who declared that she would not be his wife until he was sole king of Norway; and he swore that he would neither cut nor comb his hair till he had subdued all the land to his sway—an oath which he kept. After many years' contest with his brother jarls, he finally reduced the whole of the country from Finmarken to the Naze of Norway; and after defeating the last general confederacy of the independent Norwegian chieftains in a naval battle at Hafursfjord, the present Stavengerfjord, he remained sole ruler of the land (872). Previously to his reign, Norway, like the other Scandinavian countries, had been divided into numerous independent districts or tribes, governed by their several kings. H., however, replaced all these rulers by jarls of his own, under whom were placed Herser or bailiffs, to whom was committed the charge of seeing that the tax which was imposed over all the land was faithfully paid. H.'s severity compelled the deposed rulers to seek other homes; and his reign is memorable for the many new settlements which were made by these exiles. Thus, the Orkneys were settled by the fugitive Ejnar, the son of the king's friend, Rognvald, Jarl of More; while another son, Ganger Rolf, who had incurred H.'s anger by repeated acts of piracy, sailed with his followers in 876 to France, where he founded the Norman power. Other exiled Norwegian jarls or kings colonised the Hebrides, Shetland and Farõe Islands, and Iceland, whence they continued their customary sea-roving and plunders until these islands, with the exception of Iceland, were subdued by Harald. Although a barbarian, he ruled with a sound policy in advance of his age, and by his firmness succeeded in suppressing for the time the private warfare and sea-piracy which had prevailed in Norway before his reign; but the dissensions of his numerous sons checked all the good that might have resulted from his measures. To restore concord in his family, he divided his dominions among his children, reserving only the supreme power to himself. He died in 933 at Trondhiem, which he had made his capital, and was succeeded by his son, Eric Blodoxa, or the Bloodaxe, to whom he had three years before resigned the government.

HARALD III. (surnamed HAARDRAADE, or

Double Beard), king of Norway (1047—1067), was the son of Sigurd, chief of Stingarige, and a descendant of Harald I. In his boyhood, he was present at the battle of Stiklestad, in which his brother Olaf, surnamed the Saint, king of Norway, was slain; and he afterwards sought an asylum at the court of his relative, Jaroslav, Duke of Russia, whose daughter he sought in marriage. The rejection of his suit, however, again drove him forth, and he entered upon romantic adventures; and having gone to Constantinople, and become captain of the Vaeringjar, or Scandinavian body-guard of the Greek emperors, he experienced many marvellous adventures, which have supplied abundant materials for the narratives of the older sagas and modern romances of the north. H. took part in the expedition against the pirates of the Mediterranean; visited Jerusalem, where he fought successfully against the Saracens, whom he also defeated in Sicily and Africa in eighteen pitched battles. On his return to Constantinople, he drew upon himself the vengeance of the Empress Zoe, whose proffered love he had rejected, and with difficulty escaped from the prison into which he had been thrown, on pretence of treason. Having made good his escape, he returned to Russia, married the daughter of Duke Jaroslav, and took her with him to Norway, where his nephew, Magnus (the son of St Olaf), agreed to divide the supreme power with him, in return for a share of his treasures. The death of Magnus in 1047 left him sole king of Norway. His unruly spirit would not, however, suffer him to rest; and in opposition to the pledge he had given his dying nephew, he entered into a war to dethrone the king of Denmark, on whose crown he had no just claim. Although he was successful in battle against the Danes, he gained no real advantages by the contest; and in 1064 he recognised the right of Svend, the nephew of Canute, to the throne of Denmark, and having concluded a peace, occupied himself for a time with the internal affairs of Norway. In 1066 he landed in England, to aid Tostig against his brother Harold, king of England, but was slain in battle; his followers, after having fought with desperation, were obliged to retreat to their ships, in which they sailed for Norway, under the command of Olaf, the son of the slain monarch (25th September 1066).

HARBOUR, an inlet of the sea, so protected from the winds and waves, whether by natural conformation of the land, or by artificial means, as to form a secure roadstead for ships. It is with those harbours wholly or in part artificial that this article will deal.

Harbours may be divided into harbours of refuge, and those for commercial purposes. The latter are mostly tidal—i. e., capable of being entered by vessels only at certain states of the tide. The former are roadsteads of good depth, protected by breakwaters, and accessible at all tides, where ships may take refuge during storms. The two kinds are sometimes combined, there being the harbour proper, and a capacious protected roadstead outside of it, as at Cherbourg and elsewhere. See BREAKWATER, CHERBOURG, DOVER, PLYMOUTH, PORTLAND, HOLYHEAD.

With the birth of commerce and naval warfare, in the earliest ages of civilisation, arose the necessity for artificial harbours. The Phœnicians, the fathers of navigation, soon set to work to protect their scanty strip of Levantine coast. At Tyre, two harbours were formed, to the north and to the south of the peninsula on which the city was placed. At Sidon, similar but less extensive works long testified to the wealth and engineering genius of the Phœnicians. The breakwaters were principally constructed of loose rubble.

Carthage, in another part of the Mediterranean, also possessed a harbour, though its site is not very satisfactorily determined. It was in two divisions, formed by moles; time, however, has dealt so hardly with it, that few traces remain. Still keeping to the great inland sea, we come to Greece; but here nature had provided so many navigable inlets, that little remained to be done by man. Nevertheless, some minor works were executed at the Piræus and elsewhere, chiefly, of course, for warlike purposes. The Romans, finding ships necessary to the dominion of the world, set about constructing harbours for them, in their usual solid and workmanlike manner. The coasts of Italy still shew how well they understood both the principles and the practice of this branch of marine engineering. Below is given a plan of the ancient port of Ostia (now two or three miles inland), one of their finest and most complete undertakings of this nature. A distinguishing feature of their harbour-making is the open or arched mole. Built with open arches, resting upon stone piers, it gives full play to the tidal and littoral currents, thus preventing the deposit of sand or mud; but in proportion as this advantage is increased (by increasing the span of the arches), so also is the agitation, and consequent insecurity of the water within.

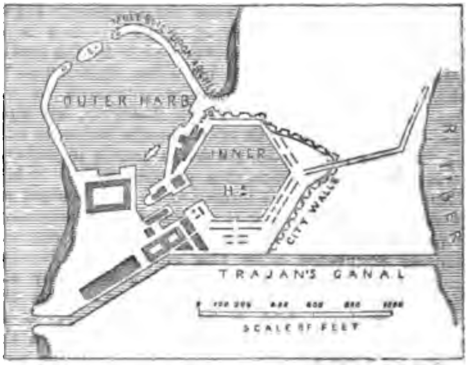


Fig. 1.
Ancient harbour of Ostia, at the mouth of the Tiber.

The decay of commerce and civilisation, consequent upon the fall of the Roman empire, put a stop to harbour-making; nor could any want of the art be felt, until the revival of commerce by the Italian republics of the middle ages. But the rich traffic of Venice and Genoa soon led to the construction of suitable ports at those places; and the moles of the latter city, and the works in the lagunes of Venice, remain to this day. France was next in the field, embanking, protecting, and deepening the mouths of the rivers along her north-western shores, as at Havre, Dieppe, Dunkirk, &c. In 1627, during the siege of Rochelle, Metezeau constructed jetties of loose rubble-stone, to prevent access to the city.

Meanwhile, England, whose ocean-commerce is of comparatively recent date, and whose fisheries even scarcely employed a vessel three hundred years ago, lagged far behind her continental rivals. With few exceptions, her ports were absolutely unprotected, or rather uncreated; and this state of things continued until late in the last century. One of the few exceptions was Hartlepool, where a harbour was formed about 1250; and Arbroath, in 1394. In the 17th c., at Whitby and Scarborough, also in Yorkshire, rough piers were thrown out, protecting the mouth of the port; while at Yarmouth, in

Elizabeth's reign, a north jetty, and subsequently a south one, were formed. An ancient mole existed at Lyme Regis, a section of which, from Mr Smiles's *Lives of the Engineers*, is given below (see fig. 3). But the chief efforts of the early English engineers were directed against the shoals and waves of Dover. When, however, Smeaton rose to vindicate the engineering talent of England, things took a different turn; and now few countries surpass Great Britain in the number of artificially improved commercial harbours, or in the just appreciation of their importance.

Fig. 2.
Dover harbour; temp. Henry VIII. Cott. Aug. II. 22 and 23.

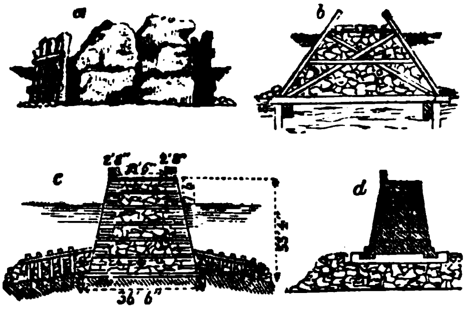


Fig. 3.
a, ancient pier at Lyme Regis; *b*, wooden-framed pier, filled with rubble; *c*, pier at Havre, with *apron*; *d*, masonry pier, on rubble foundation.

In the construction of harbours, the great desiderata are sufficient depth of water and perfect security for the vessels likely to frequent them, together with the greatest possible facilities for ingress during any weather; while the chief obstacles to be surmounted are the action of the waves upon the protecting piers and breakwaters, and the formation of sand-banks and bars.

The design of harbours may be classified under the following heads: 1. Harbours of refuge and anchorage breakwaters; 2. Deep water and tidal harbours for commercial purposes; 3. Kanted or curved piers; 4. Straight piers; 5. Quays or wharfs.

These different works are obviously suited for different localities, and for contending with different exposures. The last-mentioned is clearly suited for the most sheltered situations only, and the engineer must consider, when designing a harbour, which of all those will be most economical and effective. In judging of this, the geological features of the coast must be carefully considered. A good chart furnishes valuable evidence as to the forces to which harbour-works will be exposed. Among those may be noted the *line of maximum exposure*, or the greatest fetch or reach of open sea in front of the harbour. Mr Thomas Stevenson, civil engineer, has proved by observations that *the waves increase in the ratio of the square root of their distances from the windward shore* as measured along the line of exposure, and he gives the following simple formula: Where h = height of wave in feet during a strong gale, and d = length of exposure in miles for distances of say 10 miles and upwards:

$$h = 1{\cdot}5\sqrt{d}.$$

The heights so obtained will be increased when they pass into confined channels, and decreased when they pass into expanding channels. The greatest measured height of the waves was by Scoresby in the Atlantic Ocean, where he found billows of 43 feet in height from hollow to crest, and 36 feet was not an uncommon height. At Wick, Caithness-shire, waves of about 40 feet strike the breakwater.

The greatest recorded forces exerted by the waves are the following: A mass of 13 tons was broken or quarried out of its position *in situ* on the Skerries of Whalsey, in Zetland, at a level of 74 feet above the sea; but the most astonishing feat of which we have any knowledge was at Wick breakwater, where, in the winter of 1872, a mass of masonry, concreted together as a monolith, and bound with iron bars 4½ inches in diameter, and weighing no less than 1350 tons, was torn from its seat in the work, and thrown to leeward, where it still lies in an unbroken state.

Mr Thomas Stevenson, by means of an instrument called the Marine Dynamometer, has ascertained *numerically* the force which is exerted by the waves in the Atlantic and German Oceans, and has found that the mean of observations during winter was more than three times that exerted during summer, the maximum force recorded being 3½ *tons per square foot*.

Various local causes materially affect the height, and therefore the force of the waves. In some cases, where a strong current sets off the coast, as at Sumburgh Head roost, in Zetland, it causes a dangerous breaking sea, and while this roost or race continues to rage, the coast under lee is comparatively sheltered; but when the force of the tide is exhausted, and the roost disappears, a heavy sea rolls in upon the shore.

It is this encounter between the ground-swell of the ocean and the current of tide or land water, which causes miniature races at the mouths of rivers. Another most material element in the question of exposure is the depth of water in front of the harbour; for if that depth be insufficient to admit of the propagation of the waves, they break or spend themselves before they reach the piers. Thus, Mr Leslie found at Arbroath harbour that the works were not so severely tried by the heaviest waves as by others of lesser size which were not tripped up and broken by the outlying rocks. In the same way at the river Alne, the harbour within the bar is more disturbed by ordinary waves than during great storms. It thus appears that the largest waves are not always so destructive as smaller ones. Mr Scott Russell has stated the law, that waves break whenever they come to water as deep as their own height; so that 10 feet waves should break in 10 feet water, and 20 feet waves in 20 feet water. There seem, however, to be some waves which break on reaching water whose depth is equal to twice their own height. Proofs of the depth to which the surface undulations extend have been given by Sir George Airy, Sir John Coode, Captain Calver, and Mr John Murray, C.E. The late Dr Rankine has shewn that the crest and trough of the sea are not, as was generally believed, equidistant from the level of stagnant water. When *l* is the length of the wave, H its height from trough to crest,

$$\text{Crest above still water} = \frac{H}{2} + \cdot 7854\frac{H^2}{l}.$$

$$\text{Trough below still water} = \frac{H}{2} - \cdot 7854\frac{H^2}{l}.$$

There is much difference of opinion among engineers as to the best profile or cross-section of breakwaters for deep-water harbours. It is asserted by Colonel Jones and others, that in deep water the waves are purely oscillatory, having no power of translation, and therefore incapable of exerting any force against the masonry. This, however, is incorrect, and calculated to lead to dangerous consequences. Were there no wind propelling the waves, and no current to interfere with their character, such a result might be true. This, however, is not the case, and all sea-works, in whatever depth of water they may be placed, will assuredly have to withstand impulsive action. Besides, it must be kept in view, that in order to reduce the expense of construction, it is essential, where the bottom is soft, to make the foundation a pile of loose rubble, or concrete blocks. It follows, from what has already been said, that the rubble, by shoaling the water in front of the work, will cause the waves to become waves of translation before they reach the vertical superstructure, which, assuming the waves to have been simply oscillatory, would have reflected them without breaking, and therefore without their having exerted an impulsive force upon the masonry.

There is, however, no fixed rule as to the profile of any sea-work, which must necessarily depend upon a variety of local peculiarities, such as the nature of the bottom, and the size and quality of the materials. While a long, sloping breakwater does not offer the same amount of resistance to the waves, neither is it in itself so strong, for the weight resting on the face-stones is decreased in proportion to the sine of the angle of the slope. On the other hand, the tendency of the waves to produce horizontal displacement, supposing the direction of the impinging particles to be horizontal, is proportional *to the cube of the sine of the angle of elevation of the wall.*

In tidal harbours, or those in shoal-water, it is admitted by all that the waves break, and therefore exert an impulsive force. Such works have to withstand (1.) The direct horizontal force which tends to remove the masonry; (2.) The vertical force acting upwards on projecting stones or protuberances, and against the lying beds of the stones; (3.) The vertical force acting downwards upon the talus wall, or passing over the parapet, and falling upon the roadway; and (4.) The back-draught, which is apt to remove the soft bottom in front of the work.

In designing the ground-plan of harbours, some rules should be kept in view: (1.) The entrance should be always kept seawards of the works of masonry; (2.) Long straight piers are not so safe as those of horizontal curvature; (3.) There should be a good 'loose,' or point of departure free of rocks or a lee shore; (4.) The relation of the width of entrance to the area of a harbour should be a matter of careful study, as upon this depends the tranquillity of the interior, or what has been called the reductive power of the harbour. Mr Stevenson's formula for the reductive power is as under: H = height of wave at entrance; b = breadth of entrance; B = breadth of harbour at place of observation; D = distance from mouth of harbour to place of observation; x = reduced height of wave at place of observation.

$$x = \frac{H\sqrt{b}}{\sqrt{B}} - \frac{(H + H\frac{\sqrt{b}}{\sqrt{B}}\sqrt[4]{D}}{50}.$$

The late Mr J. M. Rendel's plan of depositing rubble from open stages of pile-work is now universally used in the construction of deep-water piers. Sir J. Hawkshaw's method, adopted at Holyhead, consists of huge, irregular, undressed masses, set in hydraulic mortar, and resting upon *pierres perdues.*

The commercial value of a harbour increases, according to Mr Stevenson, not simply as the depth of the water is increased, but as *the cube of the depth.* Hence the great expense which is willingly incurred for securing even a foot or two of additional depth. The greatest feat in deepening is at the Tyne, where Mr Ure, C.E., dredged out the channel to 20 feet at low-water all the way up to Newcastle. Scouring is also employed for increasing the depth, as by Sir. W. Cubitt at Cardiff, where 2500 tons of water a minute are let off. The late Mr Rendel's scheme for Birkenhead was based simply on the quantity liberated and the sectional area of the channel, and was therefore operative for any distance, and did not depend on the propelling head, or on the direction in which the water left the sluices, which conditions regulate ordinary scouring on the small scale, and which is efficacious for only short distances from the outlet.—Docks (q. v.) of various kinds are connected with harbours.

Pine timber is admirably adapted for soft soils, when the exposure is not great, but owing to the ravages of the *Teredo navalis* and *Limnoria terebrans* in localities where there is no admixture of fresh water, it is soon destroyed. Greenheart, African oak, and bullet-tree are little affected by the worm, as shewn by experiments made in 1814 at the Bell Rock by Mr Robert Stevenson. Even limestone and sandstone are perforated by the Pholades and Saxicavæ. Metals also suffer from chemical action when immersed in salt-water. Mr George Rennie's experiments shewed that wrought-iron resists this action better than cast in the ratio of 8 to 1; while Mr Mallet's experiments shew that from $\frac{1}{10}$ to $\frac{4}{10}$ of an inch in depth of castings 1 inch thick, and about $\frac{6}{10}$ of wrought-iron, will be destroyed in a century in

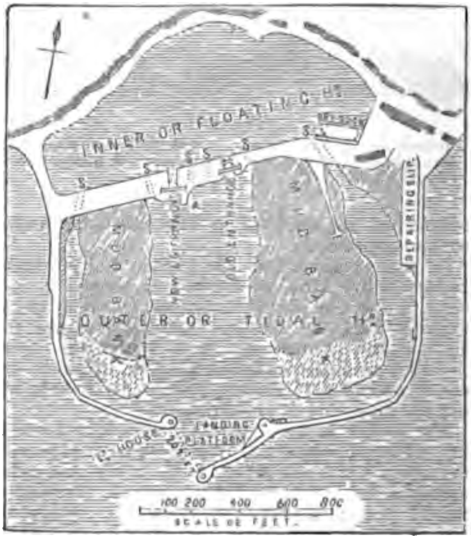


Fig. 4.—Ramsgate Harbour:
S, sluices; A, jetty, with openings for passage of currents.

clean salt-water. A cannon-ball 4½ inches in diameter became oxidised to the extent of ¾ of an inch in the century. The use of Portland cement may be regarded as the most important of recent improvements in harbour construction. Blocks of any size can be formed of sand, gravel, or stones, mixed with cement in the proportion of 1 of cement to 9 of the other materials. This will set readily in still water, and in a week will be nearly as hard as any ordinary sandstone. Sea walls of cement work can also be built continuously, so as to constitute a single monolithic mass.

Reference may be made to Sir J. Rennie's book on *Harbours*, to that of Mr Thomas Stevenson on the same subject, and to the Minutes of Institution of Civil Engineers, *passim*.

HARBOURS, or PORTS, in Law. In England, as well as Scotland, the right to erect and hold ports and havens is vested in the crown. Nevertheless, this right may legally exist in the subject, provided the latter can prove that he has a charter or grant from the crown, or has exercised the right from time immemorial, which presumes a charter or grant. But even though an individual has a right to a particular port or harbour, he holds it charged with or subject to the right of the public to make use of it. The crown has also the superintending power of opening and shutting ports for the purpose of prohibiting the importation or exportation of goods. It is also a settled maxim that the duties or tolls exacted should be reasonable and moderate. In England, the grantee of a port is presumed to be bound to repair it; but in Scotland, this obligation only extends to compel the owner to apply the dues towards repairs so far as they will go.

In most cases, the powers of the common law have been insufficient to regulate the progressive wants of the public as regards harbour accommodation; and various acts of parliament have been passed for the purpose of authorising harbours to be constructed, or extended and improved, and for exacting dues or tolls for the purpose of repaying the expenses. In 1847, a general Consolidation Act (10 Vict. c. 27) was passed for the United Kingdom, providing a code for the regulation of the procedure and conduct of all bodies, commissioners, &c., charged with making and improving harbours, docks, and piers. The duties of such bodies are there defined in all their details, as well as the mode of levying and collecting the tolls which they are empowered to levy. Various local acts are also from time to time passed to meet the peculiar wants of localities. The principle of all these acts is, that the commissioners are empowered to make the works, and, by way of paying for the expense, to levy a small toll on those who use the harbour.

HA'RBURG, an old town and rising seaport of Hanover, in the province of Lüneburg, is situated four and a half miles south of Hamburg, on the southmost branch of the Elbe, in a marshy district at the foot of a wooded chain of hills. It is surrounded with walls, and has a fortified castle. Sugar-refining and tanning are extensively carried on, as well as manufactures of woollens, linens, and hosiery. Its transit-trade with Hamburg and the countries south of the Elbe, which has long been considerable, has recently received a favourable impetus by the construction of the Hanover and Harburg Railway, and by the deepening and enlarging of its harbour, which can now accommodate 500 vessels, and admits of landing cargoes at the wharfs. The passenger-traffic between H. and Hamburg is carried on by steamers, of which from four to six arrive and depart daily. H. is a place of holiday resort for the Hamburgers. Pop. (1871) 16,506.

HARD LABOUR, an addition often made to the punishment of offences besides mere imprisonment. This practice is said to have been introduced by the statute of 5 Anne, c. 6. It is now firmly established in the United Kingdom; and by express statute, the power of adding hard labour to the punishment of imprisonment, has been given in most cases, both as to indictable offences and the more disgraceful offences which are punishable summarily. The kind of labour is prescribed by the rules of the jail or prison, where provision must be made of the proper materials for the purpose. Picking oakum, working the tread-mill, &c., form part of this labour; and in general, the number of hours for such labour, unless in case of sickness, is ten hours daily.

HARDENBERG, Friedrich von, better known by his literary pseudonym of Novalis, was the son of Baron von Hardenberg, and was born at the family residence in Prussian Saxony in 1772. His father, then director of the Saxon salt-works, was a man of a religious disposition, and a member of the Herrnhut communion, while his mother is described as 'a pattern of noble piety and Christian mildness.' Young H. inherited the serious and reverential nature of his parents. He studied at Leipsic and Wittenberg. After a brief life, made beautiful by love, friendship, study, and literary activity, he died of consumption, 19th March 1801, in the arms of his friend, Friedrich Schlegel. His chief works are *Lehrlinge zu Sais* (Disciples at Sais); a Physical Romance, 'containing,' says Carlyle, 'no story or indication of a story, but only poetised philosophical speeches, and the strangest shadowy allegorical allusions;' *Heinrich von Ofterdingen*, intended, as he himself informs us, to be an 'apotheosis of poetry,' but which he was not spared to finish; and *Hymnen an die Nacht* (Hymns to the Night). 'H.,' says Carlyle, 'is the most ideal of idealists.' A profound, beautiful, but indefinite aspiration breathes through all the fragments he has left us. What he lacks is force, activity, and common-sense vigour of understanding. H. belonged to the romantic school of German literature, but he took no part in the controversies of his friends. His *Sämmtliche Schriften* were published in 1802 (5th ed. 1837) by Tieck and F. Schlegel, the former of whom prefixed a biography. See Carlyle's *Miscellaneous Essays*.

HARDENBERG, Karl August, Prince von, a Prussian statesman, was born at Essenroda, in Hanover, May 31, 1750. He was educated at Leipsic, Göttingen, and Metzlau, and during 1776—1778, travelled in Germany, France, Holland, and England. On his return to Hanover, he became privy-councillor of the exchequer, and was raised to the rank of count; but a quarrel with the Prince of Wales, originating in a matter deeply affecting his honour, induced him, in 1782, to quit the service of the Hanoverian government. He now repaired to the court of Brunswick, where the duke appointed him, in 1787, president of the council of state. He was also commissioned by his master to convey the will of Frederick the Great, which had been deposited in the duke's hands, to the new king, Frederick-William, who received him with marked distinction. In 1790, the markgraf of Anspach and Baireuth having requested the Prussian monarch to furnish him with a person competent to administer the affairs of his dominions, Frederick-William recommended Hardenberg. After Anspach and Baireuth were united with Prussia in 1791, H. was appointed a Prussian minister of state, and a member of the cabinet ministry. At the commencement of the war with France, the king summoned him to his head-quarters at Frankfort-on-the-Maine as administrator of the army. Early in 1795, he was sent to Basel, where, on the 5th April, he concluded a peace between Prussia and the French republic. On the accession of Frederick-William III. in 1797, H. was recalled to Berlin, and was intrusted with the management of all foreign affairs. In 1804, he became first Prussian minister on the resignation of Haugwitz, and in this capacity endeavoured to preserve neutrality between France and England. But when the French troops attacked Anspach, he changed his policy, and addressed a strong remonstrance to Marshal Duroc. After the victory of Napoleon at Austerlitz, Prussia was compelled to enter into arrangements with Napoleon, H. was deprived of his office, and Haugwitz, who was friendly to the French, returned to power. In 1806, Prussia was again led to declare war, and after the fatal battle of Jena, H. accepted for some time the portfolio of foreign affairs at the desire of the Emperor Alexander. In 1810, he was appointed chancellor of state. Prussia was at this period in a deplorable condition, humbled in the very dust before France; nevertheless, H. was sagacious enough to perceive that the power of Napoleon was on the wane. He laboured ardently to create a national feeling—a patriotic thirst for revenge. The victories of the British troops in the Spanish peninsula, and the disasters that overwhelmed in ruin Napoleon's vast army in Russia, greatly assisted him in his efforts, and he had the satisfaction of beholding them crowned with success. His exertions were unwearied; he subscribed to the Peace of Paris, June 1814; and was soon after raised to the rank of prince by his sovereign. He accompanied the allied sovereigns to London, took part in the proceedings of the congress at Vienna, and in the treaties of Paris (1815). In 1817, he reorganised the council of state, of which he was appointed president. He was also present at the congresses of Aix-la-Chapelle, Carlsbad, and Vienna, and drew up the new Prussian system of imposts. During a tour through the north of Italy, he was taken ill at Pavia, and died at Genoa, 26th November 1822. The services rendered by H. to his country were undoubtedly great; to him Prussia is mainly indebted for the improvements in her army system, the abolition of serfdom, of the privileges of the nobles, and of a multitude of trade corporations, besides the complete reform of her educational system. The MSS. of his memoirs of the period from 1801 to the peace of Tilsit, were sealed up by Frederick-William III., who deposited them in the archives of the state, and forbade them to be opened before the year 1850. They have not yet been published.

HA'RDERWIJK, a seaport and fishing-town of the Netherlands, in the province of Guelderland, is situated on the eastern shore of the Zuider Zee, 31 miles east of Amsterdam. It was at one time a Hanse town, is fortified after an ancient fashion, and has a spacious harbour, in which vessels engaged in the East India trade are fitted out. Pop. 5700.

HARDICANUTE, king of England, son of Canute the Great by Emma of Normandy, the widow of Ethelred II. At the time of his father's death H. was in Denmark, and the throne of England was usurped by Harold his younger brother, Emma, however, preserving her son's authority over Wessex. In this state matters remained for some time, till Alfred, Emma's younger son by Ethelred, invaded the kingdom; but the invaders being annihilated by Earl Godwin, Harold's general, Emma was obliged to seek refuge at Bruges, whence she sent to H. to acquaint him with the state of affairs in England. H. being of an easy and self-indulgent disposition, allowed two years to pass before taking any steps to assert his rights. Roused at last by his mother's remonstrances, he, in 1039, equipped a fleet and army, and was about to sail for England to dispossess the usurper, when he was met by a deputation of English nobles, who informed him of the death of Harold, and offered him the crown. H. reigned in England till 1042, when, after a quiet reign, he died of apoplexy, induced by his gluttonous habits. With H. ended the Danish line in England.

HARDING, STEPHEN, the third abbot of the celebrated monastery of Citeaux, and one of the most remarkable religious reformers of the 12th century. Of his parentage and youthful history, little is known beyond the fact that he was of a noble English family, and in early life a soldier. Under one of those religious impulses which so frequently occurred in the middle ages, he undertook a pilgrimage to Rome. He subsequently entered the French monastery of St Claude de Joux, where he was so distinguished by his strict and exemplary life, that he was chosen abbot of the monastery of Bèze, with a view to the reformation of its discipline, which had become much relaxed. From this monastery he was transferred to that of Citeaux, where, on the death of Alberic in 1109, he was elected abbot. The rigour of observance which he here enforced had such an effect in deterring novices from entering the new order, that at first grave fears were entertained for its stability; but Stephen, placing his trust in the good cause which he had undertaken, persevered in the cause of reform; and he was rewarded, in 1113, by the accession of St Bernard and thirty other youths, whose eminent virtue gave such an impulse to the institute, that in a short time the number of claimants for admission compelled him to found several new convents, and especially that of Clairvaux, which, under the rule of St Bernard, attained to the very highest distinction in that age. Abbot Stephen continued, till his death in 1134, to direct the fortunes of the Cistercian order; and in 1119, he drew up, in conjunction with St Bernard and other members of the brotherhood, the well-known constitutions of the order, entitled *Carta Caritatis*, which were approved by Pope Calixtus II. and Eugenius III., and, with some modifications, have continued down to modern times, as the rule of the Cistercian institute. See *Mabillon Annal. Benedictin.* t. V. p. 205.

HARDINGE, VISCOUNT (HENRY HARDINGE), field-marshal and commander-in-chief of the British army, the third son of the Rev. H. Hardinge, rector of Stanhope, in the county of Durham, was born March 30, 1785, and was gazetted as ensign before he had attained his 15th year. He obtained a brigade command before his 25th year, and his foreign grade was commuted, shortly afterwards, for British rank, after which he was attached to the Portuguese army from 1809 to 1813, in the capacity of deputy quarter-master-general. When Napoleon effected his memorable return from Elba, H. joined the allied armies in Belgium, and was appointed by the Duke of Wellington commissioner at the Prussian head-quarters. He lost his hand at Ligny, and was thus unable to participate in the crowning victory of Waterloo. In 1826, he entered parliament; and in 1828 succeeded Lord Palmerston in the government of the Duke of Wellington, as secretary at war. He next filled the office of secretary of Ireland. In 1844, he accepted the high post of governor-general of India, which he filled until 1847. When the great Sikh war broke out, he hurried to the north-western frontier of India, and served as second in command under Lord Gough during the sanguinary and hard-fought battles of Moodkee, Ferozeshah, and Sobraon. After the pacification of Lahore, his services were rewarded by a viscounty, the East Indian Company granting him a pension of £5000, and parliament voting him an annuity of £3000, for himself and his next two successors. On the death of the Duke of Wellington in 1852, H. was appointed commander-in-chief of the British army, a distinguished post which he filled during the eventful epoch of the Russian war, and which he only resigned a few months before his death. In October 1855, he was advanced to the rank of field-marshal. He died September 24, 1856, at his seat, South Park, near Tunbridge, Kent.

HARDNESS, Scale of. The hardness of a body is measured by its power of scratching other substances. Variations in the degree of hardness presented by different crystallised bodies often furnish a valuable physical sign by which one mineral may be readily distinguished from others closely resembling it. Mohs selected ten well-known minerals, each succeeding one being harder than the preceding one, and thus formed the *Scale of Hardness*, which has been generally adopted by subsequent mineralogists. Each mineral in the following table is scratched by the one that follows it, and consequently by all the subsequent ones, and the hardness of any mineral may be determined by reference to the types just selected. Thus, if a body neither scratches nor is scratched by felspar, its hardness is said to be 6; if it should scratch felspar but not quartz, its hardness is between 6 and 7—the degrees of hardness being numbered from 1 to 10. The figures on the right indicate the number of known minerals of the same or nearly the same degree of hardness as the substance opposite to which they stand:

SCALE OF HARDNESS OF MINERALS.

1. Talc,	23		6. Felspar (any cleavable variety),	26
2. Compact gypsum, or rock-salt,	90		7. Limpid quartz,	26
3. Calcspar (any cleavable variety),	71		8. Topaz,	5
4. Fluor-spar,	53		9. Sapphire, or Corundum,	1
5. Apatite,	43		10. Diamond,	1

The cause of the varieties of hardness observed in different bodies is not known. The same substance —as, for example, a piece of steel—may, under the influence of different circumstances, be so soft as to take impressions from a die, or may be nearly as hard as a diamond.

HARDOUIN, Jean, was born in 1645 at Quimper, in Brittany, where his father followed the trade of a bookseller. H. received his first education in the schools of the Jesuits, and being received into that order at the age of 20, completed his studies in Paris. On the death of Père Garnier in 1683, H. was appointed librarian of the college of Louis le Grand, in which office he enjoyed full leisure for the literary pursuits in which he delighted, and in which his extravagances have acquired for him a notoriety almost without any parallel in the annals of literary eccentricity. Dupin places him among the very first scholars of his learned brotherhood. In a spirit of literary scepticism which it is difficult to look upon as serious, he maintained, not only that the entire body of classical literature, with the exception of in Latin, Pliny's *Natural History*, Virgil's *Georgics*, the comedies of Plautus, and Horace's *Satires*, and in Greek, Homer's *Iliad*, and Herodotus's *History*, was falsely ascribed to the authors whose various names it bears, but that it was all the production of the monks of the 13th century! In the same sceptical spirit, he rejected as spurious all the reputed remains of ancient art, together with the inscriptions and coins which are attributed to classical times; nay, he extended the same scepticism to the Septuagint version of the Old Testament, and even to the Greek text of the New, the original language of which he held to have been Latin! Opinions so extravagant naturally called forth the reprobation of the authorities of his order. He was required to retract them; and there is some reason to believe, that they were put forward by him rather from a love of paradox and a morbid desire of notoriety, than from any serious conviction of their probability. Nevertheless, with all this extravagance, the erudition of Père H. was beyond dispute, and most of his works are of great historical and critical value. His edition of Pliny (5 vols. 4to, Paris, 1689) is a prodigy of learning and industry. Of his remaining works, the most valuable is his great *Collectio Conciliorum* (12 vols. folio), a work of great learning and utility, which has the rare advantage of possessing one of the best indexes extant; a commentary on the New Testament in folio; several volumes on the study of numismatics and chronology; and a vast number of dissertations and essays in the *Mémoires de Trevoux*. He died at the age of 83, in the convent of his order in Paris, September 3, 1729.

HARDWARE, a commercial term applied to the commoner articles made of iron, copper, or brass, such as locks, keys, anvils, grates, shovels, &c. The great hardware manufactures of this country are at Birmingham, Wolverhampton, Walsall, Willenall, Sheffield, &c. The extent of the trade of these places is enormous; the value of the exports of hardware alone amounting to millions. The returns for the year 1871 give for hardwares, including cutlery, £4,000,000. See Iron.

HARD-WOODED TREES are forest-trees of comparatively slow growth, producing compact, hard, and valuable timber, as oak, ash, elm, chestnut, walnut, beech, birch, &c. From these, willows, elders, poplars, &c., are distinguished as *soft-wooded trees*. Neither term is extended to firs, pines, cedars, or other coniferous trees, the wood of which is of a peculiar and very different character.

HARE (*Lepus*), a genus of rodent quadrupeds, of which there are many species very similar to each other. The Linnean genus *Lepus* now forms the family *Leporidæ*, which includes the genera *Lepus* and *Lagomys*, and of which a peculiar characteristic is the presence of two small incisors immediately behind the ordinary rodent incisors of the upper jaw, so that these teeth seem to be double. The molar-teeth, six on each side above and five below, are transversely grooved, being formed of two vertical plates soldered together. All the animals of this family feed exclusively on vegetable food, and chiefly on herbage, although they are also fond of grain, roots, and the bark of trees. Their fore-feet have five toes, their hind-feet four; the soles are hairy. Their fur is soft; the colours mostly gray or brown, the alpine and arctic species becoming white in winter.—The Common H. (*L. timidus*) is widely distributed over Europe and the northern and central parts of Asia. The Irish H. (*L. Hibernicus*) has, however, recently been described as a distinct species. It differs from the common H. in its rounder head, shorter ears, and shorter limbs; also in having the fur composed only of one kind of hair, short and soft, with none of the long black-tipped hairs which are mixed with this in the common species. The fur, therefore, is of no value. The common H. is not found in Ireland. Notwithstanding the character of timidity usually ascribed to the H., it is really a pugnacious animal, and displays no little courage in encounters with those of its own race, or with animals of nearly equal powers. It has been an object of the chase from a very early period. Xenophon, in his *Cynegeticus*, gives an enthusiastic description of the sport. Concerning the hunting of the H., see Coursing. Being evidently designed to seek safety from enemies by fleetness, the H., however well supplied with food, never becomes fat. It ordinarily lies quiet in its *form* during the day, and goes in quest of food in the evening and morning. Where, through game preserving, it is abundant, it does no little damage to crops. It is a prolific animal, although not nearly so much so as the rabbit. The female produces from two to five at a birth. The young (*leverets*) are born covered with hair, and with the eyes open.—The Varying H. or Alpine H. (*L. variabilis*), which inhabits the mountains both of the north and south of Europe, and is found on those of Scotland and of Cumberland, is remarkable for the change of colour which it undergoes, without change of hair, on the approach of winter. Ordinarily of a bluish-gray colour, it becomes of a shining white, the change beginning with the feet, and extending upwards, terminating with the back. This, which in many places is called the *Blue* H., is about equal in size to the common H., but has shorter limbs and ears, and is less swift.—In the arctic regions both of the Old and New Worlds, the Arctic H. or Polar H. (*L. glacialis*) abounds. It is entirely white in winter, brownish-gray in summer, has long soft fur on the belly, and fine thick fur on the back; is considerably larger than the common H., and spends the whole year without hybernation, even in Melville Island, and similar cold desolate regions; lichens and mosses probably affording it the greater part of its food.—North America produces a number of other species of H., of which some inhabit the swamps of the southern states.—India has a H. (*L. ruficaudatus*) very similar to the common H.; other species are found in other parts of Asia, Egypt, the Cape of Good Hope, &c. The fur of the H. is used for felting for making hats and other purposes.

Common Hare (*Lepus timidus*).

HARE, in point of English law, is one of the wild animals called Game (q. v.), and is specially protected by the game-laws for the benefit of the owners of land. There is no close season as to hares, which may therefore be lawfully killed by a licensed sportsman all the year round. Being game, hares can only be bought from a licensed dealer, and sold by licensed persons. The owner of enclosed land, and also the tenant, if otherwise entitled by his lease to kill hares, may do so without a license. So those who hunt them with greyhounds or beagles require no license. All others require a license. To kill hares unlawfully by night in a warren, or place kept for breeding hares, is now a misdemeanour by 24 and 25 Vict. 96, s. 17; to kill them elsewhere, is only a misdemeanour when the third offence is committed. In Scotland, the law is substantially the same, except that the killing of hares unlawfully by night is only an offence punishable summarily, unless it is a third offence, when it becomes indictable. In Ireland, there is a close season, when hares cannot be killed—viz., between the first Monday in November and the first Monday in July following. See Paterson's *Game-laws of the United Kingdom*.

HAREBELL, or **BLUEBELL** (*Campanula rotundifolia*), the most common of all the British species of Bellflower (see Campanula), growing abundantly in dry and hilly pastures, on waysides, &c.; flowers in summer and autumn. It is common in most parts of Europe, and even to the extreme north. It is everywhere a favourite from its beauty and gracefulness, and is the subject of many allusions in poetry. It is a perennial plant, with a slender stem 6—14 inches high, sometimes bearing only one flower, but more generally a loose panicle of a few drooping flowers, on very slender stalks; the flowers sometimes white, but generally bright blue, bell-shaped, and fully half an inch long. The juice of the flowers yields a fine blue colour, and may be used as ink.

Harebell (*Campanula rotundifolia*).

HARE'S-EAR (*Bupleurum*), a genus of plants of the natural order *Umbelliferæ*, having compound umbels of yellow flowers, and generally simple leaves. The leaves of the most common British species, *B. rotundifolium*, embrace the stem and are roundish oval. This plant, which grows in cornfields in the chalk districts, is the *Thorough-wax* of the old herbalists, and was once in repute as a vulnerary, but has fallen into disuse. The species of H. are numerous, and are natives of temperate climates in most parts of the world.

HARFLEUR (called in the middle ages *Harefloť*), a small town of France, in the department of

Seine-Inférieure, is situated near the mouth of the Lézarde, on the northern bank of the Seine, about four miles east of Le Havre. The chief building is a beautiful Gothic church with an elegant tower, built by the English as a memorial of the victory of Agincourt. Pop. 1800, who are employed in fishing and the rearing of cattle. In former times, before the rise of Havre, H. was a flourishing town, and was the key to the entrance of the Seine. Its harbour now forms a meadow. It was taken by the English under Henry V. in 1415, retaken by the French in 1433; in 1440 it was again seized by the English, and ten years after was recaptured by Charles VII. of France. Off this town the Duke of Bedford took or destroyed nearly 500 French ships, August 15, 1416.

HARGREAVES, James, whose name will ever be remembered in connection with the cotton manufacture of this country, as the inventor of the carding-machine, and the spinning-jenny, was an artisan at Stanhill, near Blackburn, where he was born. H. was an illiterate man, and supported himself and family by weaving and spinning, carried on in his own house, according to the custom of the time. In 1760, he invented the carding-machine, as a substitute for the use of hand-cards; and four years later, he produced the spinning-jenny. H. had frequently tried to spin with two or three spindles at once, holding the several threads between the fingers of his left hand, but the horizontal position of the spindles frustrated his attempt. One of his children, however, is said to have upset the spinning-wheel while he was at work, and as he retained the thread in his hand, the wheel continued revolving horizontally, and the spindle vertically. The observation of these motions produced the thought, that if a number of spindles were placed upright, and side by side, many threads could be spun at once. H. now put his idea into practice, and the result was the *jenny*, at which he and his family worked, till the large amount of cotton which they spun having excited suspicion, his fellow-spinners, imbued with strong prejudices against machinery, broke into his house, and destroyed his frame. He then removed to Nottingham in 1768, where he erected a spinning-mill. Two years later, he took out a patent for his machine; and discovering that it was in use by manufacturers in Lancashire without his permission, brought an action for £7000 damages. Pending the trial, he was offered by a company £3000 for the use of the jenny, but refused; and it having been proved that he had sold some of his machines before the patent was obtained, it was thereby declared to have been invalidated, and his claim for compensation fell to the ground. Thus the inventor was but little benefited by his work. H. continued to carry on business as a yarn manufacturer, in conjunction with a Mr Jones, with moderate success, till his death in April 1778, when his share in the mill was bought by his partner for £400. His country never gave H. any reward for the invention to which so much of its wealth is due; yet it is but just to the memory of the late Sir Robert Peel to state, that one of his last acts as a British minister, was to bestow on the youngest and only surviving daughter of this inventor, the sum of £250 from the Royal Bounty Fund.

HARIKARI. See Harri-Kari.

HÄRING, Wilhelm, better known under the name of Wilibald Alexis, a German novelist, was born at Breslau in the year 1798. He was educated in Berlin, and served as a volunteer in the campaign of 1815. He afterwards studied law at Berlin and Breslau, but abandoned this pursuit for a literary career. After several poetical and other literary efforts, H. first made himself known over all Germany and abroad by his romance of *Walladmor* (2d edit. 1823—1824), written in consequence of a wager with a friend that he would produce a work which should be mistaken for one of Sir Walter Scott's. *Walladmor* was a most audacious mystification, and was greedily devoured in Germany as a production of the Scottish novelist. It was translated into various languages, among others into English by Thomas de Quincey (London, 1824), whose translation, however, departed so widely from the original, that it hardly deserved the name. H. likewise wrote several admirable tales, but his chief excellence is displayed in the field of historical romance. His *Cabanis* (6 vols. 1832), notwithstanding many defects, may be regarded as his best work; *Roland von Berlin* (3 vols. 1840); *Der falsche Waldemar* (3 vols. 1842); *Hans Jürgen und Hans Jochem* (2 vols. 1846); *Der Wärwolf* (3 vols. 1848); and *Ruhe ist die erste Bürgerpflicht* (5 vols. 1852), may likewise be classed among the first specimens of the historical romance in the German language. He died in 1871.

HARIRI, Abu Mohammed al Kasim ben Ali, a most celebrated Arabic philologist and poet, born at Bassorah, on the Tigris, in 446 H. (1054 A. D.). Little is known of his life and circumstances, save that he was the son of a silk-merchant (whence his name Hariri—*harir*, silk). H. wrote several valuable grammatical works, and his lyrics are of a high order. But the most famous of all his writings, and indeed one of the most famous compositions of all times and countries, is his book entitled *Makamehs* (Sittings). This may best be described as a novel, or a collection of rhymed tales, loosely strung together, the centre of which is always a certain Abu Seid from Seruj, who, witty, clever, amiable, of pleasing manners, well read in sacred and profane lore, but cunning, unscrupulous, a thorough rogue in fact, turns up under all possible disguises, and in all possible places—sermonising, poetising, telling adventures and tales of all kinds—always amusing, and always getting money out of his audience. The brilliancy of imagination and wit displayed in these strange adventures, their striking changes, and dramatic situations, have hardly ever been equalled; but more wonderful still is the poet's power of language. The whole force of the proverbial fulness of expression, spirit, elegance, and grandeur of the Arabic idiom, H. has brought to bear on his subject. His work—of which one of the greatest Arabic authorities has said that it deserved to be written in gold—has indeed become the armoury as well as the mine of all Arabic writers since his day. Poets and historians, grammarians and lexicographers, look upon the *Makamehs* as the highest source of authority, and next to the Koran, as far at least as language is concerned. His book has been translated either entirely or partially into nearly every Eastern and European tongue, has been the prototype of innumerable imitations, the most successful of which is the one in Hebrew, *Tachkemoni*, by Jehuda Al-Charisi. The first complete edition of the text appeared in Calcutta, 1809—1814, in 3 vols.; another by Caussin de Perceval, in Paris, 1818; one much more valuable, chiefly on account of its commentary by Silvestre de Sacy, appeared in Paris, 1821—1822 (re-edited 1847—1853).

The first (Latin) translations in European tongues of single Makamehs were made by Golius (1656) and Schultens (1731, &c.). But the palm of all translations is due to Rückert, who, with a power only inferior to that of H. himself, has so completely reproduced the spirit and form of the work in German in his *Verwandlungen des Abu Seid b.*

Serug, first published in 1826, that the *Makameh* itself has become a favourite form for similar compositions in Germany. English translations, but which fall far short of the German one, were published in 1767 by Chapellon, and in 1850 by Preston. Munk and De Sacy have rendered some portions into French.

HARISCHANDRA, a Hindu king of the solar dynasty, a descendant of Ikshwâku, and one of the more prominent personages in the legendary history of ancient India. The earliest mention is made of him in the *Aitâreya-Brâhmana* (see VEDA), where he is the subject of one of the most interesting legends of the Vedic period. He is represented there as desirous of obtaining a son, and of making a compact with the god Varuna, by which he promised to sacrifice to the god his son, if he granted him one. Varuna acceded to his prayer, and the *Aitâreya-Brâhmana* then proceeds to relate how H. delayed, from time to time, the fulfilment of his part of the compact, until at last he succeeded in finding a substitute for his son in S'unahs'epa, who was sold to him by his father for 100 cows, to be offered in sacrifice to Varuna. Ultimately, however, S'unahs'epa becomes released from his bondage through the intervention of the gods. See S'UNAHS'EPA. According to the epic poem *Mahâbhârata*, H. was a type of munificence and piety, and after death became elevated to the court of Indra; and some of the Purânas are still more explicit on his wonderful fate. Having given his whole country, his wife and son, and finally himself to Vis'wâmitra, in satisfaction of the demands made by this greedy priest for his assistance at a sacrifice, H., in consequence of this pious act, became elevated with his subjects to the paradise of Indra; but having been insidiously misled by Nârada to boast of his merits, was again precipitated. The repentance of his pride, however, arrested his downward descent, and he and his train paused in mid-air, where his city is popularly believed to be at times still visible.—See Wilson's translation of the *Vishnu-Purâna*.

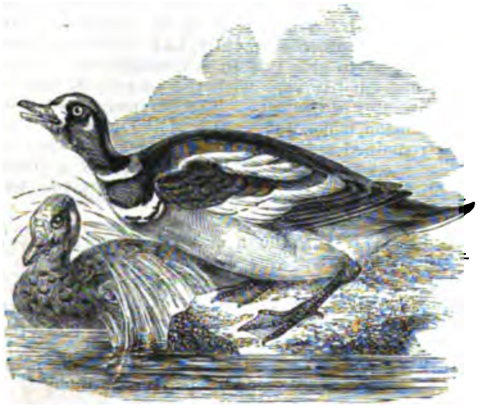
HARIVANS'A, a Sanscrit epos of some extent, which professes to be part of the Mahâbhârata, but may be more properly classed with the Purânas. It is chiefly occupied with the adventures of Vishnu, in his incarnation as Krishna, but treats likewise of the creation of the world, of patriarchal and regal dynasties, and other matter contained in Purânas. Although it is frequently quoted by later writers, it is not a compilation of much reliability. See PURÂNA.

HARLAW, BATTLE OF. From the beginning of the 12th c. to the beginning of the 14th c., the power and territory of the Celtic tribes in Scotland steadily gave way before the encroachments of the Anglo-Normans of the Lowlands. But during the long Wars of the Succession, and the feeble reigns of the first and second Stuart kings, the Celtic people regained so much of what they had lost, that, strengthened by alliances with England, they began to be regarded with alarm by the Scottish government. A trial of strength seemed inevitable, and it was precipitated by a dispute as to the right of succession to the earldom of Ross, between Donald Lord of the Isles and a brother of the Regent Albany. The island chief, gathering a host of 10,000 Islesmen and Highlanders, marched rapidly southwards, leaving havoc and desolation behind him. The rich city of Aberdeen, and the whole country to the north of the Tay, seemed to be within his grasp, when he was encountered by a vastly inferior force of the chivalry and men-at-arms of Mar, Garioch, Buchan, Angus, and Mearns, under Alexander Stewart, Earl of Mar, one of the best captains of the day, familiar in his youth with the usages of Highland warfare, and more recently distinguished in the wars of France and Flanders. The armies met on the Eve of St James (24th July) 1411, at Harlaw, a low table-land on the banks of the Ury, about 18 miles to the north-west of Aberdeen. The battle was long and bloody, but the Highlanders were at last driven back. They left two chiefs, Maclean and Macintosh, and more than 900 dead upon the field. The loss upon the other side was computed at 500 or 600, among whom were the Constable of Dundee, hereditary bearer of the royal banner, Sir Alexander Irvine of Drum, and other knights, many of the best esquires of Angus and Mearns, nearly all the gentry of Buchan, and Robert Davidson, the provost, and many of the burghers of Aberdeen. So obstinate and sanguinary was the struggle, and so greatly were the Lowlanders outnumbered, that few of them escaped without a wound. The conflict made a deep and lasting impression on the national mind. For more than a hundred years, the battle of Harlaw continued to be fought over again by school-boys in their play. For more than two hundred years, it was remembered in the music of the people. It lived still longer in their traditions; and it is not yet forgotten in their poetry. It is the subject of a still popular ballad, written, it would seem, towards the end of the 16th c., printed at least as early as 1668, reprinted in Allan Ramsay's *Evergreen* in 1724, and included in most subsequent collections of Scottish ballads. Scott, in his *Antiquary*, has commemorated 'the sair field of Harlaw' in a fine fragment of song.

HA'RLEQUIN, CLOWN, PANTALOO'N, AND CO'LUMBINE, the four chief personages in the modern Christmas pantomime. This species of play is divided into two parts—the one, the introduction, or opening; the other, the harlequinade. Both divisions of this kind of play, but particularly the opening, were wont to be acted in dumb-show, and at one time the same performers used to play all through the piece; the idea of which was a story of love, interspersed with grotesque elements. At a certain stage of the plot, a fairy was employed to transform the tyrant and his abettor into Clown and Pantaloon, and the lovers into Harlequin and Columbine; and the motley quartett were sent away for a period on a tour or chase, the termination of which took place at the will of the good fairy. During this chase, the object of the Clown ought to be the capture of Columbine; but Harlequin, who is provided by the fairy with a magic sword, the loss of which renders him helpless, is usually able to thwart all his designs, and protect his mistress. A symbolical meaning may, no doubt, be found at the bottom of such representations, at least in many of their parts; but as, in their modern form, they are a jumble of fragments from older scenic entertainments, anything like a consistent scheme is not to be looked for. As to the characters, the prototypes of the Clown and Harlequin may be traced back to the Roman Atellanæ (q. v.). The arlechino (Fr. *arlequin*) of the early Italian dramatic entertainments was a satirist and practical jester of a similar type to the modern English Clown. As civilisation advanced, the character gradually became more refined, then was confined to the ballet, and at last disappeared from the regular stage. He still figures in the improvised plays of the Italians. In English pantomimes, the Clown is the prime mover in the 'comic business;' and there are often two, the 'talking' Clown, and the 'tumbling' Clown, who acts chiefly as an acrobat. The Clown is also a never-failing adjunct in circus entertainments. Pantaloon is usually represented as a very senile old man, the butt of the Clown, and the aider and abettor of that person's comic villainy. This personage is knocked about and well cuffed by every one; he generally, therefore, wears a stuffed dress, in order to protect himself from accident. Columbine, the lover of Harlequin, has nothing to do all through the piece but to dress well, look pretty, and dance her best. The character of Columbine is usually represented by a well-trained dancer. Harlequin wears a tight dress sewn over with spangles.

The persons engaged in these occupations require to be trained to it from infancy. To make a good Clown or Harlequin (in the continental and original sense of the word) requires decided genius; and though the rôle may seem the lowest in the dramatic art, lasting European reputations have been obtained in it, as by the English clown, Grimaldi, and the famous French Carlin (1713—1783).

HARLEQUIN DUCK (*Clangula histrionica*), a species of Garrot (q. v.), which receives its name from its variegated markings, chiefly white, gray, and black. It inhabits the arctic regions, where it is found not only on the sea, but on lakes and rivers. It is a rare winter visitor of the British islands. In America, it is pretty plentiful in winter as far south as the Bay of Fundy. Its whole length is about 17 inches.



Harlequin Duck, Male and Female (*Clangula histrionica*).

HARLEY, Robert, Earl of Oxford and Mortimer, the son of Sir Edward Harley, an active partisan of the parliament during the civil wars, and descended from an illustrious Herefordshire family, was born in London in 1661. H. entered parliament, being returned for the Cornish borough of Tregony, as a Whig; but he soon began to vote and speak against his party; and policy and ambition, rather than choice, made him an anti-dissenter and an ardent Tory. He shortly acquired a great reputation for his knowledge of parliamentary law and practice, a study not much pursued in those days; and in the parliament, which met under the chieftainship of Rochester and Godolphin, in February 1701, he was, by a large majority, elected speaker. H. retained this post, having been twice re-elected, till April 1704, when he became secretary of state. The conviction of H.'s secretary for treasonable correspondence with France caused his master, though entirely exculpated, to resign his office in February 1708. H. remained out of power two years, long enough, with the assistance of Mrs Masham, to completely undermine the power of the Whigs. In August 1710, Godolphin was dismissed, and H. was appointed to his post of chancellor of the exchequer, and brought back the Tories. An event occurred in 1711, which raised H. to the acmé of popularity. A French priest and spy, who assumed the title of Marquis de Guischard, being brought before the council on the 8th March, on the charge of treasonable correspondence with France, rushed upon H., and stabbed him with a penknife. His life was said to have been in danger, and recovering, he was congratulated by parliament on his escape, created Earl of Oxford and Mortimer, decorated with the Garter, and in the following May appointed lord-high treasurer of Great Britain. From this point, H.'s course was downwards: he was not a man of business, and was destitute of that indispensable quality for a premier—decision of character. Macaulay had but a mean opinion of H. as a statesman, yet he gives him, as a man, a higher character than could be given to any other politician of the time. The principal act of H.'s administration was the treaty of Utrecht: though England might have obtained better terms, she had nothing to gain from a continuance of the war; and the peace was, at all events, popular. H. ceased to pay court to Lady Masham, and the unscrupulous Bolingbroke succeeded in getting him dismissed on July 27, 1714. Lord Oxford was dismissed on Tuesday—Bolingbroke became premier—and the queen died on Sunday. George I. was proclaimed, and Bolingbroke fled to France, but Oxford remained to meet his fate. He was sent to the Tower, and after two years' imprisonment, brought to trial: the two Houses quarrelled as to the mode of procedure, and the Commons having in anger refused to take any part in the trial, he was acquitted by the Peers, and released. He spent the remainder of his life in retirement—the friend of scholars and men of letters—the founder of a collection of books and MSS. which perpetuates his name—and died May 21, 1724.

HA'RLINGEN (Frisian, *Harns*), a flourishing seaport of the Netherlands, in the province of West Friesland, at the entrance to the Zuider Zee, about 65 miles north-north-east of Amsterdam. It stands on the site of a former town that was engulfed in the sea in 1134, and is itself protected from the inroads of the ocean by one of the largest dykes in Holland, which is 40 feet high, and fenced in along its base by three rows of piles driven into the ground. It carries on an important trade with Norway and England, butter being one of the principal articles of export. Pop. 9000, who employ themselves in commerce, salt-refining, sailcloth-manufacturing, brick-making, &c.

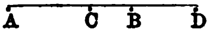
HA'RMALINE and HARMINE are vegetable bases occurring in the husk of the seeds of the *Peganum harmala*, or Syrian rue, a plant that grows abundantly in the steppes of Southern Russia, and whose seeds are used in dyeing silk, to which they impart various shades of red. *Harmaline* ($C_{26}H_{14}N_2O_2$), when pure, crystallises in colourless prisms; but its salts are yellow, and oxidising agents transform it into a red colouring matter, which combines with acids, forming salts, which constitute the basis of the *Harmala Red* of commerce. *Harmine* ($C_{26}H_{12}N_2O_2$) may be obtained by oxidation from harmaline. It crystallises in delicate prisms, and forms colourless salts.

The *Peganum harmala* belongs to the natural order *Zygophyllaceæ*. It is a half-shrubby plant, with smooth linear pinnate or bipinnate leaves, and solitary white flowers. The seeds are said to possess narcotic properties, and the Emperor Solyman is reported to have kept himself intoxicated by eating them. They are used by the Turks as a spice.

HARMA'TTAN, a dry hot wind, prevalent on the Guinea coast during December, January, and February, blowing from the interior to the Atlantic Ocean. It is generally accompanied by a fog, through which the sun appears of a pale-red colour. It has a hurtful effect on vegetation, and also unpleasantly affects the human body, drying up the eyes, nostrils, and mouth, and even causing the skin to peel off. It, however, has the good effect of checking epidemics, and curing dysentery, fevers, and cutaneous diseases. The harmattan is the same as the Sirocco (q. v.) of Italy.

HARMO'DIUS AND ARISTOGEI'TON, two Athenians strongly attached to each other, who murdered (514 B.C.) Hipparchus, the younger brother of the 'tyrant' Hippias, on account of an insult offered by him to the sister of Harmodius. They meant to kill Hippias also, with a view to the overthrow of the Pisistratidæ, but in this they did not succeed. H. was cut down by the body-guard immediately after the murder of Hipparchus. A. fled, but was afterwards taken and executed. As Hippias was banished from Athens a few years later, H. and A. naturally came to be regarded as patriotic martyrs; and in this light they appear in all subsequent Greek history. They received divine honours from the Athenians, and had statues raised to their memory. A very beautiful drinking-song on this subject has come down to us in the Greek Scholia.

HARMO'NIC PROPORTION. Three numbers are said to be in harmonic proportion when the first is to the third, as the difference between the first and second is to the difference between the second and third, otherwise harmonic proportion is that which subsists between the reciprocals of numbers which are in arithmetical proportion. Thus, 3, 5, 7, &c., being in arithmetical proportion, $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{7}$, &c., are in harmonic proportion. In geometry, a line

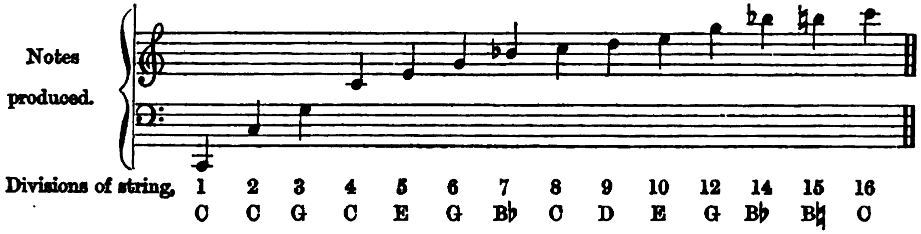


AB is said to be harmonically divided when two points are taken, one in the line, and the other in the line produced, as C, and D; such that AC : CB : : AD : DB. When the line is thus divided, AD, CD, and BD, are in harmonic proportion. A harmonic progression is a series of numbers in harmonic proportion, as the series formed by the reciprocals of numbers forming an arithmetical series.

HARMO'NICA, a musical instrument of a fascinating quality of sound, invented by Benjamin Franklin, the sound of which was produced from glass in the shape of a cup, or half globe, which was put into a revolving motion on its centre, while the rim was touched by the finger. Franklin, in a letter dated 13th July 1762, to Padre Beccaria, at Turin, mentions the history of his invention. It had already been known that beautiful sounds could be produced by friction of the finger on the rim of an ordinary drinking-glass. An Irishman, named Puckeridge, was the first who hit on the idea of playing airs on a row of glasses, which he tuned by putting water into each. He performed publicly in London; but he and his glasses were burned in the great fire in London in 1750. When Franklin finished his invention, he found an excellent performer in a Miss Davis, to whom he made a present of his harmonica. Miss Davis, in 1765, performed on the harmonica in Paris, Vienna, and all the large cities of Germany with great effect. This fascinating instrument found many admirers, but none of them ever succeeded in improving it. The compass of its notes was from C to F, including all the chromatic semitones. The producing of the sound by the points of the fingers produced such an effect on the nerves of the performer as in some instances to cause fainting fits. All attempts to make the harmonica, through means of keys, easier for amateurs, ended in failure, as no substance was found to act as a substitute for the human finger, which doubtless imparted an expression to the sound which no dead substance could possess. The harmonica gave rise to a host of similar instruments by Chladini, Kaufmann, Rieffelsen, and others, which were not eminently successful. Other instruments of no merit or importance took the same name, but had not the most remote resemblance to the original. The harmonica was somewhat similar to the instrument now known as musical-glasses.

HARMONICA, CHEMICAL. This term is applied to the musical note which is evolved when a long dry tube, open at both ends, is held over a jet of burning hydrogen. A rapid current is produced through the tube, which occasions a flickering, and is attended by a series of small explosions that succeed each other so rapidly, and at such regular intervals, as to give rise to a musical note, whose pitch and quality vary with the length, thickness, and diameter of the tube. The explanation of this phenomenon, which was discovered by Lampadius, but long remained unaccounted for, is due to Faraday. A curious modification of the experiment is given by Böttger, in the 94th vol. of Poggendorff's *Annalen*, 1855.

HARMO'NICS, the accessory, or concomitant sounds which are produced by a fundamental musical sound, either naturally, or by a division into aliquot parts. Every musical sound, although to the ordinary ear it appears to be only one sound, will, on close observation, be perceived to consist of a principal or fundamental sound, accompanied by other feeble acute sounds in perfect harmony (see HARMONY). The existence of such accompanying sounds, which are called harmonics, can be best demonstrated by the vibrations of a string stretched between two points, or bridges. Eight feet is a good length for such a string, although 16 feet, or even 32, would be better, from bridge to bridge. A scale or measure, accurately dividing the length of the string into aliquot parts, from $\frac{1}{2}$ up to $\frac{1}{16}$, is placed alongside of it. When a violin-bow is drawn across the string, it vibrates from end to end, and gives out its fundamental sound. Divide the string into halves by slightly touching it with the finger at the mark $\frac{1}{2}$ on the scale, or better, with a stretched thread lightly pressed upon it at that point; when sounded, it will be found to vibrate in two halves, each part vibrating as fast again as the entire string, and producing a sound an octave above the fundamental one, or as 2 to 1. Divide in the same manner at $\frac{1}{3}$, and the sound produced is the fifth above the last octave, being in the proportion of 3 to 2. It is not necessary to touch the string on more than one of the points of the division, for the long side of the string always divides of itself naturally, which can be seen by the eye. The parts where the string seems at rest, are called the nodal points. Divide as before at $\frac{1}{4}$, and the second octave above the lowest sound is heard, being to the first octave as 4 to 2. At $\frac{1}{5}$ the major third above the last octave is found, being as 5 to 4. At $\frac{1}{6}$ the octave of the former fifth, 3 to 2. At $\frac{1}{7}$ we find the true flat seventh, or 7 to 4; at $\frac{1}{8}$, again the octave of the lowest; at $\frac{1}{9}$ the major second, or 9 to 8; and above this, at $\frac{1}{10}$, $\frac{1}{12}$, $\frac{1}{14}$, we find the octaves of the major third, the fifth, and the flat seventh; while at $\frac{1}{15}$ we obtain the sharp seventh, or 15 to 8; and at $\frac{1}{16}$ another octave of the fundamental sound. The following is the order in which the harmonics arise, assuming that the string, at its full length, sounds the note C on the second ledger line below the bass staff, or lowest string on a violoncello.


Notes produced.
Divisions of string, 1 2 3 4 5 6 7 8 9 10 12 14 15 16
C C G C E G B♭ C D E G B♭ B♮ C

From these harmonics, the true ratios of all the intervals of the diatonic scale, in relation to a fundamental key-note, are found, and in the most perfect tune; they are as follows:

Degrees of the scale, ...	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Notes of the scale, ...	C	D	E	F	G	A	B	C
Ratios to key-note, ...	1	$\frac{9}{8}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{15}{8}$	$\frac{2}{1}$

Assuming 24 as the number of vibrations of C in any given time, the other notes of the scale may be expressed in whole numbers thus:

Notes of the scale, ...	C	D	E	F	G	A	B	C
In whole numbers, ...	24	27	30	32	36	40	45	48

In the artificial division of the octave into a chromatic scale of twelve equal semitones, all the intervals must necessarily be made somewhat imperfect, which is called temperament (see TEMPERAMENT). This must be especially attended to in keyed instruments. Singers, and performers on stringed instruments, are guided by their ear, being free from the fetters of fixed notes, to which keyed instruments are necessarily subject. Even in the natural diatonic scale as produced by the harmonics, it will be found, on analysis, that a certain degree of temperament is required to make the fifths within the octave equal. For example, the fifths from F to C, and from E to B, will be found to be accurately the same as the fifth from C to G—viz., $\frac{3}{2}$; which is easily ascertained by reducing their respective numbers to the lowest fraction; thus, F to C is $\frac{48}{32}$ = to $\frac{3}{2}$; from E to B is $\frac{45}{30} = \frac{3}{2}$; while from D to A, which in practical music must also be treated as a fifth, will be found to be too flat; thus, D to A is $\frac{40}{27}$, which cannot be reduced to $\frac{3}{2}$; but when both are brought to the fractions of a common denominator, which is done by multiplying $\frac{40}{27}$ by $2 = \frac{80}{54}$, and $\frac{3}{2}$ by $27 = \frac{81}{54}$, it is shewn that D to A, in the scale of nature, is flatter than a perfect fifth, in the proportion of 81 to 80; so that without temperament A cannot at the same time be a perfect major sixth to C, as a key-note, and also a perfect fifth to D, the true major second of C.

HARMO'NIUM, a musical instrument of modern invention, for which there are many claimants. The principle by which the sounds of the harmonium are produced, is called the *free vibrating reed*, supposed to have been a modern discovery, but now ascertained to have been known in China long before it was ever heard of in Europe. Its construction is as follows: A narrow rectangular slit being made in a piece of brass-plate of a quarter of an inch in thickness, a thin elastic spring of the same metal, and of nearly the exact breadth of the slit, is fixed at one end by two small rivets to the surface of the plate, close to one end of the slit, being so adjusted as to fill the area of the slit, and that when pressed into it at the free end, it may pass inwards without touching the end or the sides of the slit, and when left to itself it shall return back to its position of covering the slit. The spring at the free end is permanently bent a very little outwards. When a current of air is forced through the slit, the spring is put into vibration, and produces a continuous musical sound, acute or grave, according to the rapidity or slowness of the vibrations. This kind of reed is termed 'free,' in contradistinction to the reed of the organ-pipe, the spring or tongue of which entirely covers an oblong slit, in the side of a brass tube closed at one end, and vibrates against the cheeks or outside of the slit, instead of within it. After many attempts, in various countries, to construct a keyed instrument of really a useful kind with the free reed, Debain of Paris produced his invention of the harmonium, which became more or less the model of all the others that have followed. The harmonium occupies comparatively but little space, being only about 3 feet 3 inches high, and 3 feet 9 inches broad; the depth being according to the number of the stops. It has a compass of five octaves of keys from C to C, the key-board being placed on the top, immediately below the lid. Under the key-board is the wind-box, on which are valves for each key; while below the valves, and inside of the wind-box, the different rows of reeds are placed. The sizes of the reeds differ, according to pitch, from about 3½ inches long to ¼ inch; and the quality of sound is affected and modified by the breadth of the vibrating part of the reed, and the shape of the aperture in the wind-box covered by the valve. The pressure of wind is from a bellows with two feeders, which the player moves alternately with his feet, filling a magazine, similar to the bellows of a small organ. When a key is pressed down, the valve below it opens, and the wind, which has access from the bellows to the wind-box, rushes through the slit of the reed, and produces a sound which continues while the valve is kept open. It is a peculiarity of the free reed that an increase or a diminution of the pressure of wind does not alter the pitch of the sound, but merely increases or diminishes its volume. Advantage is taken of this peculiarity to effect, in the harmonium, a beautifully expressive swell, or diminution in the sound, by gradually increasing or diminishing the pressure of the wind. The vibrations of the spring being like those of a pendulum, isochronous, remain fixed in rapidity or slowness, according to the length and elasticity of the vibrating slip of metal, and thus regulate the pitch of the sound without reference to the pressure of wind. For the deep bass-notes the springs are heavily loaded at the loose end, to make them vibrate slowly; while in the higher notes they are made thinner at that end. Harmoniums are made of various sizes, and from one row of reeds (or vibrators, as they are now called) to four or more rows; each row is divided near the middle, between an E and F; and each half has its separate draw-stop. Lately, a 'knee' movement, erroneously called a pedal, for producing a small degree of crescendo on either bass or treble, has been attached. Some harmoniums are made with two rows of keys, thus affording a greater variety in playing solo with an accompaniment; and for more skilful performers, pedal-keys for the feet, like those of a church organ, are added. The manufacture of the harmonium in Paris has, of late years, increased almost incredibly. The various parts of the harmonium can now be got made there, and furnished from a single reed to a complete set. Many attempts were formerly made in England to accomplish the making of a similar instrument called the seraphine, but it was a much inferior instrument, although more expensive. Even now, the harmoniums said to be made in this country, are all got piecemeal from Paris, and put together in London. The best makers in Paris are Debain and Alexandre; and in Germany, Schiedmayer of Stuttgart and Kaufmann of Dresden. The latter is the inventor of the *Percussion action* for the harmonium, which consists of a small hammer like that of a pianoforte, which strikes a blow on the vibrator the moment the key is pressed down, and sets it instantly into vibration, thus assisting the action of the wind. Harmoniums may now be had of various sizes and qualities, at prices from £5 to £50. Valuable chiefly for accompanying psalmody, they suitably take the place of organs in temporary places of public worship, or among the less opulent class of congregations. For domestic use, they are not likely to supersede the pianoforte, but possessing the important advantage of not going out of tune through humidity of atmosphere, they will be found available where pianos cannot properly be kept.

HARMONY (Gr., a joining or fitting of pieces into one another), in Music, is understood to be the union of sounds which individually appear different, but when heard together, form a collective sound called a chord (see CHORD); or it may be explained as the melting or flowing together of several sounds into, as it were, one sound; in consequence of, or arising from, the consonant nature of their relative proportions to a fundamental sound. All musical compositions can be reduced to a fundamental harmony of successive chords, which, in their progression, are regulated by the rules of the theory of music. Dissonant, as well as consonant, chords are included as forming harmony, as they are a union of several sounds that have but one fundamental sound, or bass note, in common. The harmony of chords can either be close or spread, which the position or distance of the sounds or intervals from one to another, forming the chords, determines. Close harmony is when the sounds composing each chord are placed so near to each other, that no sound belonging to the chord could again be interposed between any of those already present. Spread harmony is when the sounds of a chord are placed at a greater distance from each other, so that some of them might be again interposed between the parts of those sounds already present. Close harmony generally takes place in music in which there exists a near relationship among the different parts, as in compositions for four male voices, in which case it becomes unavoidable, and spread harmony impossible. In choruses for mixed voices, and in instrumental compositions, spread harmony is more used, and the intervals of the chords are frequently inverted, which produces what is called double Counterpoint (q. v.). In the inversion of intervals, great care must be taken to avoid a consecutive progression of such intervals as become fifths by inversion; also that an alto part should never approach nearer a bass part than the distance of an octave. Close and spread harmony are often mixed, in order that individual parts may become more melodious and easier to sing, as well as to prevent unpleasant or abrupt skips in the melody; or to avoid an equally faulty monotonous formality of movement.

Although it has been said that every chord, whether consonant or dissonant, forms harmony, it must not be understood that any combination of sounds which one may choose to sound together is harmony. A dissonant chord treated as harmony is always judged of according to the nature of its different intervals, of which there are often some that are treated as dissonances, although they are fundamentally consonances, only more or less imperfect. All harmony in music is derived from what are called the aliquot tones. When a string is made to vibrate, we at first think that we only hear one sound; but on closer and more careful observation, we easily discover that the fundamental sound, particularly when it is a deep one, is accompanied by others in the most perfect harmony. The accompanying sounds are exactly those of which the chords in music are formed, and on which the foundation of the whole system of harmony in music is built. From the mathematical proportions and the relations of the accompanying sounds to the fundamental or principal sound from which they all arise (see HARMONICS), it follows that harmony, in its first and natural state, can only be in four parts, and it is then called perfect, or complete; in opposition to harmony of two or three parts which cannot be complete, as some of the intervals of the chords, essential to characterise the key or scale, may be awanting. A four-part harmony may be so arranged that five, or even more parts may appear, by means of doubling one or more of the intervals in the octave. From this increasing of the parts arises what is called the subordinate harmony, accompanying the principal or fundamental. In order to avoid faulty progressions in the subordinate harmony, care must be taken to strictly observe the rules which apply to the intervals in their fundamental state. The purpose of the subordinate harmony is only that of ornamenting the original, which the Germans call *figurirung*, commonly called figured harmony, but should be more properly called florid counterpoint. If it be admitted that the intervals and chords that are most consonant are also most harmonious, it naturally follows that the union of similar sounds must be the most perfect, therefore the order of perfection in which they rank must arise from their mathematical proportions in relation to the fundamental sound or unison. The common chord of a third, fifth, and octave to a bass note is the most pure and perfect harmony; after which follow the chord of the seventh, and the chord of the ninth. The inversions of any of these chords are all in various degrees less perfect than their original fundamental harmony. The position of the intervals in respect to the fundamental note is also an element in the purity of chords; as, for example, a chord of the seventh in close harmony, is far less satisfactory and pleasing than it is in spread harmony, where the different intervals are at, or near, their natural distances from the fundamental note. Such considerations are of great importance to the musician who has to accompany from a figured bass; and also to organ-builders in arranging the composition of mixture-stops. Harmony, in modern music, is therefore a succession of chords according to certain laws. In the early ages of the science, the laws of harmony were most arbitrary. Nature presents us with solitary chords, but she does not establish their succession. A collection of chords is not music, any more than a collection of words is a speech. Music, like a discourse, must also have its phrases, periods, punctuation, &c., and all in harmony. The most useful works on harmony are those of Dr Marx, Professor Dehn, and Dr Fred. Schneider.

HARMONY OF THE GOSPELS. The narratives of the Evangelists, and especially those of the first three, are in many things close repetitions of each other, and not unfrequently relate the same incident in words which are all but identical. On the other hand, they occasionally exhibit seemingly grave discrepancies, whether of facts or of circumstances; one relating an occurrence not noticed by another, or placing an occurrence at a time or in circumstances which it is hard to reconcile with the narratives of his brother-evangelists. At a very early period of Christian literature this difficulty was felt, and with a view to its more complete and easy elucidation, the passages of the several gospels which bore upon each subject or incident were collected for the purpose of comparison and of mutual illustration. The title under which the earliest compilation of this nature, which dates from the second half of the 2d c., was known was *Diatessaron*, because it consisted of extracts from the *four* Evangelists. The author of this compilation was the heretic Tatian, and it is remarkable that, in order to give a colour to his own peculiar opinions as to the unreality of the flesh of our Lord, he omitted from his collection the entire history of the birth and childhood of Jesus as related by Matthew and Mark (Eusebius, *Eccl. Hist.* iv. 29). St Jerome states that a similar harmony was compiled about the same time by Theophilus of Antioch, although no trace of such a work is now discoverable; but in the middle of the following century the celebrated Neo-platonist convert, Ammonius Saccas, undertook a new *Diatessaron*, which formed the basis of the well-known *Ten Indexes*, or canons, of the Harmony of the Gospels, in the Greek text, by Eusebius, which were afterwards adapted to the Latin text by St Jerome, and continued to be used as a key to the concordance of the gospels by readers both of the Greek and of the Latin text, down to the 16th century. The canons of Eusebius consist of ten tables. Of these, the first, which contains four columns, exhibits all the passages which are common to the four gospels; the second, third, and fourth contain three columns, and shew the passages which are found in any three of the gospels; the fifth, sixth, seventh, eighth, and ninth are in two columns, and shew the passages which occur in any two of the gospels; and the tenth contains the passages which are found only in one of the gospel narratives. The convenience and utility of such a scheme are at once apparent, and it has led in later times to the numerous and useful compilations, Roman Catholic as well as Protestant, known under the name of Synopses of the Gospels, the best and most popular of which are enumerated by Tischendorf in the introduction to his own *Synopses Evangelicæ*, p. 9, and foll.

HARMONY OF THE SPHERES. Many of the ancients supposed the motions of the stars and planets to produce a kind of music, which they called the harmony of the spheres. They attributed this music to the various proportionate impressions of the heavenly bodies on one another acting at proper intervals. Kepler wrote a work on the harmonies of the world, and particularly of the celestial bodies.

HARMS, CLAUS, a distinguished German divine, was born 25th May 1778, at Fahrstedt, in South Ditmarsch. In 1797 he went to the gymnasium at Meldorf, and in 1799 to the university of Kiel. The rationalism of the time, in which he had been to some extent educated, failed to give him satisfaction; and Schleiermacher's *Reden über die Religion* at last settled his faith. After supporting himself as family tutor from 1802 till 1806, he was appointed Dean of Lunden, in Northern Ditmarsch, whence he was called, in 1816, to Kiel, as archdeacon and afternoon-preacher in the Nicolai-Kirche. Next year, shortly before the tricentenary of the Reformation in Germany, he issued, in defence of Protestant orthodoxy, 95 theses under the title, *Das sind die 95 Theses oder Streitsätze Dr Luther's.* These produced a deep impression throughout Germany, and brought him a call to be bishop of the consistory about to be instituted for the Protestant Church of Russia. This, as well as a call in 1834 to succeed Schleiermacher in Trinity Church, Berlin, H. refused. In 1835, he was made chief pastor and provost in Kiel, but was compelled to resign, in consequence of an attack of almost total blindness. The rest of his life was spent in retirement, devoted to literary activity. He died 1st February 1855. H.'s published works are chiefly sermons, which may be reckoned among the best specimens of modern pulpit eloquence in Germany. Of these, the most famous are his *Winterpostille* (1808, 6te Aufl. 1846) and *Sommerpostille* (1815, 6te Aufl. 1846), to which a new series was added—*Neue Winterpostille* (1826) and *Neue Sommerpostille* (1827).—On H.'s life may be consulted Dorner's *Blätter der Erinnerung an das Jubiläum von H.* (1842), and *H.'s Lebensbeschreibung, verfasst von ihm selbst* (1851).

HA'RO, a small town of Spain, in the province of Logroño, and 26 miles west-north-west of the town of that name, is prettily situated in a fertile plain on the right bank of the Ebro. It has manufactures of hats, leather, brandy, and liqueurs. Much wine is grown in the neighbourhood. Pop. 6000.

HAROERIS, the elder Horus, son of *Seb*, the Egyptian Saturn, and *Nu*, or Rhea, said to have been born on the second day of the epact. He was the brother, and not the son, of Osiris, from whom he is to be distinguished. In the inscriptions, he is said to be the son of Atum, of Ptah or Vulcan, and Athor or Venus, according to different legends. He was also lord of the South and Nubia, and particularly ruler over the heaven, illuminating the world with the brightness of his eyes. As such, he was identified with the sun and Apollo, and represented as hawk-headed, wearing the crown of the upper and lower world. His name is also found in the Greek dedications to him of the temples of Ombos and Apollinopolis Parva. His connection with the sun is, however, undoubted, as he is made on one inscription a child of the sun, and type of Mentu Ra or Mars. The festival of his eyes, which mythically represented the sun and moon, took place on the 30th Epiphi.—Birch, *Gallery of Antiquities*, i. p. 36; Wilkinson, *Manners and Customs*, iv. p. 395.

HAROLD I. (1035—1040), (surnamed Harefoot, probably on account of his swiftness in running), was the younger of Canute's two sons, by his first wife Alfgiva. According to agreement on Canute's second marriage, his son by Emma was to inherit the English as well as the Danish throne: this son, Hardicanute, was, however, in Denmark at the time of his father's death, and being very unpopular with the Danish part of the population in England, lost half of his kingdom. Leofric, Earl of Mercia, led the cause of H., while the powerful Earl Godwin espoused that of Hardicanute. Civil war was happily averted by a compromise, and the kingdom was divided. H. took London, with all the provinces north of the Thames; while the possession of the south was given up to Emma for Hardicanute, who fixed her residence at Winchester, and established her authority over her son's share of the partition. In 1037, the thanes and people of Wessex submitted to H., and he was crowned king of all England, though it is stated that the Archbishop of Canterbury, Egelnoth, at first refused to perform the ceremony himself, or to allow any of his brother-bishops to do so. He died at Oxford, March 17, 1040.

HAROLD II. was the second son of the powerful Godwin, Earl of Kent, and was born at the close of the 10th century. On the death of Edward the Confessor, the Witenagemôte (q. v.), in the exercise of its rights, set aside the claims of Edgar Atheling, and, ignoring the reputed bequest of the late sovereign in favour of the Duke of Normandy, elected H. to fill the vacant throne. Duke William immediately asserted his claim, which was supported by H.'s brother Tostig and Harold Hardrade, king of Norway, for the sake of obtaining the duke's assistance to reinstate the former in the government of Northumbria. Tostig and the king landed on the coast of Yorkshire, and after defeating Morcar and Edwin, Earls of Northumbria and Mercia, advanced to York, but were met by H. at Stamford-bridge, and totally routed. Three weeks afterwards, William landed in England; the contending armies met at Senlac, about nine miles from Hastings, where H.'s death (October 14, 1066) made the Duke of Normandy undisputed ruler of England.

HARP, a musical stringed instrument, much esteemed by the ancients. In Egypt, the figure of the harp is found delineated from the earliest ages in many different forms, some of them very simple, and others with great taste and ornament; some played on while standing, others while kneeling. The Celtic bards held the harp in the greatest honour. In the Highlands of Scotland the instrument has disappeared, but it is still in use in Wales, and to some extent it lingers in Ireland, where, from its former prevalence, it is adopted as a national symbol. The old Franks and Germans punished those severely who injured a harpist in the hand. The harp was used as an accompaniment to the psalms sung by the early congregations of Christians. There are three kinds of harps now known—the ordinary Italian harp, which is strung with two rows of wire-strings, separated by a double sounding-board; this kind is now little used, being very imperfect. The double harp, or, as it is also called, David's harp, is a more useful instrument, and in the form of a triangle, with a sounding-board and gut-strings; it is always tuned in the principal key of the music, while the strings are altered to suit any modulations out of the key, by pressure of the thumb, or turning the tuning-pins of certain notes. These defects led gradually to the invention of the pedal harp, which has seven pedals, by which each note of the diatonic scale, in all the different octaves, can be made a semitone higher. The compass of the pedal harp is from contra F to D of the sixth octave above. In order to have the B flat, it must be tuned in the key of E flat. The music for the harp is written in the bass and treble clef, the same as pianoforte music. A celebrated harpist, Hochbrucker, in Donauwörth, invented the pedals in 1720; others say they were invented by J. Paul Velter, in Nürnberg, in 1730, who at least added the piano and forte pedal. After numerous attempts at further improvements, the harp at length reached a degree of perfection by the invention of the double-action pedal harp by Erard in Paris, which scarcely leaves anything more to be desired. By means of Erard's invention, each string can be sharpened twice, each time a semitone; so that the C string may be C flat, its full length, C natural by the first movement of the pedal, and C sharp by the next movement. The double-action harp is tuned with all the pedals half-down, and in the key of C natural.

HARPE, Jean François de la, was born at Paris, November 20, 1739, studied at the Collége d'Harcourt, and led for some time a rather chequered life. In 1762 he published a volume of juvenile poems, and in the following year his tragedy of *Warwick* appeared; it was very successful on the stage, and placed to his account both fame and money. Excepting the *Lycée*, this is by far the best of his works, though the writing has but little force. Grimm has admirably characterised the play as 'le coup d'essais d'un jeune homme de soixante ans.' La H.'s three subsequent plays, written in the same vein, *Timoléon*, *Pharamond*, and *Gustave Wasa*, entirely failed. The work that preserves his name, and has given him a permanent position among the literati of France, is his *Lycée, ou Cours de Littérature*, which, in default of a better, has till lately been their only reliable work of *haute critique*. That portion which relates to ancient literature is of little value, and that in which the author treats of contemporary writers is entirely worthless, owing to the bitterness and pride of the critic, who could see nothing great or good in the works of a rival or fellow-labourer. The intervening portion is, however, of great value to the student, giving, for the time, a complete critical history of French literature. The book will also be found serviceable to the student of the language. At its commencement, the Revolution found no more ardent admirer than La H.; but when he was cast into prison—where he is said to have been converted to Christianity by a fellow-captive, the Bishop of St Brieux—for refusing to countenance the extremes to which democracy was leading, his views entirely changed, and he became a firm supporter of church and crown. La H. died February 11, 1803.

HARPER'S FERRY, a village in Virginia, North America, at the confluence of the Shenandoah with the Potomac, where the latter passes through the Blue Ridge of the Alleghanies, 53 miles north-west from Washington. Its fine scenery has been celebrated by Jefferson in his *Notes on Virginia*. The Baltimore and Ohio Railway here crosses the Potomac. It is the site of a government foundry, armoury, and arsenal, which were destroyed and abandoned by the United States troops at the beginning of the civil war; and has since witnessed various struggles. It was also the scene of John Brown's abolition raid in Virginia, 1859. Pop. 1339.

HARPO'CRATES, the name given by Greek writers to the younger Horus, the hieroglyphical inscriptions calling him *Har pa khrut*, 'Horus the child,' the son of Isis. See Horus. According to the legend, he was a younger son of Osiris and Isis, who, having placed an amulet round her neck, gave birth to him at the winter solstice. He is described by Plutarch as lame in the lower limbs when born, to indicate the weak and tender shootings of corn. He is represented as a child wearing the skull-cap or *pschent*, the crown of the upper and lower world, and holding in his hands the whip and crook, to expel evil influences. At the right side of his head his hair is gathered into a single lock, and his finger is placed on his mouth, an action indicative of youth, and mistaken by the Greek and Roman writers for that of silence, of which they made H. the divinity. Sometimes he wears an amulet in shape of a vase round his neck. The temple at Edfou or Apollinopolis Magna was dedicated to him, and in the sculptures he symbolises the sun in the earliest hours of the day. He has generally been considered to be the winter sun, but rather represents the feeble and nascent sun of the later mythology. Lions were placed under his throne; cynocephali are said to be dedicated to him, probably from confounding him with the lunar god Khons; and the lotus, on which he is often depicted sitting, and which was thought to open at sunrise and close at sunset, was particularly sacred to him. So was the Persea, or *Cassia Fistularis*. His worship was introduced as part of the Isiac cult into Rome, and he was supposed to be very efficacious in giving dreams; an edict of the people being, however, directed against it in the consulship of Gabinius. In the consulship of Piso and Gabinius, his worship was driven from the Capitol; but he was very popular in the days of Pliny. Although the name of H. is not mentioned earlier than Eratosthenes, yet as he mentions it as part of that of an ancient monarch, it was undoubtedly of high antiquity.

Birch, *Gallery of Antiquities*, i. p. 37; Wilkinson, Sir G., *Mann. and Cust.*, iv. p. 405; Iablonski, *Pantheon*, i. p. 241.

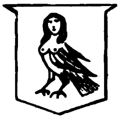
HARPOO'N, the weapon with which whales and other large cetaceans are killed. See WHALE.

HARP-SHELL (*Harpa*), a genus of gasteropodous molluscs of the whelk family (*Buccinidæ*), having the last whorl of the shell very large, the shell ribbed longitudinally, the foot of the animal very large. The species, which are not very numerous, are found in the seas of warm climates, and particularly at the Mauritius. The shells are much prized for their great beauty, but must be kept in drawers, and not exposed to light, or their delicate and brilliant colours will fade.

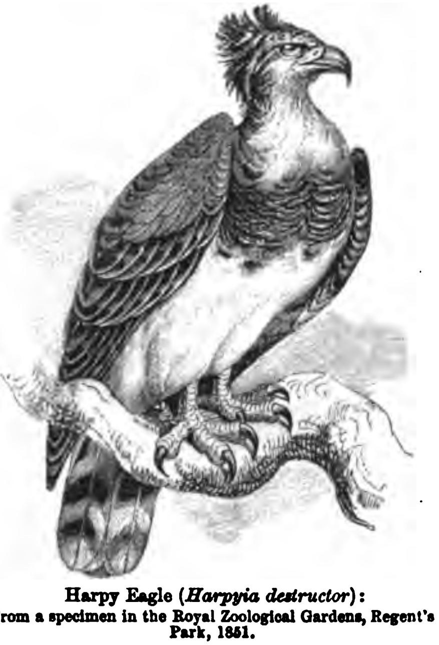
Harp-shell.

HA'RPSICHORD, a keyed musical instrument, formerly in extensive use, but now little known. In shape it was exactly like a grand pianoforte, to which its internal arrangements were also similar. The sound from the strings was produced by a small piece of crow-quill, or a piece of hard leather, which projected out of a slip of wood, called the jack, that stood upright between the strings, and was pushed upwards by the key, till the quill, or leather, twitched the string, causing a brilliant, but somewhat harsh sound, entirely deficient of any means of modification, in respect to loudness or softness. Specimens of the harpsichord, although now becoming more rare, are still to be found in good preservation, but rather as articles of vertu or curiosity, than as useful musical instruments. Many Italian and Dutch harpsichords were highly ornamented by the most eminent artists with valuable oil-paintings on the inside of the lid. The date of the invention of the harpsichord is uncertain. Before the 15th c., there is no trace of its existence. It was introduced into England early in the 17th century. In the 18th c., Kirkman, and later, Broadwood and Schudi, were the famous makers in London. After the invention of the pianoforte, the harpsichord and all instruments of the same kind, such as the spinet, were in time entirely superseded. See PIANOFORTE.

HARPY, a fabulous creature in Greek mythology, considered as a minister of the vengeance of the gods. Various accounts are given of the numbers and parentage of the Harpies. Homer mentions but one, Hesiod enumerates two—Aëllo and Okypete, daughters of Thaumas by the Oceanid Electra, fair-haired and winged maidens, very swift of flight. Three are sometimes recognised by later writers, who call them variously daughters of Poseidon or of Typhon, and describe them as hideous monsters with wings, of fierce and loathsome aspect, with their faces pale with hunger, living in an atmosphere of filth and stench, and contaminating everything that they approached. The most celebrated tradition regarding the Harpies is connected with the blind Phineus, whose meals they carried off as soon as they were spread for him; a plague from which he was delivered by the Argonauts, on his engaging to join in their quest. The Boreads Zetes and Calais attacked the Harpies, but spared their lives on their promising to cease from molesting Phineus.—A harpy in heraldry is represented as a vulture, with the head and breast of a woman.



Harpy.



Harpy Eagle (*Harpyia destructor*):
From a specimen in the Royal Zoological Gardens, Regent's Park, 1851.

The name H. has also been given in modern times to some of the *Falconidæ*, as the Marsh

Harrier (see Harrier) of Europe, and the H. or H. Eagle of South America (*Harpyia destructor* or *Thrasaëtus harpyia*), an inhabitant of the great tropical forests, where it preys chiefly on quadrupeds, and to a large extent on sloths and young deer. Of all birds, it has the most terrific beak and talons. It is larger than the common eagle; is short-winged and short-legged; the upper mandible greatly hooked; the feathers of the head capable of being erected into a great ruff and crest. It has not so elegant a form as the true eagles, but is probably equal to any of them in strength and courage. When adult, it is generally of a blackish slate colour, with gray head, and white breast and belly. It makes its nest in trees.

HARQUEBUSS. See Arquebuss.

HA'RRIER, a variety of dog used for hare-hunting, whence its name; probably of the same origin with the Foxhound (q. v.)—from which it differs chiefly in its smaller size—or perhaps partly derived from the beagle. It does not exceed 18 inches in height at the shoulder, but otherwise greatly resembles the foxhound, even in colours. It is not so swift as the foxhound. Its scent, however, is extremely keen, which enables it to follow all the doublings of the hare.

Harrier.

Persons hunting with harriers are exempt from taking out a game licence. See Hares.

HARRIER (*Circus*), a genus of *Falconidæ*, allied to Buzzards (q. v.), but differing from them in the more slender form of the body, longer and more slender legs, longer wings and tail, and in having the feathers around the eyes placed in a radiating manner, somewhat as in owls, a peculiarity which distinguishes them from all the other Falconidæ. They are remarkable for their low flight, skimming along the ground in pursuit of small quadrupeds, reptiles, &c. The **Marsh H.** (*C. æruginosus*), also called the **Moor Buzzard,** and sometimes the **Harpy** and the **Duck Hawk,** is the largest British species, being about 21—23 inches long. The head of the adult male is yellowish white.—The **Hen H.** (*C. cyaneus*) is 18 or 20 inches long, the adult male of an almost uniform gray colour, the female brown. The female is known as the **Ringtail,** from a rust-coloured ring formed by the tips of the tail-feathers. The Hen H. derives its name from its frequent depredations in poultry-yards. The male of the Hen H. is called the *Blue Hawk* in Scotland.

Hen Harrier (*Circus cyaneus*).

HARRI-KARI (Happy Despatch), the term applied by the Chinese to official suicides in Japan. According to Dr Macgowan, the Japanese estimate the number of these suicides at 500 per annum, exclusive of suicides by hanging or drowning. All military men, and persons holding civil offices under the government, are bound, when they have committed any offence, to rip themselves up, which they do by two gashes, in the form of a cross; but not until they have received an order from the court to that effect; for, if they were to anticipate this order, their heirs would run the risk of being deprived of their place and property. Not unfrequently, upon the death of superiors or masters, the same operation is self-inflicted by those who desire to exhibit devotion and attachment; sometimes also, in consequence of a disgrace or affront, it is resorted to, when no other resource presents.

HARRINGTON, James, an English political writer, was born in Northamptonshire, of a good family, in 1611, studied at Oxford under the celebrated Chillingworth, and, at the termination of his university career, proceeded to visit the continent. His travels embraced the Netherlands, Germany, Denmark, France, and Italy. On the breaking out of the civil war, he took part with the parliament, and in 1646 was appointed by the parliamentary commissioners one of the personal attendants of the monarch. After the execution of Charles, he withdrew from public notice, and devoted himself to the elaboration and completion of his political system. The result was his famous *Oceana*, a kind of political romance, on the plan of Plato's *Atlantis.* The work was first published in 1656, and was dedicated to Cromwell, who read it, but was not overwell pleased with its strait-laced and somewhat finical republicanism, and its animadversions upon usurpation. 'The gentleman must not think,' the Protector is reported to have said, 'to cheat me of my power and authority; for what I have won by the sword, I will not suffer myself to be scribbled out of.' Hume allows it to be 'a work of genius and invention,' and Dugald Stewart calls it 'one of the boasts of English literature.' Hallam's verdict is less favourable; he pronounces the author to be in general 'prolix, dull, pedantic, yet seldom profound;' but he admits that he 'sometimes redeems himself by just observations.' After the publication of *Oceana*, H. continued to exert himself in diffusing his republican opinions, founded a club called the 'Rota,' fell under suspicion after the Restoration, and was imprisoned, but afterwards released. Meanwhile, however, an attack of insanity had supervened, from which he never perfectly recovered. He died at Westminster, September 11, 1677. An edition of his writings was published by Toland in 1700, and a more complete one by Dr Birch in 1737. The best edition is probably that by Hollis (with Toland's Life), in 1771.

HARRIS, JAMES, an English philologist and logician, the eldest son of James Harris, Esq., of Close, Salisbury, was born July 20, 1709. His mother was the Lady Elizabeth Ashley Cooper, sister of Lord Shaftesbury, author of the *Characteristics*. He was educated at Salisbury, and Wadham College, Oxford, and entered upon the study of the law; but his father having died in 1734, leaving him a handsome fortune, he abandoned the pursuit of his profession, and gave his whole time, for a period of fourteen years, to the study of his favourite Greek and Latin authors. In 1745 he married a daughter of John Clarke, Esq., of Sandford, near Bridgewater, by whom he had five children, the eldest of whom, his only son, became the first Earl of Malmesbury. In 1761, he was returned to parliament for Christchurch, which seat he retained until his death. In 1762, he was appointed a Lord of the Admiralty, and the next year, Lord of the Treasury, and in 1774, Secretary and Comptroller to the queen. He died in 1780. He is chiefly known as the author of *Hermes*, or a *Philosophical Inquiry concerning Language and Universal Grammar*, a work of great erudition, published in 1751. 'It is written,' says Coleridge, 'with the precision of Aristotle and the elegance of Quintilian.' He had previously published three treatises—*On Art; On Music, Painting, and Poetry;* and *On Happiness*. In 1775 appeared his essay *On Philosophical Arrangements*, part of a large projected work on the Logical System of Aristotle. His last work, entitled *Philological Inquiries* (1780), consists of a series of criticisms and comments on the principal ancient, medieval, and modern authors. His works, with Life by his son, the Earl of Malmesbury, were published at London in 1801.

HA'RRIS, or HERRIS, a district or parish of Scotland, in the Hebrides, comprises the southern portion of the island of Lewis and a number of adjacent islets. See LEWIS.

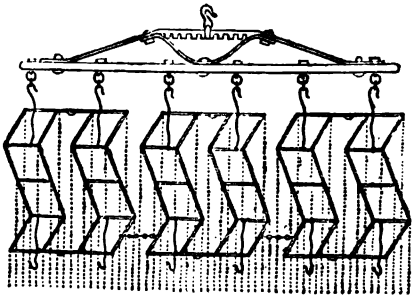
HA'RRISBURG, the capital of Pennsylvania, United States, America, is situated in the midst of magnificent scenery on the left bank of the Susquehanna River, 107 miles west-north-west of Philadelphia, lat. 40° 16′ N., long. 76° 50′ W. It has a handsome state-house, a court-house, jail, state arsenal, state lunatic asylum, numerous churches, several academies, eight or ten newspaper-offices, a railway bridge, 2876 feet in length, and seven diverging railways. It was settled in 1733 by John Harris, an Englishman, under a grant from the Penns, the original European settlers of Pennsylvania. Pop. (1870) 23,104.

HARRISON, JOHN, a celebrated mechanician, was born at Faulby, near Pontefract, Yorkshire, in 1693. His mechanical genius, which early displayed itself, led him to study the construction of clocks and watches, with a view to diminishing as much as possible their errors and irregularities, and by 1726 he had effected considerable improvements in their structure. In 1714, the government had offered prizes of £10,000, £15,000, and £20,000 for the discovery of a method for determining the longitude within 60, 40, or 30 miles respectively. After repeated attempts, H. constructed a chronometer, which, in a voyage to Jamaica in 1761—1762, was found to determine the longitude within 18 miles; he therefore claimed the reward of £20,000, which, after a delay caused by another voyage to Jamaica, and further trials, was awarded to him in 1765—£10,000 to be paid on H.'s explaining the principle of construction of his chronometer, and £10,000 whenever it was ascertained that the instrument could be made by others. The success of H.'s chronometer is owing to his application of the *compensation curb* to the balance wheel, and on the same principle he invented the *gridiron pendulum* for clocks. These, along with his other inventions, the *going fusee* and the *remontoir escapement*, were considered to be the most remarkable improvements in the manufacture of watches of the last century (see HOROLOGY). H. died in Red Lion Square, London, in 1776.

HARRISON, WILLIAM HENRY, ninth president of the United States, born February 9, 1773, in Virginia, was the son of Benjamin Harrison, who signed the declaration of independence. On the death of his father, he joined in 1792, as ensign, the army which Wayne was leading against the north-western Indians. He left the army in 1797. In 1801, he became governor of Indiana, and as its representative in Congress, succeeded in passing a law relating to the sale of the federal land in small parcels, to which the western states ascribe all their prosperity. In the war against the Indians in 1811, and which soon became also a war against the English in Canada, H., as commander-in-chief of the American army, shewed great military talent. He defeated the Indians in an important battle at Tippecanoe, and by the victory of Perry on Lake Erie was enabled to pursue the British invaders into Canada, where, on October 5, 1813, he totally routed them in the battle of Thames. In 1814 he resigned his commission. In 1816 he was elected to Congress, and in 1824 became a member of senate. In 1828 he went as ambassador to Colombia, but was recalled in 1829, and for 12 years was clerk of a county court in Ohio. The Whig party tried in vain to make him president of the United States in 1836, but succeeded in 1840. He died a month after his inauguration, in April 1841.

HA'RROGATE, HARROWGATE, or HIGH HARROGATE, a village in Yorkshire, 20 miles west of York city, is celebrated for sulphureous and chalybeate springs. The sulphureous springs are also saline, and of laxative and diuretic quality, while the chalybeate waters are tonic. H. is a very agreeable residence, the surrounding country being full of beauty and interest; it is largely frequented by visitors in summer, and is now easily accessible by the railway from Leeds to Doncaster. The waters are of considerable activity, and should only be taken under medical advice. They are used both externally and internally, and are in great repute in many diseases of the skin, and in some cases of dyspeptic disorders, scrofula, gout, &c. Harrogate springs were discovered in 1571. A local report on their virtues, with analyses in detail, by Professor Hoffman, was published in 1854. Pop. in 1871, 6843.

HARROW, an agricultural implement, used for smoothing and pulverising ploughed land, and for covering the seeds previously sown. It consists of a frame of a square or rhombic form, in which are fixed rows of teeth, or *tines*, projecting downwards. The harrow is a very ancient implement, having been in use beyond the dawn of history; but as in early times only the lighter soils were cultivated, it often consisted of bushes, or branches of trees, which merely scratched the ground. Subsequently, we find a wooden frame and wooden tines in use; next, the wooden frame with iron tines, a form of the instrument very much used at the present day, and especially in favour for light soils. For heavy soils, the harrow constructed wholly of iron is most used, as it is heavier and does more execution; and of this sort the zigzag form made by Mr Howard of Bedford is preferred. The Howard harrow has the tines so arranged that no one follows in the track of another, but each has a separate line of action, which greatly diminishes the risk of any portion of the surface escaping pulverisation. A 'brake' is a large harrow used for breaking down rough or hard land. The 'chain-harrow,' which is a congeries of iron rings, is useful for covering grass-seeds, and especially for separating weeds from the earth or clods in which they are enveloped.


Howard's Harrow.

HARROW-ON-THE-HILL, a village of Middlesex, England, is finely situated on the summit of a small eminence about twelve miles north-west of London, on the London and Birmingham Railway. Pop. (1871) 4997. The village derives its celebrity solely from the grammar-school founded here, in 1571, by John Lyon, a wealthy yeoman of the parish. The school was originally intended to afford a gratuitous education to poor boys belonging to the parish, and is still nominally free to all the boys of the parish, but, as in many other cases, it has been diverted from its primary purpose, and is now chiefly attended by the sons of the nobility and gentry, and possesses a very high reputation. It has several exhibitions to Oxford and Cambridge. Among the eminent men who have been educated at H. may be mentioned Sir William Jones, Dr Parr, Lord Byron, George Canning, and Sir Robert Peel.

HARRY, BLIND, a Scottish minstrel of the 15th century. Scarcely anything is known of his life beyond what is told by Dr John Major (or Mair) in his *History of Scotland*, published in 1521. 'When I was a child,' he says, 'Henry, a man blind from his birth, who lived by telling tales before princes and peers, wrote a whole book of William Wallace, weaving the common stories (which I, for one, only partly believe) into vernacular poetry, in which he was skilled.' In 1490—1492, Blind Harry is found at the court of King James IV., receiving occasional gratuities of five, nine, and eighteen shillings. The poem attributed to him, *The Life of that Noble Champion of Scotland, Sir William Wallace, Knight*, was completed before the end of the year 1488, when it was copied by John Ramsay. This copy, the oldest MS. of the work now known to exist, does not ascribe it to Blind Harry, nor is his name given to it in the earlier printed editions. The poem, which contains 11,861 lines, of ten syllables each, is written in rhyming couplets. The language is frequently obscure, and sometimes unintelligible, but the work as a whole is written with vigour; in some passages, it kindles into poetry; and it is altogether a surprising performance, if we receive it as the composition of one who was born blind. The author seems to have been familiar with the metrical romances which were the popular literature of the time, and he makes repeated appeals to two Latin lives of Wallace, one by his schoolfellow, Master John Blair, another by Sir Thomas Gray, parson of Liberton. But the poem has no claim to be regarded as history; it is full of gross mistakes or misrepresentations of facts known to every one, and it can only be looked upon as an embodiment of the wild and sanguinary legends which two centuries had gathered round the name of the martyred hero of a fierce struggle for national life. The work is believed to have been printed in the Scottish capital as early as 1520, but no perfect copy is known to be preserved of any earlier edition than that of Edinburgh in 1570, bearing the title of *The Actis and Deidis of the Maist Illuster and Vailyeand Campioun Schir William Wallace, Knicht of Ellerslie*. The work was reprinted at Edinburgh in 1594, 1601, 1620, 1648, 1673, and 1758; at Glasgow, in 1665 and 1699; at Aberdeen, in 1630; and at Perth in 1790. The best edition is that of Dr Jamieson (from the MS. of 1488), published at Edinburgh in 1820, in 1 vol. 4to. The work was for about 200 years one of the most popular in Scotland, but gradually fell into neglect as its language, never very easy, ceased to be understood except by scholars. Its place was supplied by a modernised version by William Hamilton of Gilbertfield, published at Glasgow in 1722, with the title of *A New Edition of the Life and Heroic Actions of the Renoun'd Sir William Wallace*. This is a poor performance, but it continued to be widely circulated among the Scottish people almost to our own day.

HART, the name given to the Stag (q. v.) or male of the red deer, from the age of six years, when the crown or *surroyal* of the antler begins to appear. Great importance was formerly attached to the distinction of names proper to deer at different ages, and Guillim, in his Heraldry, defines hart as above, rebutting the notion 'that a stagge, of what age soever he be, shall not be called a hart until the king or queen have hunted him;' but 'if the king or queen do chase or hunt him, and he escape away alive, then after such hunting or chasing he is called a *hart royall*.'

HART, SOLOMON ALEXANDER, R.A., an English painter, of Jewish origin, was born at Plymouth, in Devonshire, April 1806, entered the Royal Academy, London, in 1823, and exhibited his first oil-picture, 'Instruction,' in 1828. Since then, he has painted, among other works, 'The Elevation of the Law' (1830); 'Isaac of York in the Donjon of Front-de-Bœuf' (1830); 'English Nobility privately receiving the Catholic Communion' (1831); 'Eleanor sucking the Poison from Edward's Arm;' 'Milton visiting Galileo in Prison' (1847); and 'The Three Inventors of Printing' (1852). In 1835, H. became an Associate; in 1840, an R.A.; in 1854, Professor of Painting in, and in 1865 Librarian of, the Royal Academy. His picturesque vigour and technical power are universally acknowledged.

HARTEBEEST. See KAAMA.

HARTFORD, a city, and one of the two capitals of Connecticut, United States, America, is situated on the west bank, and fifty miles from the mouth, of the Connecticut River, and distant one hundred and eleven miles north-east from New York. The legislature meets here and at New Haven alternately. It has a handsome state house, city hall, arsenal, deaf and dumb asylum, an admirable asylum for the insane, an Episcopal college, numerous churches, a free library, and many banks and insurance offices. It has a large trade and many flourishing manufactories, among which is the large establishment for the making of

Colt's firearms. The various manufactures amount to over £1,000,000 per annum. Railways connect the city with all New England, and many lines of steam-boats, packets, and sailing-vessels carry on an extensive commerce. Tobacco and silk are among its exports, and its manufactures of cotton, books, carriages, clocks, machinery, &c., are distributed over the whole continent. H. is one of the oldest towns in New England, where were enacted the famous 'Blue Laws.' Pop. in 1870, 37,180. It was also the seat of the Hartford Convention (q. v.).

HARTFORD CONVENTION, in the political history of the United States, was an assemblage of delegates from the New England States, at Hartford, Connecticut, December 15, 1814. This convention was proposed by the Massachusetts legislature, which appointed delegates from that state. The government of the United States, under the presidency of Mr Madison, declared war against Great Britain in 1812, for injuries to commerce growing out of the war with France, and the impressment of American seamen by British men-of-war. Of the two American political parties, the Democratic favoured France, while the Federalists took the part of England. As the war destroyed commerce and the fisheries, the chief interests of New England, which was also Federalist in politics, there was a violent opposition. The governors of these states would not allow the militia to leave them, and complained that while their people were taken by conscriptions, their own coasts were left undefended. The ostensible object of the convention was to devise means of security and defence. George Cabot of Massachusetts was elected president, and Theodore Dwight of Connecticut, secretary. It sat 20 days with closed doors, and as it was supposed to be of a treasonable character, it was watched by a military officer of the government. The convention, at rising, proposed certain amendments to the constitution—free population as the basis of representation, a single term for the presidency, to exclude foreigners from office, to limit embargoes to 60 days, and to require a two-thirds vote of congress to admit new states, make war, &c. Though no treasonable act was committed, and no treasonable intention proved, the Federalist party never recovered from the odium of its opposition to the government, and 'Hartford Convention Federalist' has been to this day a term of reproach.

HARTLEPOOL, a municipal and parliamentary borough, seaport, and market-town of England, in the county of Durham, is situated on a small peninsula, north of the estuary of the Tees, 20 miles E.S.E. of Durham. It consists of one principal and several smaller streets, and was formerly surrounded by walls. The harbour is safe, and easily accessible; extensive docks have been constructed. Fishing is here carried on with success. H. formerly attracted many visitors for sea-bathing during the summer months; but since its recent commercial revival, owing to the formation of railways connecting it with the coal-mines of Durham, it is no longer visited for that purpose. In 1872 (including West H.), 2125 vessels, of 458,424 tons, entered, and 4541, of 753,096 tons, cleared the port. The trade is chiefly in coal. As one of the Hartlepools, it joins in sending one member to parliament. Pop. of municipal borough (1871), 13,166.

HARTLEPOOL, West, a modern market-town and seaport in the county of Durham, situated one mile to the westward of the ancient borough of Hartlepool, and within the township of Stranton. It has sprung into existence within the last few years, having been founded by Ralph Ward Jackson, Esq., an enterprising railway speculator, in 1847. It consists of one principal and several diverging streets, and possesses a large and handsome Gothic church, several large hotels and dissenting chapels, a theatre, Athenæum, and Mechanics' Institute, Custom-house, Market-house, and other public buildings, and had in 1871 a population of 21,110. The first harbour was constructed here in 1847, of 12 acres, and has since been enlarged to 44 acres. The first dock has a water area of 8 acres; the Jackson Dock has 14 acres; and the Swainson Dock, 10 acres. There are also large graving-docks, timber-ponds, and about 3 miles of quays. In 1867, the number of vessels entering and clearing the port (including Hartlepool) was 9213, of 1,468,948 tons burden. The export of coal from the united port is about 1,500,000 tons annually. In 1866, a poor year, 575,899 tons were exported coastwise, and 903,611 to foreign ports. Besides coal, the following are the principal imports: Flax and hemp, grain, timber, butter, cheese, fruit, cattle, tallow, yeast, iron, zinc, &c.; the exports consisting of woollen, cotton goods, copper, cement, drugs, machinery, earthenware, yarn, hides, &c.; the trade being carried on for the most part with the Baltic ports, Cronstadt, St Petersburg, and Danzig, and with Hamburg and Rotterdam. Iron ship-building is carried on here to a large extent: in 1872, 11 steam-vessels, of 8199 tons, were turned out. There are large iron-foundries, cement-works, locomotive engine and boiler works, mast and block lofts, saw-mills, tile-works, and brick-fields. The Hartlepool boroughs consist of Hartlepool, West H., Throston, Stranton, and Seaton Carew, and send one representative to the House of Commons.

HARTLEY, David, a celebrated mental philosopher of last century, was born August 30, 1705. His father was vicar of Armley, in Yorkshire. At 15, he entered Jesus' College, Cambridge, and became a fellow of the college. He studied at first for the church, but his turn for original and independent thinking led him to dissent from some points in the Thirty-nine Articles, and he, in consequence, had to abandon his original intention. What his precise difficulties were, we are not informed; we know only that, in his mature years, he impugned the eternity of hell-punishment, maintaining the ultimate restoration of the damned. In all other points, his published opinions coincided with the Church of England, and he continued to the last a member of the church. He finally chose the profession of medicine, in which he attained considerable eminence. He practised as a physician successively at Newark, Bury St Edmunds, in London, and at Bath, where he died on the 25th of August 1757, at the age of 52 years.

His work on the mind, entitled *Observations on Man*, on which his fame rests, was begun when he was about 25, and occupied his thoughts for 16 years. It was published in 1749. The first part relates to the constitution of the human mind, and is the really important and original part. The second part treats of religion and morals, and might have been written by any orthodox clergyman, if we except the opinion above stated with reference to future punishment.

His handling of the mind turns throughout upon two theories or hypotheses, which have very different merits, and are by no means necessarily conjoined, although they are never separated in his mind. The first is called the Doctrine of Vibrations, or a theory of nervous action analogous to the propagation of sound, the suggestion of which he owed to Newton, of whose writings he was a devoted student. His second and most valuable innovation consisted in shewing that the faculties, powers, and feelings of the mind might be explained to a very wide extent by the principle of the Association of Ideas (see ASSOCIATION OF IDEAS), a principle far from new in the statement of it, but never before appreciated in anything like the range of its bearings upon the phenomena of mind.

The doctrine of vibrations supposed that when any one of the senses is affected by an outward object, the effect was to set the particles of the nerve in a vibratory motion, which ran along to the brain, and produced corresponding vibrations in the cerebral substance. In like manner, when an active impulse proceeded outwards to the muscles, the manner of communication along the nerves was of the same kind. He even extended these molecular vibrations to the other tissues. As a hypothesis, this assumption was so far legitimate, if it served to explain the facts, or even to imagine in a probable way what goes on in the substance of the nerves and brain during the processes of sensation, thought, and volition. The distaste that has generally been entertained towards this part of H.'s speculations, arose from a mistaken notion of its favouring materialism. Not only was the author not a materialist—being most express in affirming a spiritual entity different from the body—but his views had nothing more of materialism in them than the views that mankind have always held as to the connection of mind with bodily actions.

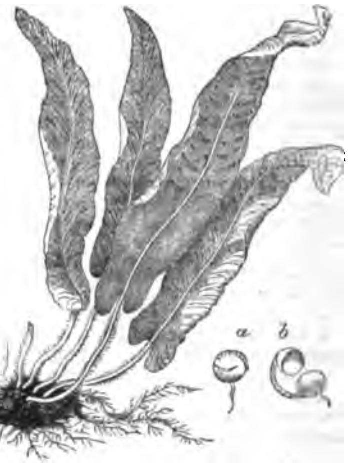
As regards the second doctrine of H., the doctrine of Association, he was certainly the first to do justice to the applications of that principle to explain the phenomena of the mind. He points out how it is involved in the conversion of our sensations into ideas, throughout all the senses, and also in the first origin of voluntary power, which he truly regards as essentially an acquired power. He then treats of the commonly recognised intellectual faculties—Memory, Imagination, Reason, &c.—shewing how widely the process of association pervades them all. Lastly, the Emotions, which he classifies under six heads—Imaginative Emotions, Ambition, Self-interest, Sympathy, Theopathy (the religious sentiment), and the Moral Sense—may be readily seen to be, in a great many instances, the products of association, there being certain elementary feelings that unite among themselves, and pass into new connections, and give birth to complex feelings, under the general law. Many of those explanations would be considered now as faulty or defective; but at the time, H.'s attempt was a great step in advance, and might have been much more fruitful in consequences to mental science, but for the unfortunate and mistaken prejudices excited by the vibration theory, which he carries out into every part of his exposition.

HARTMANN VON DER AUE, or **VON AUE**, one of the old German poets, born about 1170, was a Swabian knight. He had probably begun the study of grammar, knew French when he joined the Crusade in 1197, and, as he himself says, could obtain, by his own reading, material for his narrative poems. Of these the first was *Erec* (the legend reproduced in Enid of Tennyson's *Idylls of the King*), written shortly before 1197, and edited by Haupt (1839); the last was *Iwein*, written before 1204, and edited by Benecke and Lachmann (1827; 2d ed. 1843), with a dictionary by Benecke (1833). Both of these are drawn from the Arthurian cycle of legends; and their natural development of events displays a completer mastery of their material than the more incoherent British narratives which form their basis. Between the composition of these two poems, H. wrote the religious legends, *Gregor auf dem Steine* (ed. by Lachmann, 1838), which was read in churches till the 16th c., and *Der arme Heinrich* (Longfellow's *Golden Legend*), which has been edited by W. Müller (1842), and also, along with H.'s *Lieder und Büchlein*, by Haupt (1842). By these works, which have all been translated into modern German, H. was known among his contemporaries. Gottfried von Strasburg, in his *Tristan*, written about 1207, praises him as still alive; and his death is lamented about 1220, by Heinrich von dem Türlein, in his *Krone*.

HARTO'GIA, a genus of trees, or shrubs, of the natural order *Celestraceæ*. *H. Capensis*, a native of the Cape of Good Hope, is only ten or fifteen feet high, but the trunk is a foot to a foot and a half in diameter. The wood is hard, fine-grained, close, and tough; it is much valued, and when polished, is superior to the finest mahogany. It is often used for veneering. The Dutch colonists call it *Ladle-wood*, probably from one of the first uses to which they found it convenient to apply it.

HARTSHORN, the term given in pharmacy to the antlers of the *Cervus elaphus*. Its composition is very different from that of persistent horns, as those of the ox, for example, and is identical, or nearly so, with that of bone. The products of its distillation were formerly much used in medicine, under the titles of Oil of Hartshorn, Volatile Salt of Hartshorn, Spirits of Hartshorn, &c.; but they are now replaced by simpler preparations of the active ingredients of these substances, namely, ammonia and carbonate of ammonia. See AMMONIA.

HART'S-TONGUE (*Scolopendrium*), a genus of ferns, of which one species, *S. vulgare*, is a native of Britain, and is common in most parts of the country, in moist woods, shady banks, caves on the sea-shore, and other cold and damp situations. It is also found on the continent of Europe and in North America. It is very different in appearance from every other British fern, its fronds being, in general, quite undivided—although sometimes, by monstrosity, they are forked and even multipartite—linear, from a few inches to two feet in length, and from an inch to two or three inches in breadth. The *sori* are in transverse lines, on the lateral nerves. Fine plants of this fern have a very ornamental appearance, and are in their greatest luxuriance in winter.



Hart's-Tongue (*Scolopendrium vulgare*):
a, sporangium, or spore-capsule; *b*, the same, opened, shewing its elastic ring.

HARTZENBUSCH, JUAN EUGENIO, a modern Spanish dramatic poet of German extraction, was born at Madrid, November 6, 1806, studied under the Jesuits, and produced his first work, *Amantes de Teruel*, in 1836. His principal works since then, all of which have been published at Madrid, are *Doña Mencia* (1838), *La Redoma Encantada* (1839), *La Visionaria* (1840), *Alfonso el Casto* (1841), *Primero Yo* (1842), *Honoria* (1842), *El Buchiller Mendarias* (1842), *La Coja y el Encogido* (1843), and *La Madre de Pelayo* (1846). He has also collected and republished his fugitive poems and prose-essays under the title of *Ensayos Poéticos y Articulos en Prosa, Literarios y de Costumbres* (1843; Paris, 1850). His writings are characterised by glowing imagination, vigorous diction, and sonorous versification. H. is considered one of the most original of the living poets of Spain. He is also one of the few who possess any solid knowledge of German literature.

HÂRÛN, surnamed AL-RASCHÎD, i. e., the Just, the most renowned of the Abbaside califs, succeeded his elder brother, Haudi, in the califate, in the year 786, not having yet attained his twenty-first year. Various insurrections in the interior of the kingdom were speedily put down, and the wars against the Byzantines and the Chasars brought to an end. Though the boundaries of the vast empire, which extended from the Caucasus to the sources of the Nile, were not enlarged, the empire lost none of its provinces. H. gave himself up unreservedly to the pleasures of life, leaving the entire administration of his extensive kingdom in the hands of Yahya the Barmecide, and his four sons; and the energy of their administration, the enforcement of order, and the general prosperity of the country, proved that his confidence was not misplaced. His capital city of Bagdad he rendered the most flourishing city of that period. Tribute was paid to him from all quarters, and splendid edifices were erected by him at a prodigious cost. At the same time, he was the patron of learning, poetry, and music, and his court was the resort of the most eminent Mohammedans of the age. He was celebrated in countless songs and narratives; and is the hero of several of the stories in the *Arabian Nights*. Towards the end of his reign, he conceived a rooted hatred towards the Barmecides (see BARMECIDES); yet so well did he know their tried fidelity, that he suffered the reins of government to remain in their hands for some years afterwards. In 803, he caused the vizier, his four sons, and all their descendants, one only excepted, to be executed, not even excepting his favourite Jaafer, who had been his companion in his nocturnal rambles through the streets of Bagdad. On the destruction of this family, his affairs fell immediately into irretrievable confusion; treason and rebellion, no longer dreading the far-reaching arm of the able vizier, shewed themselves in every corner of the empire; and now, when it was too late, H. thought with bitter regret of his savage cruelty to that able family. The most formidable of these insurrections having broken out in Khorassan, in the north-east of the empire, H. marched in person against the rebels. But an attack of apoplexy obliged him to remain behind in Tûs, where he soon afterwards died, in the month of March 809. The tales of the *Arabian Nights* have thrown a false halo round his memory, for though he was undoubtedly the most enlightened monarch of the age, yet, like the most of the Abbaside race, he could, when it suited him, act to perfection the part of the avaricious and bloody tyrant.

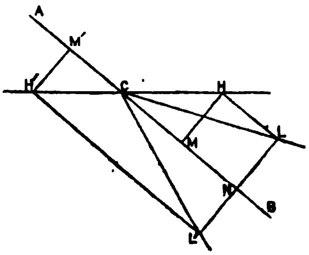
HARU'SPICES. The word *haruspex*, or *aruspex*, is probably derived from an old Latin word, *haruga*, a victim, or *hira*, intestines, and the root *spec-*, to see or look. The haruspices seem to have come originally from Etruria, whence the Romans derived many of their religious institutions. Their art, *haruspicina*, which in many respects was like that of the Augurs (see AUGURIES AND AUSPICES), consisted in interpreting the will of the gods by inspecting the entrails of the animals offered in sacrifice (hence they are also called *extispices*), and by observing other circumstances connected with the offerings, such as the willingness or unwillingness of the victim to come to the altar, the flame, the smoke, &c. They took indications also from earthquakes, lightning, and all other extraordinary phenomena of nature called *portenta*. The haruspices did not equal the augurs in dignity and respect; they were regarded rather as *media* of communication with heaven, than as possessing any independent religious authority. They had no organisation, like the augurs; they did not, in earlier times at least, form a *collegium*, nor had they a *magister*. They were, however, at one time considered of great importance; but latterly their art fell into disrepute with the more intelligent portion of the Roman citizens. Cato is alleged to have said that 'he wondered that one haruspex did not laugh when he saw another.' Some of the later emperors, especially Alexander Severus, endeavoured to revive and encourage the art of the haruspices, but it was finally abolished by Constantine. Their sacred books were called *libri haruspicini*, *fulgurales*, and *tonitruales*.

HARVARD COLLEGE, the oldest college in the United States, often termed a university, was founded at Cambridge, Massachusetts, three miles from Boston, in 1636, only six years after the settlement of the colony, £800 having been appropriated in three sums for the support of 'a schoale or colledge.' In 1639, this 'schoale' was named Harvard College, in honour of the Rev. John Harvard, who gave it £700. It has been well endowed by private liberality, chiefly that of the merchants of Boston, and has, besides its valuable landed property, 1,000,000 dollars of invested funds. At its first establishment, this now flourishing college was little more than an Indian school. Many Indian youth were received, but only one ever graduated. They were found utterly unfit for the life, pursuits, and studies of civilisation, and those partly educated went back to their forests and wigwams. The first president of Harvard was the Rev. Henry Dunster, 1640. In 1764, the library was destroyed by fire; the only works saved being an Oriental Collection, bequeathed by Dr Lightfoot, and the Greek and Roman classics, presented by Bishop Berkeley. In 1848, a scientific department was generously endowed by Abbott Lawrence, for the benefit of persons who do not wish to pursue the full course. The government is vested in the president, five fellows, and treasurer, with a board of overseers, formerly composed of the congregational ministers of sixteen adjoining towns. In religion, it is Unitarian, but liable to change, the overseers being now appointed by the state legislature. Connected with the college are seven professional schools of law, theology, medicine, science, mining, dentistry, and agriculture. There are 56 professors, 14 tutors, 1161 students, and libraries of 187,000 volumes.

HARVEST (Ger. *herbst*, autumn; probably allied to Gr. *harp-*, Lat. *carp-*, to snatch, pluck, gather), the season of gathering and storing the chief products of the fields. The most important harvest operations are those connected with the cutting down of the grain crops, in which, as well as in the mowing of hay (q. v.), machines moved by horses are now extensively used. See REAPING.

HARVEST BUG (*Leptus autumnalis*), is an animal of the *Acarus* tribe, which derives its popular name from its attacking the labourers employed in the harvest. As the acari in their perfect state are usually provided with eight feet, and in their larval stage with only six feet, and as the H. B. has only the latter number, it was suspected by Siebold, and it has been since proved, that this animal is the larva of one of the Trombidida, a family of Acaridans. It is so minute, that, were it not for the brilliancy of its colour, which is a vivid crimson, it would be quite invisible. It makes its appearance, or rather renders us conscious of its presence, about the middle of July, and disappears towards the middle of September; and is most plentiful in hot dry seasons. It occurs on the blades of grass, and on various plants in fields, gardens, and woods, and attacks not only man, but the dog, cat, &c. Persons with delicate skins are its special prey, and it seems to prefer the legs, the under part of the thighs, and the lower part of the abdomen. The wound it inflicts—how produced is not well understood—occasions insupportable irritation, which usually leads the victims to scratch themselves, and thus to increase the inflammation. The skin becomes swollen and red, and sometimes even purple; and the minute vesicles caused by these animals sometimes terminate in suppuration.

HARVEST MOON. In our latitudes, at the time of full moon nearest the autumnal equinox, it happens that the moon rises for several days nearly at sunset, and about the same time by the clock, instead of rising, as it usually does, 52′ later on one day than on the preceding. This phenomenon is owing to the fact, that at this time the moon is in Aries, when the part of the ecliptic below the horizon makes the least angle with it, as shewn in the following figure, where AB represents a portion of the equator; H′CH, a portion of the horizon; CL, a portion of the ecliptic when C represents the equinoctial point of Aries; CL′, a portion of the same if C were the equinoctial point of Libra. Then (supposing the moon to move in the ecliptic, a supposition not far from the truth, and one which greatly simplifies the explanation of this phenomenon), if the moon be at C (point of Aries) on one night, it will have retrograded to L by the same time on the following night; and, by the revolution of the earth in the direction NM′, will appear on the horizon at H, and the distance LH reduced to time will give the moon's retardation. If C be the equinoctial point of Libra, then L′ will be the moon's position on the second night, and it will rise at H′ after the earth has revolved so as to carry the whole of the line H′L′ above the horizon; this line, when reduced to time, gives the retardation. Hence, as the moon when at the full is in Aries at the sun's autumnal equinox, and in Libra at the sun's spring equinox, the retardation is least in the first instance and greatest in the second, being respectively CN — CM, and CN + CM′ = CN + CM. In the latitude of Edinburgh (55° 58′), the greatest retardation is 1 hour 8′ 24″, and the least 11′ 44″; in lat. 64° 27′, the least retardation is zero, or the moon rises at the same time on two successive evenings, while at the arctic circle (67° 30′) it rises 4′ earlier on the second evening. As this phenomenon occurs at a time (about the 23d of September) when the farmer is busy with his harvest, and very opportunely supplies him for several evenings with light sufficient to continue his operations after sunset, the moon at this stage has received the name of 'harvest moon.' As the moon's orbit is inclined to the ecliptic, this irregularity will be increased or diminished according as the ascending node is between Capricorn and Cancer, or between Cancer and Capricorn. It is nothing at the equator, increasing as we proceed north. At our antipodes the greatest retardation occurs in September, and the least in March.



HARVEY, SIR GEORGE, P.R.S.A., an eminent artist, was born at St Ninians, near Stirling, in 1806. Displaying a taste for drawing, he was at the age of 18 placed in the school of the Trustees' Academy, Edinburgh, where he made rapid progress. In 1826, when the Royal Scottish Academy was instituted, he was elected an Associate, and in 1829 an Academician. Since his entrance, he has been a constant exhibitor, and many of his works are well known through the medium of engravings. The principal of these are—'Covenanters Preaching,' 'Battle of Drumclog,' 'The First Reading of the Bible in Old St Paul's,' 'The Curlers,' 'Columbus discovering America,' and 'Quitting the Manse.' H. has not confined himself to historical art, some of his most successful works being representations of Scotch scenery. His landscapes are remarkable for pastoral peace, and some of the more imaginative for a singular solemnity of atmospheric effect. He was elected president of the Royal Scottish Academy on the death of Sir John Watson Gordon in 1864, and knighted in 1867.

HARVEY, WILLIAM, the discoverer of the circulation of the blood, was born at Folkstone, in Kent, on the 1st of April 1578. His father was a yeoman; and five of his brothers were merchants of weight and substance, *magni et copiosi*, in the city of London, while the sixth sat as member of parliament for Hythe.

After six years' attendance at the grammar-school at Canterbury, H., being then 16 years of age, was entered at Caius College, Cambridge. He took his first degree in arts in 1597, and having selected physic for his profession, left Cambridge about the year 1590, and proceeded to the university of Padua, then the most celebrated school of medicine in the world. Having passed five years at that school in attendance on the lectures of Fabricius de Aquapendente, Julius Casserius, and other eminent men, who then adorned that university, he obtained his diploma as doctor of medicine in 1602. He returned to England in the same year; and after receiving his doctor's degree from his original university, Cambridge, settled in London as a physician. In 1609 he was appointed physician to St Bartholomew's Hospital, and in 1615 Lumleian Lecturer at the College of Physicians—an office then held for life; and it is generally supposed that in his first course of lectures (in the spring of 1616) he expounded those original and complete views of the circulation of the blood with which his name is indelibly associated. It was not till the year 1628 that he gave his views to the world at large, in his celebrated treatise entitled *Exercitatio Anatomica de Motu Cordis et Sanguinis* (4to, Franc.), having then, as he states in the preface, for nine years or more gone on demonstrating the subject in his college lectures, illustrating it by new and additional arguments, and freeing it from the objections raised by the skilful amongst anatomists. Shortly after H.'s election as Lumleian Lecturer (in 1617 or 1618), he was appointed physician-extraordinary to James I., and in the beginning of 1630 was engaged 'to accompany the young Duke of Lennox in his travels beyond seas.' In 1632, he was formally chosen physician to Charles I.; and in 1633 we find that his absence, 'by reason of his attendance on the king's majesty,' from St Bartholomew's Hospital was complained of, and that Dr Andrews was appointed as his substitute, 'but without prejudice to him in his yearly fee or in any other respect'—a procedure which shews the esteem in which H. was held. We learn from Aubrey that he accompanied Thomas Howard, Earl of Arundel, in his embassy to the emperor in 1636; and during this journey he publicly demonstrated to Caspar Hofmann, the distinguished professor of Nürnberg, and one of the chief opponents of his views, the anatomical particulars which made the circulation of the blood a necessary conclusion—a demonstration which, it is reported, was satisfactory to all present save Hofmann himself, who still continued to urge futile objections. He attended the king in his various expeditions, and was present with him at the battle of Edgehill (October 23, 1642). 'During the fight,' says Aubrey, 'the Prince and Duke of York were committed to his care. He told me that he withdrew with them under a hedge, and tooke out of his pockett a booke, and read. But he had not read very long before a bullet of a great gun grazed on the ground neare him, which made him remove his station.' He accompanied the king after the battle to Oxford, where, according to the same authority, 'he came several times to our college (Trinity), to George Bathurst, B.D., who had a hen to hatch eggs in his chamber, which they opened dayly to see the progress and way of generation;' and where the honorary degree of Doctor of Physic was conferred on him in the December of that year. In 1645 he was, by the king's mandate, elected warden of Merton College; but on the surrender of Oxford to the parliament in July 1646, he left the university, and returned to London. He was now 68 years of age, and seems to have withdrawn himself from practice, and from all further participation in the fortunes of his royal master. During the remainder of his life, he was usually the guest of one or other of his brothers, now men of wealth and high standing in the city; and it was at the country-house of one of them that Dr Ent visited him at Christmas 1650, and after 'many difficulties' (see Dr Ent's Epistle Dedicatory, in Willis's translation of Harvey's works) obtained from him the MS. of his work on the generation of animals, which was published in the following year, under the title of *Exercitationes de Generatione Animalium, quibus accedunt quædam de Partû, de Membranis ac Tumoribus Uteri, et de Conceptione*, 4to.

From this period to the time of his death, the chief object which occupied his mind was the welfare and improvement of the College of Physicians, to the buildings of which he erected a handsome addition at his own cost. In 1654 he was elected, in his absence, president of the college, but he declined the office, on account of his age and infirmities. In July 1656 he resigned his Lumleian lectureship, which he had held for more than forty years; and in taking leave of the college, presented to it his patrimonial estate at Burmarsh, in Kent, then valued at £56 per annum. He did not long survive, but, worn down by repeated attacks of gout, died at London on the 3d of June 1657, and was buried in a vault at Hempstead, in Essex, which his brother Elia had built.

A handsome edition of Harvey's works, in Latin, revised by Drs Lawrence and Mark Akenside, was published by the College of Physicians in 1766. The best edition, in English, is that of Dr Willis, published by the Sydenham Society in 1847.

HA'RWICH, a municipal and parliamentary borough, seaport, and market-town of England, in the county of Essex, is pleasantly situated on an elevated and healthy site near the north-east extremity of a promontory 66 miles north-east of London. Southward from the town extends an esplanade, from which fine views of the harbour and the German Ocean may be obtained. The chief branches of industry are the manufacture of Roman cement, and of artificial manure from Coprolites (q. v.), fishing, and ship-building. Steamers run daily to Ipswich, and in summer there is steam communication with London. The harbour of H., formed by the junction of the Stour and the Orwell, is said to be the best on the east coast of England. It is capacious, safe, and commodious; but its entrance is rocky, and, although there are two light-houses and numerous buoys, cannot be entered without careful navigation. H. has been made a harbour of refuge. The battery by which the town is defended was erected about 1820, at which time a considerable space intervened between it and the usual tide-mark; but so great have been the encroachments made by the sea on the promontory on which H. stands, that two jetties or groins, 1350 feet and 1000 feet long respectively, have been constructed to prevent its nearer approach; and these have proved very successful. In 1872, 814 vessels of 200,737 tons entered, and 789 of 180,423 tons cleared the port. Pop. (1871) 6079.

HARZ MOUNTAINS, a broad mountain-range in the north of Germany, extends east-south-east from Goslar and Osterode in Hanover to Hettstädt and Mansfeld in Prussian Saxony. It forms an elevated plateau, covered with irregular and, for the most part, forest-clad mountains, and situated mainly in Hanover and Brunswick. The range, which is divided into Upper and Lower Harz, is 50 miles in length, about 16 miles in breadth, and covers a superficies of upwards of 750 square miles. It is composed for the most part of greywacke belonging to the Devonian formation, and broken through in one or two places by granite, as in the Brocken (q. v.) and the Rammberg. The highest peak of the range is the Brocken. The H. M. are exceedingly rich in metals and minerals. Silver, iron, lead, copper, zinc, &c. are mined; marble, alabaster, and granite are quarried. Mining, stone-cutting, and the timber-trade afford employment to the inhabitants, who are about 70,000 in number. The H. M. are the scenes of many of the wild legendary tales of German literature.

HASDRUBAL, more correctly **ASDRUBAL** (*one helped by Baal*), a name of frequent occurrence in Carthaginian history, there being nearly twenty more or less celebrated individuals so called. One of the best known is that son-in-law of Hamilcar (see HAMILCAR BARCA), who accompanied his father-in-law to Spain (236 B.C.), and for eight years after the death of the latter, continued to carry out the plans of his great kinsman. The empire which the military talent and energy of Hamilcar had founded was consolidated by the skilful statesmanship of Hasdrubal. He formed the south and east coasts of Spain into Carthaginian provinces, and founded many towns, the most famous of which was Carthago Nova (now *Cartagena*), possessing a fine harbour, and having in its neighbourhood rich mines. This city he adorned with a splendid 'royal palace.' Under his direction, agriculture flourished; mining was vigorously prosecuted; the tribes as far north as the Ebro became subject to Carthage, and paid tribute; and powerful chiefs were attached to Carthaginian interests by intermarriage and other means. H. was at length (220 B.C.) murdered by a slave, whose master he had put to death. He was a leader of the popular party at Carthage after the conclusion of the first Punic war, and was early brought out into public life. He was a skilful general, and shewed great energy and prudence in a war with the Numidian tribes. But his talents were more particularly administrative, as has been already seen in his Spanish government. So powerful was he in Spain, and so independent of the home government, that the Romans made the famous treaty in regard to the Iberus as the common frontier not with the Carthaginians, but with Hasdrubal.

Another H., brother of the great Hannibal, and son of Hamilcar Barca, bore a conspicuous part in the second Punic war, first as the opponent of the Scipios and the conqueror of Cn. Scipio in Spain, and afterwards as the commander of a Punic army in Italy. While he was marching southward to join Hannibal in Umbria, he encountered the Roman consuls, C. Nero and M. Livius, at the river Metaurus. The Romans gained a complete victory; an immense number of the Carthaginian forces were slain; and H. himself, when he saw that all was lost, rushed into the midst of the enemy, and fell (207 B.C.) as became the son of the great Hamilcar. In generalship and in military bravery he seems to have been little inferior to his father and brother.

A third H. was one of Hannibal's principal officers in his Italian campaigns, and largely contributed, by a well-timed charge, to decide the victory on the great day of Cannæ.—A fourth, called Calvus, i. e., the Bald, led an expedition to Sardinia in 215 B.C., during the second Punic war. He was defeated by the Roman general, and carried to Rome as a captive.—A fifth, son of Gisco, co-operated with H., son of Hamilcar, in Spain, and afterwards, in conjunction with Syphax, unsuccessfully opposed Scipio in Africa (204 B.C.).—The last we shall mention is that unfortunate general to whom fell the hopeless task of defending Carthage against the Romans in the third Punic war. He was at first commander without the city (another H., grandson of the Numidian Masinissa, being general within the city), but he ultimately became sole leader, and opposed all the plans and movements of Scipio with great energy and skill. But at length Carthage fell, and H. was carried prisoner to Rome, to adorn the triumph of his conqueror.

HASÉ, KARL AUGUST, an eminent living theologian of Germany, was born at Steinbach, in Saxony, 25th August 1800, and, after leaving Altenburg gymnasium, studied theology at Leipsic, Erlangen, and Tübingen. For taking part in the *Burschenschaften*, he was, after a tedious trial, confined for five months in the fortress of Hohenasperg. In 1829, after having been *Privat-docent* for a year, he was made extraordinary professor of philosophy in Leipsic, where his lectures on Dogmatics and the life of Christ proved especially attractive. He was, indeed, the first critical biographer of Christ who decidedly rose above the old rationalistic conception of Him as merely an excellent moral teacher, his *Leben Jesu* (1829, 5te Aufl. 1865), which appeared six years before Strauss's, having proposed as its aim to shew 'how Jesus of Nazareth, according to divine destination, by the free act of His own spirit, and by the opportunities of His time, became the Saviour of the world.' Vindicating equally the rights of the individual religious consciousness, and the historical importance of the church, he opposes modern supernaturalism, as in *Die Leipziger Disputation* (1827), equally with extreme rationalism, as in *Theologische Streitschriften* (1834—1837), and *Die Tübinger Schule* (1855). Before the first year of his professorship in Leipsic was over, H. was called as professor of theology to Jena, where he still represents the departments of Dogmatics and church history principally. His *Hutterus Redivivus* (1827, 10te Aufl. 1862) seeks to do justice to the old Lutheran Dogmatics in contrast with modern systems, by exhibiting its harmonious completeness, and is in extensive use among German theological students. Besides his *Compendium of Universal Church History* (1834, 8te Aufl. 1858), which has been translated into English, and is unsurpassed for its concise pictures of times, men, and systems, H. has treated special portions of church history in *Die beiden Erzbischöfe* (1839), *Neue Propheten* (1851), *Franz von Assisi* (1856), and *Das geistliche Schauspiel* (1858). Several works of his on ecclesiastical law, and his edition of the *Libri Symbolici Ecclesiæ Evangelicæ*, are highly valued.

HASHI'SH is the Oriental name of the plant (or rather of the tops and tender parts of the plant) which is scientifically known as *Cannabis indica*, and which we term *Indian Hemp*. The medicinal value of the preparations of Indian Hemp is described in another article. See HEMP, INDIAN. It is the peculiar intoxication occasioned by the use of H. that will be now specially noticed.

Various preparations of the plant are employed for the purpose of producing the desired effect. A favourite mode of extracting its active principle is by boiling the tops and flowers with water, to which butter or oil has been added, evaporating, and thus forming an oleaginous solution or fatty extract. This fatty extract is frequently mixed with other substances which are reputed to possess aphrodisiac properties, and is taken in the form of electuary, confection, or pastil. The *majoon* used at Calcutta, the *mapouchari* employed at Cairo, and the *dawames* or *dawamesc* of the Arabs, are preparations of this kind.

Dr Moreau of Tours, who has written an elaborate work on this subject (*Du Hachisch et de l'Aliénation Mentale*, 1845), which is based not only on general observation but on personal experience, thus describes the *fantasia*, which is the term employed in the Levant to describe the excitement produced by this agent: 'It is really *happiness* which is produced by the hashish; and by this I imply an enjoyment entirely moral, and by no means sensual, as we might be induced to suppose. The hashish-eater is happy, not like the gourmand or the famished man when satisfying his appetite, or the voluptuary in the gratification of his desires, but like him who hears tidings which fill him with joy, like the miser counting his treasures, the gambler who is successful at play, or the ambitious man who is intoxicated with success.' (P. 54.)

One of the first appreciable effects of the drug, is the gradual weakening of the power of controlling and directing the thoughts. Then comes the stage already described; and accompanying, and in part following it, there are observed errors of sense, false convictions, and the predominance of one or more extravagant ideas. These ideas and convictions are generally not altogether of an imaginary character, but are suggested by external impressions which are erroneously interpreted by the perceptive faculties. Finally, if the dose is sufficiently powerful, there is a complete withdrawal of the mind from external things.

HASLAR HOSPITAL. See GOSPORT.

HA'SLINGDEN, a small manufacturing and market-town of England, in the county of Lancashire, is situated in a mountainous district, on and around an eminence 18 miles east-south-east of Preston. It has a town-hall and mechanics' institute, buildings of recent erection, and a parochial chapel, a handsome edifice, the front of which is 300 years old. There are also chapels and meeting-houses for Baptists, Methodists, Independents, and Primitive Methodists. Cotton and woollen manufactures are extensively carried on. In the vicinity are coal-mines and stone-quarries. Pop. in 1871, 7698.

HASP AND STAPLE, in Scotch Law, the ancient form of entering an heir in a burgage subject, i. e., property situated in a burgh. The heir was made to take hold of the hasp and staple of the door, as a symbol of possession, and then enter and bolt himself in. This form is no longer necessary.

HASSAN-BEN-SABAH, the 'Old Man of the Mountain' of European story, was founder of the sect of the Assassins (q. v.), likewise denominated Hassanis or Ismanilians.

HA'SSELT, a town of Belgium, capital of the province of Limbourg, is situated near the centre of the province, on the left bank of the Demer, 17 miles west-north-west of Maastricht. It is well built, is surrounded by walls, and carries on a considerable trade in distilling, and in the manufacture of linen fabrics, lace, and tobacco. Pop. (1870) 10,500.

HÂSTINAPURA is the name of the ancient capital of the Kurus (see KURU), frequently mentioned in the Mahâbhârata. The Vishnu-Purâna relates that it was founded by Hastin, washed away by the Ganges—under the reign of Nichakra, who, in consequence of this event, had to remove the seat of his government to Kaus'âmbî—and at a later period it was undermined by Balarâma. It was situated on the Ganges, and is placed by Lassen, in his map to the *Indische Alterthumskunde*, about 78° long. and 28° 50′ lat.

HA'STINGS, a parliamentary and municipal borough, market-town, and famous watering-place of England, in the county of Sussex, is picturesquely situated on the shore, and surrounded on all sides except the south, which is open to the sea, by high cliffs. It is distant about 35 miles east of Chichester, and 74 miles south-east of London by rail. It consisted formerly of only two streets, intersected by a small stream called the Bourne; but is now a considerable town, many new streets and terraces having been erected within the present century. Stretching westward along the sea-front of the town is the Marine Parade, a spacious terrace, which, joined and continued westward by the Grand Parade of St Leonards-on-Sea, forms one of the finest sea-walks in the kingdom. Formerly an insignificant village, situated a mile west of H., St Leonards is now the Belgravia of that town, is united with it by lines of handsome houses, and included with it in the population returns. The chief point of interest in H. is the ruin of an ancient castle, standing on the summit of the West Cliff, and supposed to have been erected previous to the Norman invasion. Fishing is the chief occupation—about 160 boats are employed. Owing to the want of a harbour, the boats have to be pulled up on the beach by means of a rope and windlass worked by horse-power. H. is a great resort of pulmonary invalids during the cold season of winter and spring; and in summer has facilities for bathing, though probably less desirable as a residence at this season than many other towns on the southern coast.

H. in the beginning of the 10th c. was of sufficient importance to have a mint. Here, as is well known, the Conqueror landed in 1066, and in the immediate vicinity are traces of a camp, said to be that occupied by the Normans on the night previous to their march against the Saxons. See BATTLE. Under the Confessor, H. became a member of the Cinque Ports, after which it long continued in great repute for its ship-building. It has returned two members to the imperial parliament since the reign of Edward III. Pop. (1871) of parliamentary borough, 33,337.

HASTINGS, according to the French chroniclers, the name of a viking or sea-rover of the 9th century. It is uncertain whether he was born in Norway, Denmark, or France, most probably in the second of these countries. The story of his devastations is something appalling. From his youth on to a gray old age his whole delight appears to have been in pillage, rapine, and bloodshed. The shores and cities of France, Spain, Portugal, and Italy are said to have been repeatedly wasted and burned by him and his savage comrades. As the Scandinavian *sagas*, however, speak of several Hastings, the Danish historian Suhm considers that the French chroniclers—who wrote at a much later period—have gathered up the confused fear-begotten traditions of the south-west of Europe, relating to all the pirates of this name, and applied them to a single personage, who has thus become in their hands rather a type of the ferocious Norse viking, than a historical individual.

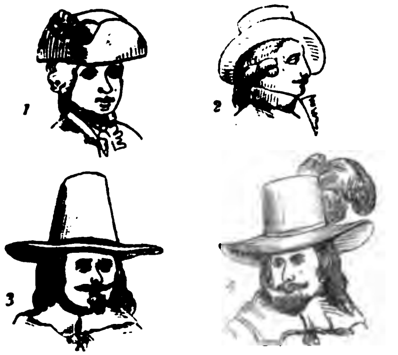
HASTINGS SAND, the lower division of the Wealden beds, forming a portion of the Lower Cretaceous period. It consists of a considerable thickness (1000 feet) of sand, calciferous grit, clay, and shale; and differs very little from the Weald Clay, the upper division of the series, except in being a little more arenaceous. The strata have been deposited in shallow fresh water. The sand often exhibits fine specimens of ripple-marks, and the clay which separates the sand-beds sometimes contains cracks that have been produced by the drying of the bed on exposure. The strata are highly fossiliferous. There are numerous saurian reptiles, including the huge iguanodon and the flying pterodactyle. The remains of several chelonians also occur. The fish belong chiefly to the ganoid or placoid orders, the most remarkable being the lepidotus, whose conical palate teeth and thick square enamelled scales are very frequent. The shells belong to genera which inhabit fresh water, such as Paludina, Cyclas, and Unio.

HASTINGS, WARREN, governor-general of India, born December 6, 1732, was descended from an ancient family long settled at Daylesford, in Worcestershire. He was early left an orphan; but when only seven years old, he resolved to recover the manor and estate, which had passed out of the possession of his family. He was sent to Westminster School, and promised to be one of the first scholars of his age, when, at 17, he was sent out to India as a writer in the East India Company's service. Having realised a moderate fortune, he, in 1764, returned to England. In 1769, he again visited India, on his appointment as member of the council at Madras, and in 1772 was promoted to be president of the Supreme Council of Bengal. A year later, parliament enacted that the chief of the presidency of Bengal should be styled governor-general of India, and that H. should be the first governor-general. The finances of his government were in a disordered state, yet the demands of the East India Company for money were incessant. His first step was to wrest certain rich provinces from the Great Mogul, and to sell them to Sujah Dowlah, the Nabob of Oude. The Rohillas resented the transfer to a cruel master, and H., for a money consideration, infamously lent the nabob the services of the Company's army for their subjugation. The great Brahman, Nuncomar, was put to death by his influence, in order to strike terror into the native population. He exacted vast sums from Cheyte Sing, the Rajah of Benares, and finally confiscated all his possessions. He formed a treaty with Asaph-ul-Dowlah, the son of Sujah Dowlah, under which the mother and grandmother of the nabob, known as the begums or princesses of Oude, were to be stripped of their domains and treasures for the benefit of the Company. These were the chief blemishes of his Indian administration; but against these are undoubtedly to be set off great public services. He was constantly trammelled by orders from home, and frequently borne down by an able and factious majority in council; yet he preserved the British empire in India from a formidable combination of foreign and domestic enemies. He acted with vigour when the war with France broke out; he broke the power of Hyder Ali; he organised a system by which justice was dispensed, the revenue collected, and peace maintained. He encouraged Asiatic learning. When he left India in the spring of 1785, that great empire was tranquil. A treaty had been concluded with Tippoo Sahib, son and successor of Hyder, and the Carnatic had been evacuated by the armies of Mysore. On his arrival in England, he was received with distinction by George III. and the court. The directors acknowledged his services by a unanimous vote of thanks. The Whig opposition were, however, loud and vehement against him, and succeeded in carrying in the Lower House a motion for his impeachment at the bar of the House of Lords. The trial began in Westminster Hall, February 12, 1788, the managers of the impeachment being Burke, Fox, Sheridan, Windham, and Mr Charles (afterwards Earl) Grey. Burke opened the proceedings in a speech which was extended over four sittings; Mr Fox and Mr Grey urged the charge respecting Cheyte Sing; and Mr Sheridan was intrusted with the conduct of the article relating to the princesses of Oude. The interest taken by the public in the impeachment began to decline after these great displays of rhetoric. The trial, notwithstanding, languished for upwards of seven years. On the 149th day (April 23, 1795), it terminated in the acquittal of Hastings. Out of 400 peers, only 29 voted. The last 24 years of his life were passed at Daylesford, where, in the pursuits of literature, and the occupations of a country gentleman, the evening of his eventful, stormy, and checkered career was serenely passed. He died August 22, 1818, in his 86th year, and was buried behind the chancel of the parish church of Daylesford. Few students of English literature require to be reminded of the eloquence with which the story of his life and his memorable impeachment has been told by Lord Macaulay.

HAT, a well-known species of head-covering, which has assumed various shapes and characters. What we understand by a hat is a fabric of Felt (q. v.), or a silk material used as a substitute for felt. Hats are only a variety of the still more ancient cap and bonnet, and were at first made of velvet, silk, and other rich materials. Formed of felt, and assuming a certain firmness of fabric, hats began to be manufactured in England about 1510, and we hear of them superseding caps, or softer headgear, in the reign of Elizabeth. The felting of caps is, however, said to have been long known anterior to this period; and there is a tradition that a knowledge of felted caps or hats had been introduced by the Crusaders. Wool was the material first employed in forming felt-hats; but in time, as trade with America was developed, the fur of the Beaver (q. v.), as finer and softer, came into use; hence, the term beaver was long synonymous with hat. For about three centuries, fine beaver-hats, dyed black, and prepared with much skill, formed the head-covering of the higher classes in Great Britain; the middle and humbler classes, still continuing, for a length of time, to use the less expensive caps and bonnets according to the fashions of their ancestors. See BONNET.

The growing scarcity of beaver-fur led to attempts to substitute a cloth formed of silk plush, drawn over a pasteboard frame, about 1810. These were not very successful; and hats of wool or beaver-felt were common until about 1840. The high cost of beaver at length forced on the improvement of silk-hats, and now the beaver is almost entirely superseded; while the fabrication of silk-hats has been carried to great perfection not only in England, but in continental countries and the United States. The silk-hat consists of a body and rim, usually made of two or three layers of cotton cloth saturated with varnishes, to give the fabric stiffness, and make it waterproof. These are moulded on wooden blocks according to the fashion of the day; and when the desired shape is produced, the whole is carefully furnished over with lac and dammar varnish, and, before dry, the fine silk plush is applied with great nicety, so as to prevent the seams being perceived; it is then trimmed with silk braid on the edge of the brim, and a silken band round the junction of the body with the brim; and the lining of leather and thin silk being put in, it is complete. Lightness, gloss, and durability are the prime qualities of the silk-hat; and in these respects the hats of New-York manufacture deserve a high commendation. Very excellent hats are made in London, Paris, and Edinburgh; but they are heavier than those of America.

As suggested by the whims of Fashion (q. v.), hats have undergone a wide variety of changes of shape. The raising of the top part in which the head is inserted, and the widening or diminishing of the brims, have constituted the chief differences. Sometimes the top has been high and narrow, sometimes high and widened; and as regards the brim, it has sometimes been so broad as to be looped up. Political and religious differences have been marked by the form of hat. The Puritan of the reign of Charles I. adopted the steeple hat (fig. 3), high and narrow with a broad brim, and devoid of ornament, as the badge of his party. The Cavalier, during the same era, wore a lower and broader crown, with a feather stuck on one side (fig. 4). And a still lower-crowned hat, with a profusion of feathers, became the fashion in the reign of Charles II. The Quaker hat, low in the crown, with a broad brim, and quite plain, dates from the origin of the sect at the middle of the 17th century. A growing extravagance in breadth of brim, led to the device of looping up the back and sides, and so was fashioned the cocked-hat (fig. 1), which was worn by gentlemen throughout the 18th century. But in this cocked-hat era there were exceptions to the fashion. Beaux, by way of singularity, wore low-crowned hats with brims (fig. 2), and such must be considered the precursors of the present round-hat, which finally superseded every variety of cocked-hat at the beginning of the 19th century. The writer of this can recollect of only three persons wearing cocked-hats as ordinary attire as late as 1810. While cocked-hats ceased to be used by common soldiers at the reform of military costume consequent on the war with the French Republic, officers in the army continued till a later period to wear that species of flattened cocked-hat known as the *chapeau bras*—that is, the hat which, by being flattened up, could be carried conveniently under the arm. This kind of hat was disused by regimental officers about 1812; but with slight variation in shape, it is still continued by field-officers in European armies.



Hats:
1, hat copied from a print of the year 1786; 2, large round hat worn in the year 1786, from Kay's *Etchings* (Edinburgh); 3, hat from a print dated 1645; 4, hat copied from Hollar's full-length portrait of 'Robert Devereux, Earle of Essex, his Excellency Lord Generall of the Army.'

Light, handy, and, in effect, adding height to the stature, the common round-hat is easily damaged, and quite unsuitable for rough wear in travelling or when in the country. These inconveniences, as is well known, have led to the introduction of a variety of undress hats, black and gray, and some of them of felt almost as soft as cloth. Such are the Wide-awakes, the Tom-and-Jerries, and an innumerable tribe of hats worn by sportsmen, tourists, and youths generally. With these exceptions, the round-hat, with slight changes of form from time to time as suggested by fashion, continues to be the hat proper, worn by all when in ceremonial dress. The only professional hat in England is that of clergymen of the established church. It is a round-hat of fine beaver, with a broad brim, which is looped up at sides and back, so as to form a kind of shovel. This is ordinarily known as the shovel-hat. During the 18th c., it was not unusual for the gentlemen to wear gold-lace bands and edgings on their hats. This, like some other fantastic decorations of attire, is now resigned to footmen and other domestic servants in livery, whose hats and other garments present a fair specimen of the dress of our foppish ancestors. W. C.

HAT MONEY, a small duty or primage paid to the master of a ship for his care and trouble over and above the freight. The right to it is regulated entirely by custom of particular ports. The name is probably derived from the payment being originally gratuitous, and given to the master on going round with the hat at the end of a prosperous voyage.

HATCH, HATCHWAY. Hatches are square or oblong openings in the deck of a ship, forming the communications between one deck and another. The fore-hatchway is usually close abaft the fore-mast, the after-hatchway between the main and mizen masts, and the main-hatchway immediately before the main-mast. This last is ordinarily the largest, and through it goods are hoisted to and from the hold. In merchant vessels, and especially barges, there are frequently other hatchways, according to the nature of the cargo; indeed, in some craft, the whole deck consists of hatchways. When used for purposes of communication, a companion-ladder is placed from each hatchway to the deck below. These ladders are, however, generally limited to the fore and after hatches. As he emerges through the latter, in ascending to the upper deck, every officer and sailor touches his hat in token of 'salute to the quarter-deck.' When not so used, the hatchway is covered by a wooden grating which admits air and sufficient light to those below, while it protects men operating above from accident. During stormy or wet weather, these gratings are covered with tarpaulings, securely fastened, and the ship becomes water-tight. After an action by boarding, the conquered crew are often battened down in the lower decks, and then made prisoners as they are allowed to ascend through the hatchway one by one.

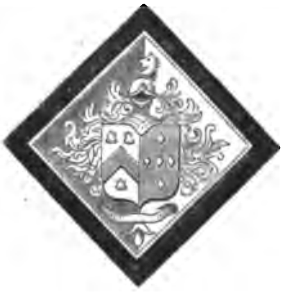
HA'TCHIE, a river which rises in the north-east part of Mississippi, United States, America, and empties into the Mississippi River, near Randolph, about 25 miles above Memphis, Tennessee. It runs through a fertile cotton region, and is navigable by small steam-boats about 100 miles from its mouth.

HA'TCHMENT, or **ACHIEVEMENT**, the funeral escutcheon placed in front of the house of the deceased, or elsewhere, setting forth his rank and circumstances. It is in the form of a lozenge, and in its centre are depicted the arms of the deceased, single or quartered.

The achievement of a *bachelor* represents his arms in a shield complete, i. e., accompanied with helmet, crest, mantling, motto, and any other external ornaments to which he may be entitled, on a black ground.

In the achievement of an unmarried lady, her arms are placed in a lozenge on a black ground, but without external heraldic ornaments except in the case of a peeress, when her supporters, robe of estate, and coronet are added.

The achievement of a husband whose wife survives, impales his arms with his wife's in a shield with the external ornaments to which he is entitled, the ground of the hatchment being, under his side of the shield, black, and under his wife's, white. If the wife be an heiress, her arms are not impaled, but carried in an escutcheon of pretence. The external ornaments are appended, except the insignia of any order of knighthood having a circle or collar, with which heralds do not consider it proper for a knight to encircle his wife's arms. On this account the achievement of a knight has two shields placed side by side, one containing the husband's arms only, encircled by the collar, ribbon, &c., of the order, the other containing those of husband and wife: the ground is divided perpendicularly in the middle of the second shield, and painted black and white.



Hatchment of Husband.

When the wife is a peeress in her own right, there are also two shields—the dexter containing the arms of the husband, with the lady's arms on an escutcheon of pretence ensigned with her coronet; the sinister lozenge-shaped with the lady's alone, and each accompanied with its proper external decorations. The ground is divided black and white in the middle of the dexter escutcheon.

The arms of a wife whose husband survives are impaled with her husband's arms in a shield, or, in the case of an heiress, borne on an escutcheon of pretence. There is no helmet, crest, or mantling, but a peeress is entitled to her robe of estate. The ground under the dexter side of the shield is white, and under the sinister black.

The achievement of a widower differs from that of a husband, in the ground being entirely black.

The achievement of a widow differs from that of a wife, both in having the ground entirely black, and in the form of the escutcheon, which (except in the case of an escutcheon of pretence) is lozenge-shaped. The arms are encircled by a silver cordon or cordelière, the symbol of widowhood.

On the decease of the last of a family, a death's head surmounts the shield in place of a crest.

The achievement of a reigning king or queen, whether married or not, represents the royal arms complete on a ground entirely black. That of an archbishop or bishop has the insignia of his see impaled with his paternal arms, the whole surmounted by a mitre, and the ground is per pale ar. and sa. The dean of a cathedral or collegiate church and a king at arms, also impale the arms of office with their family arms. In the achievement of the wife of a prelate, there are two shields—the first containing the impaled arms of the see and the bishop, surmounted by a mitre; and the second, the family arms of the bishop with those of his wife. The ground is all white, except that part which is under the arms of the wife.

The funeral escutcheon of Scotland, France, and Germany, differs considerably from that in use in England; it indicates not merely the deceased's right to a coat of arms, but his gentility of descent. The hatchment is much larger, consisting of a lozenge above six feet square; and the arms of the deceased, which occupy the centre, are surrounded by those of the eight or sixteen families from whom he derived his descent, the paternal quarterings on the right side, and the maternal on the left. The deceased is not entitled to an achievement unless all these families had a right to bear arms. On the four corners are deaths' heads and the initials and title of the deceased, the black interstices are powdered with tears.

HA'TFIELD, a small market-town of England, in the county of Hertford, is situated on the slope of a hill, 7 miles south-west of the town of Hertford. It consists of one considerable street, crossed by a smaller one; its trade is unimportant. The palace was once the property of the bishops of Ely, but, together with the manor, was seized by Henry VIII., and was afterwards successively the residence, before their accession, of Edward VI. and Queen Elizabeth. Hatfield House, built by Sir Robert Cecil, is a noble structure, and a fine specimen of Elizabethan architecture. The parish church is an old and interesting edifice of the 13th century. Pop. (1871) of parish, 3998.

HATRA'S, a town of Hindustan in the North-west Provinces, 33 miles to the north of Agra, in lat. 27° 36′ N., and long. 78° 9′ E. H. contains (1871) 23,722 inhabitants, and has a considerable trade, more particularly in the cotton of the neighbourhood. As a place of some strength, it was at one time prominent in the wars of the Doab; but on falling, in 1817, into the possession of the British, it was immediately dismantled.

HA'TTERAS, CAPE. See CAPE HATTERAS.

HATTI SHERÍF, sometimes called HATTI HUMAYUN—i. e., exalted writing, the name given by the Turks to every rescript of the sultan. The hatti sherífs are composed in the Turkish language, and written in the Arabian court-hand Divâni. Above the text, as a token of the authenticity of the rescript, stands the intricate flourish or mark of the sultan, usually in black, but sometimes in red or gold. This flourish is called Tugra or Rishâni Sheríf—i. e., exalted sign; and the functionary who superscribes it is called Rischândschi, or the signer. The hatti sheríf is irrevocable. That of Gulhana, promulgated by Abdul Medjid, November 3, 1839 (renewed February 18, 1856), which guarantees life and property to all subjects of the empire without distinction of creeds, has in modern times obtained the widest celebrity.

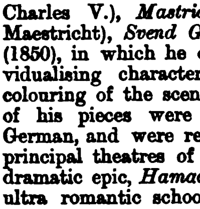
HATTO, the name of two archbishops of the see of Mainz, who have a somewhat conspicuous place in the history of Germany. The first of these was chosen Archbishop of Mainz in 891, and died in 913.—The second archbishop of that name was a monk of the monastery of Fulda, and succeeded the celebrated Rabanus Maurus, well known in the history of the eucharistic controversies, as abbot of the monastery of St Boniface, about the year 942. In the second expedition of the emperor Otho I. into Italy, in 961, H. was sent as his ambassador from Pavia to Rome; and after his return, on the death of Archbishop William, he was raised to the see of Mainz, and continued one of the chief directors of the imperial counsels. Of his after-life, and of his personal character, the most opposite accounts have been given. By some he is represented as a zealous reformer, and an upright and successful administrator; by others, as a selfish and hardhearted oppressor; and the strange legend of his being devoured by rats, which Southey has perpetuated in his well-known ballad of *Bishop Hatto*, is represented as an evidence of the estimate which was popularly formed regarding him. It is by no means improbable, however, that this legend is of a much later date, and that its real origin is to be traced to the equivocal designation of the tower on the Rhine, Maüsethurm, near Bingen, which has been selected as the scene of the occurrence. Maüsethurm may, by a very slight modification, mean either *Rat Tower* or *Toll Tower*, and the latter name would naturally arise from the use to which the tower continued even down to a late period to be devoted. The date at which the Maüsethurm was built is unknown, and it is far from certain that it is not much later than the time of Hatto. It was stormed by the Swedes in 1635. Archbishop H. died in 969 or 970.

HA'TZFELD, a small town of Austria, in the Temeser Banat, is situated 24 miles west of Temesvar, on the railway between that town and Pesth. The breeding of horses is here extensively carried on, and there is a large trade in corn. Pop. in 1869, 7981.

HAU'BERK, a twisted coat of mail, sometimes extending only as high as the neck, but more generally continued so as to form a coif, leaving only the face of the knight who bore it exposed. In early times, the sleeve of the hauberk sometimes terminated at the elbow, but in the 13th and 14th centuries it came down to the wrist, and very generally descended over the hand in the form of a glove, either one-fingered or divided. In the 14th c., the hauberk was worn under plate-armour. See HABERGEON.

HAU'BERT, an old term in feudal law, to denote the tenure of ward and relief.

HAUCH, HANS CARSTEN, one of the best Danish poets of the present day, was born at Frederikshald, in Norway, in 1791; graduated at the university of Christiania in 1821; and after having travelled through Germany, Italy, and France at the cost of the government, with a view of prosecuting the study of natural history, came to Copenhagen in 1827, and was appointed professor of physics at the Royal Academy of Soroe, in Denmark. This post H. exchanged in 1846 for the chair of Northern Literature in the university of Kiel, but on the breaking out of the Schleswig-Holstein revolution, two years afterwards, he was compelled to return to Copenhagen, where the dowager-queen, Maria Sophia, offered him an asylum at the palace of Frederiksborg, where he has since then resided; and on the death of his friend Oehlenschläger, in 1850, he succeeded him in the chair of æsthetics at the university of Copenhagen. H.'s earliest attempts at dramatic composition—*Contrasterne* and *Rosaura*—which appeared in 1816—1817, attracted very little attention, but his tragedies of *Tiberius og Bajazet*, *Gregory VII.*, and *Don Juan* (1829) at once established his reputation, which he has fully maintained by his subsequent dramas of *Karl den Femten's Död* (The Death of Charles V.), *Mastrichts Belejring* (The Siege of Maestricht), *Svend Grathe* (1841), and *Marsk Stig* (1850), in which he exhibits great powers of individualising character, and portraying the local colouring of the scenes which he describes. Many of his pieces were translated by himself into German, and were represented with success at the principal theatres of Germany and Sweden. H.'s dramatic epic, *Hamadryaden*, which belongs to the ultra romantic school, has met with less favour among his own countrymen than in Germany, where it elicited the commendatory notice of Tieck, Schubert, and other critics of note; but his *Lyriske Digte*, 1842 (Lyrical Poems), some of which are extremely beautiful, enjoy an undisputed popularity in Denmark. As a writer of tales and romances, H. has shewn considerable diversity of talent; the principal are—*En Polsk Familie* (A Polish Family), *Slottet ved Rhinen* (The Castle on the Rhine), and *Guldmagern* (The Goldsmith, 1836—1845), *Saga om Thorwald Vidfœsle* (1849), *Nordische Mythologie*, *Waldemar Seier* (1862), &c. His *Robert Fulton* (1853) is regarded as the most perfect of his works. H. has been a voluminous contributor to current Danish and German literature, and in his own country his name is associated with a sharp literary contest, in which he took an active and not always a very dignified part against his countryman and brother-poet, J. L. Heiberg.

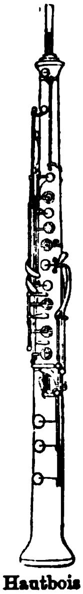


Hauriant.

HAURIANT, a term in Heraldry applied to a fish placed upright as if to refresh itself by sucking air, as in the example. Gules, three lucies (the ancient name of pikes) hauriant in fess argent, the arms of a family of the name of Lucy in Hertfordshire.

HAUSER, KASPAR, the foundling of Nuremberg, was found by a citizen of that town in the market-place, between four and five o'clock in the afternoon of the 26th May 1828. He was dressed like a peasant-boy, and had with him a letter addressed to the captain of the sixth regiment of horse at Nuremberg. Being conducted to this officer and interrogated, it soon became evident that he could speak very little, and was almost totally ignorant. To all questions he replied, 'Von Regensburg' (from Regensburg), or 'Ich woais nit' (I don't know). On the other hand, he wrote his name in firm legible characters on a sheet of paper, but without adding the place of his birth, or anything else, though requested to do so. H. was then, to judge from his appearance, 16 or 17 years old. Though short and broad shouldered, his figure was perfectly well-proportioned. His skin was very white; his limbs delicately formed, the hands and feet small and beautiful, the latter, however, shewing no marks of his having ever worn shoes. With the exception of dry bread and water, he shewed a violent dislike to all kinds of meat and drink. His language was confined to a few words or sentences in the old Bavarian dialect. He shewed entire ignorance of the most ordinary objects, and great indifference to the conveniences and necessaries of life. Among his scanty articles of clothing was a handkerchief marked K. H.; he had likewise about him some written Catholic prayers. In the letter which he carried, dated, 'From the confines of Bavaria, place unknown, 1828,' the writer stated himself to be a poor day-labourer, the father of ten children, and said that the boy had been deposited before his door by his mother, a person unknown to the writer. He stated further, that he had brought up the boy secretly, without allowing him to leave the house, but had instructed him in reading, writing, and the doctrines of Christianity; adding that it was the boy's wish to become a horse-soldier. The letter enclosed a line, apparently from the mother, stating that she, a poor girl, had given birth to the boy on the 30th April 1812; that his name was Kaspar; and that his father, who had formerly served in the sixth regiment, was dead. H. was treated by the magistrates of Nuremberg as a destitute boy, and became the object of general sympathy. Binder, a burgomaster, exerted himself, in particular, to throw some light on the obscurity in which the origin of the young man was involved. In the course of many conversations with him, it came out that H., from his childhood, had worn only a shirt and trousers; that he had lived in a dark place underground, where he was unable to stretch himself out at full length; that he had been fed upon bread and water by a man who did not shew himself, but who cleaned and dressed him, and provided him with food and drink while he was in a state of natural or artificial sleep. His sole occupation was playing with two wooden horses. For some time before he was conveyed to Nuremberg, the man had come oftener to his dungeon, and had taught him to write by guiding his hand, and to lift his feet and walk. This narrative gave rise to various suppositions and rumours. H. was, according to some, the natural son of a priest, or of a young lady of high rank; while others believed him to be of princely origin, or the victim of some dark plot respecting an inheritance. Some incredulous persons believed the whole affair to be an imposition. On the 18th July 1828, H. was handed over to the care of Professor Daumer. The history of his education is remarkable in a pedagogic point of view, as his original desire for knowledge, his extraordinary memory, and acute understanding decreased in proportion as the sphere of his knowledge extended. His progress was, on the whole, small. On the 17th October 1829, he was found bleeding from a slight wound on the brow, which he said had been inflicted by a man with a black head. All efforts made to discover the perpetrator were ineffectual. The incident excited a great sensation; H. was conveyed to the house of one of the magistrates, and constantly guarded by two soldiers. Among the many strangers who came to see H. was Lord Stanhope, who became interested in him, and sent him, for the sake of his education, to Anspach. Here he was employed in an office of the court of appeal, but by no means distinguished himself for industry, and was gradually forgotten till his death again excited attention. A stranger, under the pretext of bringing him a message from Lord Stanhope, and informing him of the circumstances of his birth, invited H. to meet him in the palace garden at three o'clock in the afternoon of the 14th December 1833, and stabbed him in the left side. H. had sufficient strength left to return home and relate the circumstances of his assassination, but died on the 17th December 1833. Compare Daumer, *Mittheilungen ueber Kasper Hauser* (2 vols. Nuremb. 1832); Feuerbach, *Kasper Hauser Beispiel Eines Verbrechens am Seelenleben* (Ansbach, 1832).

HAU'TBOIS, or **O'BOE**, a wind instrument of the 'reed' genus. On account of its piercing sound, it was much used in military bands, in the middle of the 17th c., for playing the melody, and from it the whole band used in Germany to be called *Oboisten*. The hautbois, at an early date, took its place as one of the essential instruments of the orchestra. It is made of wood, generally of box, ebony, cocoa, or rosewood, and is constructed in three pieces, or joints, forming a continuous tapering tube, about 21 inches long, the bore of which is narrow at the small end, and widens into a bell-shaped opening, 1¼ inch in diameter, at the mouth. In the upper and middle piece there are holes, by stopping or opening which with the fingers, the player forms the notes of the natural scale, the intermediate semitones being formed by the keys. The reed is fixed upon the end of a small brass tube which fits, socket-wise, into the small end of the upper piece. The sound of the hautbois is rich; and from its great power in swelling or diminishing the sound, it is capable of every variety of expression. Originally, the hautbois had but two keys, but others have from time to time been added, till the number is now usually fifteen, and sometimes more. Its ordinary scale is that of C natural, but by means of the keys it can be played in every key with facility. Its range of available notes is from B to G in alt. Triebert of Paris is now the most celebrated maker.



Hautbois: Bœhm's System.

Hautbois is also the name given by organ-builders to a reed stop of eight feet tone, which is made of metal, similar in shape to the real hautbois, and intended to imitate it in its sound. Its reed is made of thin brass. In all English organs it is an indispensable stop in the swell, where it is most effective. It is only a treble stop, of which the bass is the bassoon. In continental organs it is found of various scales, and when very fine, is called the *Oboe d'amour*.

HAUTE GARONNE, &c. See GARONNE, HAUTE, &c.

HAÜY, RENÉ JUST, a celebrated French mineralogist, was born at St Just, in Picardy, 28th February 1743, studied for the church, and took priest's orders. His attention was turned at a comparatively early period of his life to botany, but it was not until he was 38 years of age that, in consequence of accidentally hearing Daubenton lecture on the subject in the Jardin des Plantes, he commenced the study of mineralogy. Linnæus had already shewn that the regular form of crystals is due to the action of forces which obey definite laws, and Romé de Lisle had ascertained that the angles are constant in different crystals of the same variety; but the true laws of crystallisation remained unknown until H. was led to their discovery by a fortunate accident. See his memoirs on crystallography and mineralogy, amounting to about 100, published between 1782 and 1821. (For their titles and dates, see Poggendorff's *Biog. Liter. Handwörterbuch*, pp. 1038—1040.) His most important works are his *Traité de Mineralogie* (Paris, 1801, 4 vols. with atlas), of which a second edition appeared in 1822—1823; *Traité Elementaire de Physique* (Paris, 1804, 2 vols.), of which a third edition appeared in 1821; *Traité des Caractères Physiques des Pierres Précieuses*, 1817; and *Traité de Crystallographie*, in 2 vols., with a volume of plates, in 1822. He was also a contributor to the *Encyclopédie Méthodique*, and the *Dictionnaire d'Hist. Nat.* H.'s narrow escape during the revolution has been already noticed in the memoir of Geoffroy Saint-Hilaire (q. v.). In 1793, he was appointed on the Commission of Weights and Measures; in 1794, conservator of the Cabinet des Mines; in 1795, teacher of physics at the Normal School; and finally, in 1802, he was appointed professor of mineralogy in the Museum of Natural History and in the Faculty of Sciences. He was an Honorary Canon of Nôtre-Dame, and is, in consequence, generally known as the Abbé Haüy. He died at Paris, 3d June 1822, leaving no wealth beyond the collection on which he had based his great discoveries. This collection is now preserved in the Jardin des Plantes.

HAVA'NA, or, in English, *the harbour*, by far the most important city in the West Indies, is the capital of Cuba (q.v.) It stands on the N. shore of the island, in lat. 23° 8′ N., and long. 82° 23′ W. Pop. (1863) 205,676; of 66,781 coloured, 29,013 being slaves: (1867) 202,488. The climate is tropical, and almost uniform. In summer, the average maximum temperature is 87° F.; in winter, 85° F. The haven is one of the noblest in the world, and its comparatively narrow entrance is secured by six forts. H. engrosses nearly the whole of the foreign trade of the colony, excepting, perhaps, the illicit importation of Africans, which requires more secluded localities; and it is connected by railroads and telegraph with places in the interior and on the south coast. Trade and industry have, however, been greatly checked by the insurrection which began in 1868 and still continues. Most of the mercantile nations have establishments here. H. is famous for its cigars, and it has also manufactures of chocolate, woollen fabrics, and straw-hats. It is a bishop's see, and the seat of government; and, in addition to a handsome display of religious and political establishments, has a university, a botanic garden, several theatres, and one of the most magnificent opera-houses in existence. The buildings are not very remarkable, and the streets are in general narrow, but the promenade of *Isabel Segunde*, running through the centre of the city, is very fine; it has a broad carriage-way, with shaded walks and several fountains, of which latter there are about 50 in the city.

HA'VEL, a river of the north of Germany, and a considerable tributary of the Elbe, has its origin in a small lake a mile west of the town of New Strelitz, in Mecklenburg. It flows southward from its source to Potsdam, and thence west and north-west to its junction with the Elbe, opposite the town of Werben. Its entire length is 218 miles, and it is navigable to Furstenberg, a town within 30 miles of its source. The H., which throughout a considerable part of its course serves as the connecting link to a long chain of lakes, is of great importance to the internal trade of Prussia. Of its affluents, the Spree, which is longer than the H., is the only one worthy of mention.

HAVELOCK, Major-General Sir Henry, K.C.B., was born April 5, 1795, at Bishop-wearmouth, in Durham, where his father was a merchant and ship-builder. He entered the army a month or two after the battle of Waterloo, went to India in 1823, and honourably distinguished himself in the Afghan and Sikh wars. In 1856, he commanded a division of the army that invaded Persia. While absent in that country, news arrived of the Indian mutiny, and he hastened to Calcutta. He was directed to organise a small movable column at Allahabad, and to push on to the relief of the British at Cawnpore and Lucknow. He made a forced march to Futtehpûr, where, at the head of 2000 men, he engaged and broke the rebels. He continued his march upon Cawnpore, and twice defeated the enemy—first at Aeng, and then at the bridge over the Pandu Nuddi, 8 miles from Cawnpore. The consequence of the latter victory was the massacre of all the European women and children in the hands of Nana Sahib. H. had another battle to fight at Ahirwa, where the rebels were strongly entrenched. He turned their left, and the 78th Highlanders carried the village in a splendid charge. He now entered Cawnpore, and gazed with his men upon the mutilated bodies of the unhappy ladies and children. The sight steeled their hearts, and the avenging column quitted Cawnpore to advance upon Lucknow. H. crossed the Ganges, and repulsed the rebels at Unao, and afterwards on the same day at Busserut Gunge. After fighting eight battles with the rebels, in all which he was victorious, his little army found itself so thinned by fatigue and sickness, that it was obliged to retire upon Cawnpore. Early in September, General Outram arrived with reinforcements, and H. again advanced to the relief of Lucknow; Outram, with chivalrous generosity, refusing to take the command out of his hands. The relieving force, which mustered 2500 men and 17 guns, routed the enemy at Mungalwar. It next engaged them at the Alum Bagh, an isolated building, about three miles from the Residency of Lucknow. H. and his column, with desperate bravery, fought their way through streets of houses, each forming a separate fortress, until they gained the Residency, to the indescribable joy of the beleaguered garrison. The victorious army were now in turn besieged, but held their own until November, when Sir Colin Campbell (now Lord Clyde) forced his way to their rescue. After the relief of Lucknow, H. was attacked by dysentery, and died November 22, 1857. Before his death, news arrived of his elevation to the distinction of K.C.B. Other honours were in store for him, but they came too late. He was made major-general; appointed to the colonelcy of the 3d Foot; and received a baronetcy, with a proposed pension of £1000 a year. The rank and the pension were given to his widow, daughter of Dr Marshman, an eminent minister among the Baptists. A new patent of baronetcy was issued in favour of the eldest son, H. having died the day before the patent was sealed. A metropolitan statue, raised by public subscription, has been erected to his memory in Trafalgar Square. H. was a strictly religious man and a severe disciplinarian, somewhat after the type of the grave and gallant Puritans who fought and conquered under Cromwell. 'For more than forty years,' he said to Sir James Outram in his last moments, 'I have so ruled my life, that when death came, I might face it without fear.' His death, at the moment when the rebellion had been crushed, excited the deepest sympathy and regret, not only in the army of India, but also among the public at home.

HAVENS. See Harbour.

HAVER, a term used in Scotch Law to denote the person in whose custody a document is. It often happens that in the course of a litigation it is essential for the court to see, or for one party to rely, on a document in the hands of a third party. In order to get at the haver or holder, letters of incident diligence are issued, which have the effect of compelling him to produce and exhibit the document, or state on oath why he refuses to do so. The term is not used in England, the same party being merely summoned as a witness by being told in his *subpœna* that he must bring the document with him; or, if there is no trial, he may be examined by commission or under interrogatories.

HA'VERFORDWEST (Welsh, *Hwlfordd*), a parliamentary and municipal borough, seaport, and market-town of Wales, capital of the county of Pembroke, and a county of itself, occupies a highly picturesque situation on the sides and at the foot of several steep hills on the West Cleddau River, 8 miles north-east of Milford, and about 270 miles west-north-west of London. It is well built, but irregular, and is surrounded by several picturesque walks. When the Flemings settled in the district in the reign of Henry I., H. was one of their principal stations. The castle, the keep of which is now used as the county jail, was erected by Gilbert de Clare, first Earl of Pembroke, in the 14th century. The nave of St Mary's Church—one of the finest in South Wales—is remarkable for the beauty of its roof-carving, and for its skilful construction and rich ornamentation. In conjunction with the boroughs of Fishguard, Narberth, and St David's, H. returns a member to parliament. The trade of the town is inconsiderable. Pop. (1871) 6622.

HA'VERHILL, a town in Massachusetts, United States, at the head of navigation of the Merrimac River, on its north bank, 12 miles from its mouth, and 32 miles north of Boston. It is a pretty town, connected by two bridges with Bradford, and the seat of an active manufacturing industry in iron, woollens, hats and caps, railway carriages, coaches, soap and candles, tinware, leather, boots and shoes, &c. In the colonial times, it was a frontier town, and suffered much from the Indians. Pop. in 1870, 13,092.

HAVERS, Clopton, M.D., an eminent anatomist and physician, who, after studying at Cambridge and Utrecht, where he graduated, settled in London in 1687. His *Osteologia Nova, or Some New Observations of the Bones and the Parts belonging to them* (8vo, Lond. 1691), was long a standard work, and his name is indelibly recorded in the annals of anatomy as the discoverer of the Haversian canals in bone. He edited *The Anatomy of Man and Woman, from Spacher and Remmelin* (folio, Lond. 1691), and was a contributor to the *Philosophical Transactions.* The exact date of his death is not known.

HA'VERSACK, a bag of strong coarse linen, in which, on a march, each soldier carries his own bread and provisions. It is borne on the left side by a strap passing over the right shoulder, and is only used in the field and in cantonments.

HAVE'RSIAN CANALS. See BONE.

HA'VERSTRAW, a village in New York, United States, America, situated on the west bank of the Hudson River, 37 miles north of New York City. Stony Point, famous in the history of the American Revolution, lies in this township. Steam-boats and sloops carry on an active trade with New York, and there are several foundries and manufactures. Pop. of township in 1870, 6412.

HAVI'LDAR, the highest rank of non-commissioned officer among native troops in India and Ceylon. In the Hong-kong Gun Lascars, the havildar receives 1*s.* 3*d.* per diem; but in India, his pay is somewhat less.

HAVRE, LE (a contraction of the original name, LE HAVRE DE NOTRE DAME DE GRACE), the second town in the department of Seine-Inférieure, France, and, next to Marseille, the chief commercial emporium of that country, is situated on the north side of the estuary of the Seine, in lat. 49° 29′ 16″ N., long. 0° 6′ 37″ E., and 108 miles north-west of Paris, reckoning in a straight line. H. has direct communication with Great Britain, Holland, Hamburg, Portugal, Mexico, Brazil, United States, India, &c. It is the port of Paris, with which it is connected by a railway 134 miles long, and the continuation of this line to Strasburg affords such facility of communication with Germany, that the greater part of the trade of that country with America is carried on through Havre. For foreign trade, H. is the Liverpool of France; it receives annually from 500,000 to 600,000 bales of cotton, nearly three-fourths of the whole quantity imported; it also ships most of the exports to America, and, generally speaking, possesses about one-fifth of the whole trade of the country. The sum-total of its imports and exports exceeds 1,300,000,000 francs (£52,000,000). The imports consist chiefly of cotton, spices, coffee, tea, sugar, timber, coal (from England), &c.; and the exports, of French manufactured goods, of wine, brandy, oil, jewellery, provisions, &c. In 1868, 2781 vessels, of 993,748 tons, entered, and 2677 vessels, of 952,872 tons, cleared the port. About 500 vessels belong to Havre. H. also possesses manufactories of paper, sulphuric acid, tobacco, cotton goods, starch, lace, oil, machinery, ropes, salt, &c., also sugar-refineries; the annual value of the manufactures being estimated at £2,500,000. Its harbour is one of the most accessible in France, and is entered by a narrow channel formed by two long jetties stretching from east to west, and which, owing to the current, requires little dredging. This channel leads to the *avant-port* (outer harbour), where the various passenger-steamers lie, and within this avant-port are capacious wet docks, capable of accommodating 500 ships. The largest of these is L'Eure, which contains 700,000 square feet. Among the dry docks, one recently completed, 515 feet long and 112 broad, is a stupendous work, and obviates the necessity for sending large steamers for repairs to Southampton. A new basin has been constructed in the plain of the Leure, measuring about 53 acres. H. was, till lately, surrounded by ramparts and lofty walls; but these were demolished, to admit of the extension of the town, which has now absorbed the neighbouring communes of Ingouville and Graville l'Heure, and numbers (1872) 81,785 inhabitants. Among the public buildings may be noticed the churches of Notre Dame and St Francis, the new City Hall (built in the style of the Tuileries), the tower of Francis I., Exchange, Mansion-house, Arsenal, barracks, and a number of elegant villas which clothe the slopes of Ingouville. The principal institutions are a Royal School of Navigation, a School of Applied Geometry, and a library containing 20,000 volumes. The greater part of the town is modern. H. was founded in 1509 by Louis XII., on the site of a fishing village, and was intended as a harbour of refuge for the French navy. It was greatly extended and improved by his successor, Francis I., and from his time rapidly rose in importance, especially as the rival harbour of Harfleur was being gradually silted up with sand. The names of Richelieu, Colbert, Vauban, Napoleon, &c., are connected with the improvements and additions made to the original harbour. It was bombarded by the British in 1694, 1759, 1794, and 1795. Under Louis XIV., it became the entrepôt and chief seat of operations of the French East India and the Senegal and Guinea Companies. It is celebrated as the birthplace of Mademoiselle Scudery, Bernardin St Pierre (author of *Paul and Virginia*), and Casimir Delavigne. The statues of the last two are placed in front of the library facing the harbour.

HAWAI'I. See SANDWICH ISLANDS.

HA'WASA, or, more properly, AUSSA, formerly an important, but now a decayed town of Eastern Africa, capital of the country of Adal (q. v.), is situated on the Hawash, in lat. 11° 30′ N., and long. 41° 45′ E. It is still the seat of some traffic, a perpetual fair or market being held here, at which salt, blue calico cloth, and the produce of the soil, are said to be the chief articles of sale. About H., however, little has yet been ascertained. Pop. estimated at between 5000 and 6000.

HA'WASH, a considerable river of Abyssinia, has its origin near the south-western border of the Shoa territory, in lat. about 90° N., and long. about 38° E. It flows in a general north-east direction, forming throughout three-fourths of its course the southern and eastern boundary of Shoa, and separating that country from the districts inhabited by the Gallas tribes. It then flows through the territories of the Mudaito tribes, and falls into Lake Aussa, in lat. 11° 35′ N., and long. 41° 50′ E. The name of the country of Abyssinia (called Habesh by the Arabs) probably originated in that of the river.

HAWFINCH (*Coccothraustes vulgaris*), a bird of the Grosbeak (q. v.) genus, and the finch family (*Fringillidæ*). It is considerably larger than the chaffinch; the adult male has the crown and back chestnut brown, the neck and rump gray, the wings partly black, the larger wing-coverts white. The H. is a very shy bird, avoiding man, and therefore often unobserved in districts where it is by no means rare. It is gregarious. It lives chiefly in forests, builds its nest on the highest branches of trees, and feeds very much on beechmast and the kernels of the haw, plum, cherry, &c. It is not uncommon in some parts of England, but is rare in Scotland. It is widely diffused over Europe and the temperate parts of Asia.

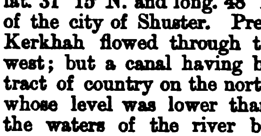
HA'WICK, a burgh of barony, and a considerable manufacturing town in the south of Scotland, in the county of Roxburgh, is situated at the confluence of the Teviot and the Slitrig, 10 miles south-west of Jedburgh, and 53 miles south-east of Edinburgh by railway. Some of the churches and bank-offices are elegant modern buildings; many elegant mansions and fine villas have sprung up within recent years; and several new streets are models of neatness. The town contains several relics of antiquity worthy of mention. Among these are the Tower Inn, part of which was an ancient fortress, and the residence of the barons of Drumlanrig, the superiors of the town; and the Moat, a circular mound, supposed to have been used in remote times both as the place of assembly and deliberation of the neighbouring chiefs, and as the seat of the administration of justice. H. carries on the manufacture of Tweeds (q. v.) on an extensive scale, and has long been known as a principal seat of the hosiery manufacture in Scotland. The Tweed-trade has greatly increased in importance of late years, and, besides the manufacturers, resident wholesale merchants are largely engaged in it. The stocking manufacture was commenced in 1780. Plaids, shawls, blankets, and leather are also manufactured in the town. About 300 power and 100 hand looms are employed. The exchange is a large and handsome building erected in 1865, in which year the formerly defective water-supply was made excellent by the introduction of the Allan, a mountain burn, which joins the Teviot 5 miles above the town. The ancient municipal constitution of the burgh, founded on a charter granted by James Douglas of Drumlanrig, and confirmed by Queen Mary, was reformed by special act of parliament in 1861. The corporation now consists of fifteen councillors, elected by £4 householders. The council elect a provost and four bailies from their number, as in royal burghs. H. now forms one of the three Border burghs, which together return a member to parliament. Pop. (1871) 11,355.

HAWI'ZA, a large and important Arab town of Persia, in the province of Khuzistan, is situated in lat. 31° 15′ N. and long. 48° E., 80 miles south-west of the city of Shuster. Previous to 1835, the river Kerkhah flowed through the town from east to west; but a canal having been made to irrigate a tract of country on the north side of the river, and whose level was lower than that of the vicinity, the waters of the river burst through the new opening, and are now lost in a marsh, 15 miles north of Háwíza. The inhabitants of the town can now obtain water only by digging wells in the old bed of the river. Pop. estimated at 12,000.

HAWK, a term often applied to almost all the *Falconidæ*, except the largest eagles, but also used in a more restricted sense to designate a section of the family, reckoned among the *ignoble* birds of prey, having the wings so short as not to extend to the extremity of the tail, and the bill short and curving from the base. In many of their characters and habits, however, they make a very near approach to the true falcons. The species are numerous, are arranged in several genera, and are distributed over the world. Examples of two of the most important genera are the Goshawk (q. v.) and Sparrowhawk (q. v.) of Britain.

THE HAWK frequently occurs as a charge in Heraldry, and may be *belled*, *jessed*, and *varvelled*. The *hawk's bell*, itself used as a separate charge, is attached to the leg of the bird by *jesses* or thongs of leather. *Varvels* are rings attached to the end of the jesses. The *hawk's lure*, also a heraldic charge, consists of two wings joined with a line, to the end of which is attached a ring. The line is sometimes *nowed* or knotted.

HAWK.



Lure. Bell.

HAWKERS, or PEDLARS, or PETTY CHAPMEN, persons who go from town to town, or door to door, selling goods, wares, or merchandise, or exercising their skill in handicraft. A considerable change has been made by recent legislation in regard to this class. Those pedlars exercising their calling entirely on foot have been separately dealt with from hawkers who employ one or more beasts of burden in their business. The foot pedlars are placed under the surveillance of the police, and are exempt from excise duty. Since January 1, 1872, any person whatever who can satisfy the chief officer of police of the police district in which he resides, that he is of good character, is above seventeen years of age, and has resided during the previous month in the district, will receive, on due application, a certificate valid for a year, on payment of five shillings. Such certificate entitles the holder to exercise his calling in the particular police district only; but should he desire to extend his traffic to another police district, he can, by satisfying the chief officer of that district of his good character, receive an indorsation on his certificate, rendering it valid for that particular district also, on payment of sixpence. The police have power at any time to open and search the packs, &c. of any certificated pedlar, with a view to prevent dishonesty and smuggling, &c., for which they have much opportunity. They have an appeal to the local Justice of Peace and other courts against oppression by the police.

Hawkers or pedlars who use beasts of burden are in a different category. Any person may become such by merely taking out an annual or half-yearly license from the excise, and there is no limit of the locality, the license being valid all over the kingdom. These licenses are at the rate of £4 per annum for each beast of burden used in the trade. He is in no case entitled to sell spirits, but he may sell tea and coffee. He must not sell plated goods without taking out a plate license, nor must he sell by auction without an auctioneer's license. Any person hawking unprovided with a license, or who refuses to produce the license to any person who calls for it, is liable to severe penalties. Commercial travellers, book agents, sellers of vegetables, fruit, fish, or victuals, also sellers in fairs or markets legally established, do not require either licenses or certificates, though it must be sometimes difficult to define whether a seller comes within the category of a pedlar or hawker (34 and 35 Vict. c. 96; 29 and 30 Vict. c. 64).

The reason why the state imposes this tax on hawkers is, that they have great advantages over regular shopkeepers, as they pay no rent, and often interfere with the natural course of dealing at shops.

HAWKESBURY, a river of New South Wales, in East Australia, enters the Pacific at Broken Bay, about 20 miles to the north of Sydney. Its entire course does not exceed 50 miles, the dividing ridge of mountains being here very near to the coast. Pitt Town, Wilberforce, and Windsor are situated on its banks, and it is navigable from the sea to four miles above the last-mentioned place. The H., even in this land of floods, is remarkable for its inundations. In 1808, the water rose 86 feet; and in 1844, it rose 20 feet in a few hours.

HAWKINS, SIR JOHN, an English navigator, was born at Plymouth about 1520. He has the infamous distinction of being the first Englishman that trafficked in slaves. His 'commercial' career ended in 1568, after which we find him more honourably employed. He was appointed treasurer of the navy in 1573, knighted for his services against the Spanish Armada in 1588, and for the rest of his life was engaged in making havoc of the Spanish West Indian trade. In 1595, along with his kinsman, Drake, he commanded an expedition directed against the Spanish settlements in that part of the world, but died, November 21, in the same year. H. founded a hospital at Chatham for the relief of disabled and sick sailors.

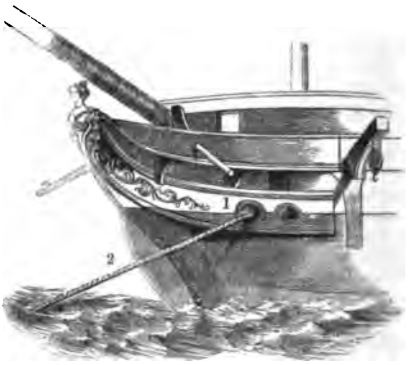
HAWK-MOTH, a name sometimes used to comprise all the lepidopterous insects of the section *Crepuscularia*, the Linnæan genus *Sphinx*. They have a spine or stiff bristle on the anterior edge of each of the hind-wings, and these being received in corresponding hooks on the under-side of the fore-wings, attach them together. Their wings are generally covered with a looser down than those of butterflies. The body is rather large and thick. Notwithstanding the name *Crepuscularia*, signifying that their period of activity is that of twilight, and which is truly characteristic of the greater number, many of them may be seen darting from flower to flower even at mid-day, or hovering over flowers, from which they suck the honey by their long proboscis. They make a loud humming noise with their wings, and are insects of very rapid and powerful flight. Their caterpillars have always 16 feet. A peculiar position which the caterpillars often assume has led to the name *Sphinx*, because of a fancied resemblance to the sculptured monster of Egypt. Their chrysalids are cylindrical, free from points and angular prominences, blunt-headed, with a conical abdomen, and are sometimes enclosed in cocoons, sometimes concealed in the earth.—The name Hawk-moth is sometimes limited to a division of the *Crepuscularia*, of which the genus *Sphinx*, as now restricted, is the type, and of which the Death's Head Moth (q. v.) is an example. Their caterpillars are smooth and elongated. The name Hawk-moth appears to be derived from the hovering motions of these insects, resembling those of hawks looking for prey.—Many hawk-moths are natives of Britain; they are more abundant in warmer climates. Some of the species have a wide geographical range.

HAWKSBEE, or HAUKSBEE, Francis, a natural philosopher of considerable eminence, was born in the latter half of the 17th c., and died about 1730. He was admitted a Fellow of the Royal Society in 1705, and was appointed to the office of curator of experiments to the Society, and in 1723 he was elected assistant-secretary. He contributed 43 memoirs to the *Philosophical Transactions*, chiefly on chemistry and electricity. Of his experiments in the latter department, Dr Thomson, the historian of the Royal Society, observes, that 'they constitute the beginning of the science, and by drawing the attention of philosophers to that particular subject, were doubtless of considerable service in promoting electrical investigations.' All these memoirs appeared between the years 1704 and 1713. His chief independent work was published in 1709, and was entitled, *Physico-Mechanical Experiments on various Subjects; touching Light and Electricity producible on the Attrition of Bodies*. He is perhaps best known for his improvement of the earlier air-pumps of Boyle, Papin, and Hooke (a subject fully discussed in Wilson's *Religio Chemici*, pp. 215—218), and for being the first who used glass in the electrical machine.

HAWKWEED (*Hieracium*), a genus of plants of the natural order *Compositæ*, sub-order *Cichoraceæ*. The species are annual, or more generally perennial plants, some with leafless scapes, one-flowered or many-flowered, and some with leafy stems; the leaves, stems, and involucres in many species being hairy. They are very numerous, natives of the temperate and colder regions of the northern hemisphere, particularly abounding in Europe. A number are natives of Britain, and some of them are very common plants. The flowers are generally yellow, but the Orange Hawkweed (*H. aurantiacum*), a native of the south of Europe, and doubtful native of Britain, is often cultivated in gardens for its rich orange flowers. It is a perennial, about two feet high.

Orange Hawkweed (*Hieracium aurantiacum*).

HAWSE, the situation of the cables in front of a ship's bow, when she is moored with two anchors out forward—one on the starboard, the other on the port bow. The term is also used to denote any small distance ahead of a ship, or between her bow and the anchors at which she rides; as, for instance, when it is said of another vessel 'she sailed athwart our hawse,' or 'she anchors in our hawse.' When the two cables pass directly to their anchors, without crossing or chafing at the hawse-holes by which they enter the ship, the vessel is said to have a 'clean hawse.'



1. Hawse Holes. 2. Hawser.

HAWSER. See Rope.

HAWTHORN (*Cratægus oxyacantha*; see Cratægus), a shrub or small tree, a native of Europe, Siberia, and the north of Africa, common in Britain, and much planted both for hedges and for ornament. It varies in height from six or eight to twenty or twenty-five feet. It has roundish obovate 3—5-lobed deciduous leaves, and corymbs, generally of white, rose-coloured, or sometimes deep crimson flowers, succeeded by a small red fruit (*haws*) with yellow pulp, the central stony part bearing a very large proportion to the pulp. The fruit remains on the tree after the leaves have fallen, and affords winter-food to birds. There are many varieties of H., and curiously enough, some have only one style, whilst some have several. The variety called GLASTONBURY THORN—because supposed to have originated at Glastonbury Abbey—is remarkable for its early flowering, which often takes place in the middle of winter, whilst the common kind is not in flower till May or June. The winter flowers of the Glastonbury variety are, however, not generally followed by fruit, and a second flowering often takes place in the same year. The common H. is often popularly called *May*, from the season of its flowering in England. It is also called *Whitethorn*, in contradistinction to the Sloe or Blackthorn. The use of the H. for hedges is almost universal in Britain. It is also sometimes employed as a stock on which to graft apples and other *Pomaceæ*. It attains a great age, and in its more advanced stages, is a tree of slow growth, although, when young, it shoots up rapidly. The wood is very hard, close-grained, and takes a fine polish, but is apt to warp. A fermented liquor, which is very intoxicating, is made from the fruit in many parts of France.

The H. is particularly valuable as a hedge-plant, in consequence of its strong and plentiful spines, its long life, and its ready adaptation to very various soils. For this purpose, it is propagated by seed; the haws are laid in a heap to rot, with a mixture of sand or fine mould, and in a year or sixteen months after, the seeds are sown in ground carefully prepared by digging and manuring with well rotted manure. The seed-drills are about sixteen inches apart. The young plants are kept clear of weeds, and the earth about them occasionally stirred with the hoe. They often grow to the height of a foot or two feet in the first season. They are commonly once transplanted before their final planting to form hedges. See HEDGE. H. hedges bear trimming very well, and the natural disposition of the plant to spread out above, can be counteracted, so as to make the hedge as it ought to be, widest at bottom; but unless the soil is very favourable, some of the plants are apt to die, and form gaps, which it is by no means easy to fill up with fresh plants.—Young H. plants are called *quicks* or *quicksets*, because used to make living (*quick*) fences.

HAWTHORNE, NATHANIEL, an American author of distinction, was born at Salem in the state of Massachusetts, on July 4, 1804. He was educated at Bowdoin College, and after graduating there, he obtained a post in the Custom-house at Boston, which he soon, however, threw up, and betook himself to literary work for a subsistence. He wrote a number of stories for the journals, which he afterwards collected in 1837, and published under the title of *Twice-told Tales*; a second volume of which appeared in 1851. In 1843 he took up his residence at the charming village of Concord, in a manse which had formerly been the dwelling of Emerson, and which suggested the title of his next work, *Mosses from an Old Manse* (Boston, 1846). This sketch, in which he gives some interesting recollections of his boyhood, first made his name known in Europe. In 1842 he published *The Liberty Tree*; and in 1845, *The Journal of an African Cruiser*. After a three years' residence at Concord, he again accepted a situation in the Custom-house at Boston, and removed to that town. This, however, did not stop his literary work. *The Scarlet Letter* appeared in 1851 and was received with universal approbation, as was likewise *The House of the Seven Gables*, published in the same year; and their author was at once recognised, both in Europe and America, as a man possessing a true poetic spirit, combining fine feeling with a charming style, and displaying a deep knowledge of human nature accompanied by genuine humour. His *Blithedale Romance* (Boston, 1852) may be regarded as a kind of autobiography, so far as it goes, being founded on passages in his own life. In 1853, he received the appointment of consul at Liverpool, from his friend President Pierce, who had been a fellow-student of his, and whose life he had written (*Life of Franklin Pierce*, Boston, 1852). He resided in Liverpool discharging the duties of his office for four years, and afterwards went to Italy to recruit his impaired health; a journey which furnished him with material for his fantastic romance, *Transformation* (London, 1860), which is regarded by some as the best of his works. After his return to America he published *Our Old Home* (Boston, 1863), a sketch of England and the English. He died suddenly at Plymouth in Massachusetts, May 19, 1864. Besides the works already mentioned may be noted, *Septimius, a Romance of Immortality*, a posthumous work, published in London in 1872.

HAY (Ger. *heu*, Dutch, *hoy*; probably from the root of Ger. *hauen*, Eng. *hew*, to cut), the stems and leaves of grasses or other plants dried for Fodder (q. v.) of cattle. Throughout the grazing and dairy districts of England, and especially in the vicinity of large towns, the hay-harvest is as important as the corn-harvest, and a large breadth of old pasture is annually cut. In Scotland, however, little of this old natural grass is converted into hay, and the crop consists mainly of clover and rye-grass. This requires less turning and labour than the closer succulent natural grass, and with twice turning, and a week or ten days' drying, will generally be fit for the rick, into which the English farmer at once places it. In Scotland, the weather is seldom sufficiently fine to fit the hay, within a moderate time, for a large rick, and the practice is to put it, after a few days, in *cocks*, containing one or two hundred-weight, and thence, after another week, into what are technically called tramp-ricks, containing from one to two tons. From these it is transferred at any convenient time to the rick-yard. This practice, although almost universal in the north, is attended with loss of time and labour, and, moreover, bleaches and dries up the hay, giving it the appearance of straw, and preventing that gentle heating which English farmers desire both in their clover and grass hay.

The management of the natural grasses of which most English hay consists is somewhat different, and the process is seen in perfection in Middlesex and various of the counties about London. The great matter—too generally overlooked in Scotland—is to preserve the colour and flavour of the grass; and this can only be done by keeping it constantly turned, and having it rapidly dried, if possible, without the deteriorating washing of repeated rains. Artificial drying best attains this end, but is of course impracticable on the large scale. In the best style of English hay-making, the grass, after being cut with the scythe or machine, and as soon as the dew is off, is shaken and spread out by means of forks or of a *tedding-machine* drawn by a horse. It is not allowed to lie long exposed to the sun, but before evening, is drawn together by rakes into *wind-rows*, which, if there is any prospect of rain, are made up into small heaps or cocks. It is again spread out next morning, or on the return of favourable weather; and when the operations are expedited by wind and sun, the hay will be ready for the rick by the second or third day. There is, however, much difference in the time during which the hay requires to lie out;

the bulk of the crop and the quality of the land must be especially considered. When the grasses are cut, as they should be when in bloom, and before their seed ripens and their stems get tough and hard, they contain the largest amount of moisture, and require careful making, but produce then the most nutritive and palatable hay. As soon as it is thoroughly dry, it should be put at once into the stack or rick, and well trodden down. A certain amount of heating improves the flavour, and renders the hay more palatable to every sort of stock. When, as is sometimes the case, it is imperfectly made, or picked up too soon, it gets overheated, and becomes dark brown or black, its nutritive properties are diminished; it is, moreover, apt to disagree with both horses and cattle, and can only be profitably used when mixed with straw and cut into chaff. Hay put together when damp from rain or dew does not heat, as when it contains an undue amount of natural moisture, but speedily moulds. When hay has been weathered and injured by repeated rains, it may be rendered more palatable by scattering a little common salt over the rick whilst it is being built. Throughout Scotland, eight or ten pounds of salt to the ton is very generally used alike for the clover and grass hay. In the midland and southern districts of England, the best hay is generally got up in June; but in Scotland, little is carried until the middle of July. When the crop is good, and everything done well, the cost of hand and horse labour expended upon the hay before it is safely ricked will approach 20*s.* per ton. The crop averages from one to two tons per acre. Hay that has stood for seed is tougher and less nutritive than that cut earlier, for the sugar, gum, and gluten of the matured seed have been abstracted from the stems, which are then apt to be little better than straw. For milch cows, well-made English hay is deservedly prized; but good clover-hay is richer in albuminous matters, and better adapted for horses and sheep.

HAYBOTE, in English Law, is an implied right or liberty of a tenant to take thorns and other wood off the lands he occupies, to repair the hedges, gates, and fences thereof. It also includes wood taken to make rakes and forks for gathering hay, whence the name is derived.

HAYDN, JOSEPH, a German composer, was born at the village of Rohrau, on the confines of Hungary and Austria, 31st March 1732. He was the son of a poor wheelwright; and manifesting great musical talent, he was received, at the age of eight, into the choir of the cathedral of St Stephen's, at Vienna. Here he remained till his 16th year, acquiring a practical rather than a theoretical knowledge of his art, by singing the music of the best Italian and German religious composers. In that year, however, his voice broke, and he lost his place as a chorister. He now gave lessons in Vienna, played in the orchestra, occupied himself with composition, and in this manner earned a maintenance. At the same time, he studied with extreme care the first six sonatas of Emanuel Bach, which had accidentally fallen into his hands. His position, however, continued very critical, and he was on the verge of starvation, when he had the good-fortune to obtain as a pupil a little girl, Signora Martinez, who was being educated at Vienna under the care of the poet Metastasio. H. embraced this opportunity of making himself acquainted with the Italian language. Subsequently, Metastasio introduced him to the celebrated singer Porpora, who employed him to accompany him on the piano during his singing lessons, and from whom he obtained the instruction in composition he so anxiously desired and needed. In the latter part of 1750, he composed his first quartet for stringed instruments, and from this period his prospects rapidly brightened. In 1759, a certain Count Morzin engaged him as music director and composer, 'with a salary of 200 florins, free lodgings, and table with his secretaries and other officials.' About this time, H. married the daughter of a hairdresser, who had been kind to him in his days of penury. This marriage did not prove a happy one. 'It is nothing to her,' said H. near the close of his life, 'whether her husband be a cobbler or an artist.' Her sole ambition was to squander H.'s earnings. In 1760, Prince Esterhazy placed him at the head of his private chapel. For him H. composed his beautiful symphonies (a style of composition in which he excels all other composers), and the greater number of his magnificent quartets. While in this situation, his patron conceiving the design of dismissing the band, H. composed the famous symphony known as *Haydn's Farewell*, in which one instrument after another becomes mute, and each musician, as soon as he has ceased to play, puts out his light, rolls up his music, and departs with his instrument. It is said that in consequence the prince changed his mind, and did not dismiss the band. After the death of Prince Esterhazy, in 1790, H. accompanied Salomon the violinist to England, where, in 1791—1792, he produced six of his *Twelve Grand Symphonies*. His reception was brilliant in the highest degree. In 1794, he made a second engagement with Salomon for England, and during this period brought out the remaining six symphonies. In England, he first obtained that recognition which afterwards fell to his share in his own country. On his return to Austria, he purchased a small house with a garden in one of the suburbs of Vienna. Here he composed his oratorios, the *Creation* and the *Seasons*. The former work, the harmonies of which are pervaded with the fire of youth, was written in his sixty-fifth year, and is considered by many to be equal to the finest productions of Handel; the *Seasons* (completed in eleven months) was almost his last work. He died at Vienna, 31st May 1809.

Although H. composed slowly and very carefully, his works are exceedingly numerous, comprising 118 symphonies, 83 quartets, 24 trios, 19 operas, 5 oratorios, 163 pieces for the baritone, 24 concertos for different instruments, 15 masses, 10 smaller church-pieces, 44 sonatas for the pianoforte, with and without accompaniments; 12 German and Italian songs, 39 canzonets, 13 hymns in three and four parts, the harmony and accompaniment to 365 old Scottish songs, besides a prodigious number of divertissements and pieces for various instruments. —Compare Griesinger, *Biographische Notizen über Haydn* (Leip. 1810); *Vie de Haydn* (Paris, 1817); Grosser, *Biographische Notizen über Haydn* (Hirschb. 1826).

HAYDON, BENJAMIN ROBERT, an English painter, was born at Plymouth, January 25, 1786. He exhibited his first picture at the Academy in 1807, 'Joseph and Mary Resting with our Saviour after a Day's Journey on the Road to Egypt,' which found a purchaser in the author of *Anastasius*. It was succeeded by 'Dentatus.' H. quarrelled with the Academy about the hanging of this picture, and his life thereafter was divided between painting and controversy. His pictures brought him admiration, and his wilful temper procured him foes. As years passed on, the admiration cooled, while the foes remained virulent as ever. At this period, he had many patrons, and his pictures brought large prices; his 'Judgment of Solomon,' for instance, 700 guineas. He made several attempts to be admitted an Associate of the Academy, and when he was refused, he characteristically imputed the refusal to the envy and jealousy of the academicians, and railed against them more bitterly than ever. His great work, 'Christ's Entry into Jerusalem,' was exhibited by himself in 1820, but did not find a purchaser. Nothing daunted, H. painted two other subjects from the passion of the Saviour. In 1821, he married, and two years thereafter he produced the 'Raising of Lazarus,' in some respects the most powerful of his works. This style of subject—covering enormous canvases—not hitting the public taste, he became involved in pecuniary embarrassments, and was finally incarcerated in the King's Bench, from which, after a time, he was released through the assistance of his friends. While in prison he painted the 'Mock Election,' which George IV. purchased for 500 guineas. Of his succeeding works, 'Napoleon Musing at St Helena' excited admiration, and was frequently reproduced. In 1836, he was again imprisoned for debt, and was released on a settlement being effected with his creditors. At this time he forsook the brush for the platform, and his lectures on art in London and the provinces brought him fame and money, a circumstance which only increased his rage at the Academy and the artistic public. When government determined to decorate the new Houses of Parliament with pictures, H. considered that the hour of his fortune had at last arrived. He engaged in the competition, and was unsuccessful. This defeat he never entirely recovered. His last works were 'Uriel and Satan,' 'Curtius Leaping into the Gulf,' and some others of a kindred nature. He exhibited two of his latest productions in 1846 at the Egyptian Hall, but the exhibition was coldly regarded by the public. This was the drop which made the cup overflow. On June 22 of that year, he died by his own hand.

As a painter, H. excited much temporary admiration, but he does not now rank high. He delighted in classical and sacred subjects, and these modern English taste does not seem to affect. In 1853, Mr Tom Taylor published *The Life of Benjamin Robert Haydon*, in two volumes, containing copious extracts from his letters and journals.

HAY'ESINE, or BORATE OF LIME, known also as BOROCALCITE, HYDROBOROCALCITE, TIZA, &c., was named after the mineralogist Hayes, and remained a mineralogical curiosity until 1851, when a specimen was first exhibited as a commercial article in the collection of imports sent to the Great Exhibition in Hyde Park by the town of Liverpool. This brought it into notice; and it is now occasionally imported in very large quantities from the ports of Iquique and Pisagua Bay, in Peru. Owing to the absurd love of the Peruvian government for monopolies, vast quantities of borate of lime are comparatively useless, as that which is received in Europe is almost all smuggled out of the country in opposition to the government decrees. About 9000 tons have been exported altogether, and its value in this country is about £30 per ton. The borate of lime is found in rounded nodules, rarely larger than a good-sized orange, imbedded in the soil at certain spots of the Pampas of Tamarugal, and in the northern part of the desert of Atacama. It is always associated with the nitrate of soda, which is so abundant in that locality. Its chemical composition is $CaO,B_2O_3 + 6H_2O$ (*Hayes*); or boracic acid, 45·98; lime, 18·45; water, 35·57 (*Bechi*). It is used as a source of boracic acid in the manufacture of the borate of soda, so extensively employed as a fluxing material for glazing pottery; in glass-making, metallic soldering, &c.: the only other known sources being the boracic acid from the Tuscan springs, and the borax and tincal from Tibet. See BORAX.

HAYNAU, JULIUS JAKOB, BARON VON, an Austrian general, was born in 1786, entered the Austrian service in 1801, and gradually advanced in rank, till in 1844 he was appointed field-marshal. During the Italian campaigns of 1848—1849, he signalised himself by his ruthless rigour, especially at the capture of Brescia. H. was engaged in the siege of Venice, when he was summoned by the emperor to Hungary, in May 1849, to take the supreme command of the forces in that country. The storming of Raab, the advance southward, the occupation of Szegedin, and the engagements on the Theiss, were all the work of Haynau. But his atrocious severity towards the defeated Hungarians, and especially his alleged flogging of women (a charge denied by H.), excited the hatred and detestation of Europe. In 1850, he was dismissed from the public service, not for his cruelty, however, but for the intractability of his disposition. In the same year, he was brought into unenviable notoriety on the occasion of his visit to the brewery of Messrs Barclay and Perkins during his stay in London, when he was assaulted by the draymen, and barely escaped with life. For this insult the British government declined giving any satisfaction. On subsequently visiting Belgium and France, he was received by the populace with strong dislike; but by the vigilance of the authorities was preserved from actual insult. Baron Schönhals, in a biography of his friend H. (Grätz, 1853), tries to exonerate him from the accusation of being either constitutionally or intentionally cruel, and asserts that he only acted in obedience to the orders of his masters. H. died at Vienna, March 14, 1853.

HAYTI, otherwise known as HISPANIOLA or ST DOMINGO is, after Cuba, the largest of the West Indian Islands. It is nearly equidistant from Porto Rico on the E., and from Cuba and Jamaica on the W., with the Caribbean Sea on the S., and with the Bahamas and the open ocean on the N. H. lies in N. lat. between 17° 37′ and 20°, and in W. long. between 68° 20′ and 74° 28′. It belongs to the group of the Greater Antilles, or Leeward Islands, and, like all the principal members of its series, its greatest length (about 400 miles) is in the direction—from west to east—of the chain of which it forms a part; its greatest breadth is 160 miles. Area, including the islands of Tortuga, Gonaive, &c., about 28,000 square miles, being somewhat smaller than Scotland; and the population about 760,000. The country, as the native name implies, is mountainous, being traversed longitudinally by a ridge, which sends out lateral spurs, terminating in headlands on either coast. The range is of volcanic origin—a fact still corroborated by the frequent occurrence of terrible earthquakes. Cibao, believed to be the loftiest summit, is said to be about 7000 feet above the level of the sea. The mountains, richly and heavily timbered, are understood to be susceptible of cultivation almost to their tops. With such a soil well watered, and with a climate tempered by the sea-breezes, H., as a whole, is perhaps the most fertile spot in the West Indies; while its excellent harbours, more especially those in the Bay of Gonaives on the west, offer considerable facilities to foreign trade—hurricanes, however, prevailing in August and September. The rivers are inconsiderable, and useless for navigation. Besides several bodies of fresh water, the salt lake of Henriquillo, near the south shore, claims particular notice, as indicating by its tidal action some subterranean communication with the Caribbean Sea.

The productions are coffee, logwood, mahogany, tobacco, cotton, cocoa, wax, ginger, and sugar; and mines of gold, silver, copper, tin, and iron, though not now worked, are found in many places. The imports for the year 1871 were valued at £1,040,850, about half of which were from Great Britain; the exports in the same year were valued at £1,006,000. The number of vessels which entered the port in the year 1872 was 904, and the number which cleared it was 850.

Within little more than an age after 1492, the aborigines had been swept away by the remorseless cruelties of the Spaniards. In connection with this deplorable result, H., already the seat of the first white settlement in America, became one of the earliest fields, in the western hemisphere, of negro servitude. Next came the bucaneers, during the 17th c., to avenge the red man's wrongs; and as those marauders were chiefly French, the western portion of the island, which was their favourite haunt, was, in 1697, ceded to France by the peace of Ryswick, thus presenting the first important break in the unity of Spanish America. For nearly 100 years, the intruders imported vast reinforcements of Africans; while the mulattoes, who were a natural incident of the concomitant licence, rapidly grew, both socially and politically, into an intermediate caste, being at once uniformly excluded from citizenship, and generally exempted from bondage. In 1791, under the influence of the French Revolution, the mutual antipathies of the three classes—white, black, and mixed—burst forth into what may well be characterised as the most vindictive struggle on record—a struggle which, before the close of the 18th c., led to the extermination of the once dominant Europeans, and the independence of the coloured insurgents. Thus, as the emancipated bondmen mostly belonged, at least in form, to the Church of Rome, H. now exhibited the only Christian community of negro blood on either side of the Atlantic. In 1801, France sent out a powerful armament to recover her revolted dependency, treacherously seizing and deporting the deliverer of his brethren, Toussaint l'Ouverture. In 1803, however, she was constrained to relinquish her attempt; and in 1804, Dessalines (q. v.), aping the example of Napoleon, proclaimed himself Emperor of H.; thus reviving the indigenous name of the island, which had been in disuse for upwards of 300 years.

This great change was fatal to the commercial prosperity of French H., decidedly the more valuable section of the island. In its progress, it had destroyed capital in every shape; and in its issue, it could not fail to paralyse labour under circumstances where continuous exertion of any kind was equally irksome and superfluous. Nor was the political experience of the lately servile population more satisfactory than its economical condition. Sometimes consolidated into one state, and sometimes divided into two, the country alternated, through the instrumentality of one revolution after another, between despotism and anarchy, between monarchy and republicanism, between a kingdom and an empire. Its only tranquil period of any duration coincided with the rule of President Boyer, which subsisted from 1820 to 1843—its last 21 years comprising not merely the whole of French or Western H., but likewise the Spanish or eastern portion of the island. H. thus united, besides being immediately recognised by the European powers in general, was soon acknowledged even by France, on condition of paying 150,000,000 francs, or £6,000,000 sterling, as a compensation to the former planters.

About the year 1843, the inhabitants of the eastern or Spanish portion of H., rising against their Haytian oppressors, formed themselves into a republic called the Dominican Republic (q. v.), and in May 1861 threw itself under the protection of Spain, a connection which was dissolved in 1865. The western portion of the island had been republican in its form of government previous to 1849, when its former president, General Soulouque, ascended the throne, proclaimed an empire, and assumed the title of Emperor Faustin I. In 1859, however, he was compelled to abdicate, and a republic was again proclaimed, with General Fabre Geffrard as president, which post he held till expelled in 1867, when a new constitution was adopted. The president is elected for four years. The area of the Haytian republic is 10,204 square miles, and the pop. estimated at 572,000.

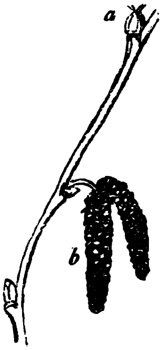
HAYWARD, the name given in England to one who keeps the common herd of cattle of a town, or of a manor, when the copyhold or other tenants have the right of sending cattle to graze. In Scotland, the corresponding term is 'shepherd' in rural burghs.

HAZARD, a game at dice, without tables, which can be played by any number of persons. One person, called the *caster* (his opponent who bets with him being called the *setter*), takes the box and dice, and makes a throw (called a *main*), which must be above 4, and not exceeding 9; and if the first throw made is not within these limits, the caster must throw until such a one occurs. After the caster has thrown the main, he throws his own chance. The throws 2, 3, 11, 12 are called *crabs*, and are losing throws for the caster, except in the following cases, viz., 12 when 6 is the main, 11 when 7 is the main, or 12 when 8 is the main; in these cases, and also when the caster's throw is the same as the main, the throw is called a *nick*, and the caster wins. If his throw be not a nick, or a crab, then, if he can repeat the same throw before the main turns up, he wins. If the caster throws crabs, not nicks, or if he fails to repeat his throw before the main turns up, the setter wins the stakes. The setter, on the whole, has slightly the advantage of the caster, especially if 6 or 8 be the main, when his chance is to the caster's in the proportion of 7295 to 6961, or 22 to 21 nearly. Hazard is exclusively a game of calculation, and is never played merely with a view to amusement. Essentially an essay of calculations and combinations, requiring a cool and clear head to execute them, it has been an incitement to the wildest schemes under the name of 'systems' that ever laughed mathematics to scorn. Hazard has been long a standing game at all the houses of play in Britain, in the face of a fact, that owing to the intricacy of the calculations of probabilities, the odds in favour of the professional player over the amateur are 100 per cent. 'In spirit, if not to the letter, it is the arithmetic of dice.'

HAZARIBA'GH, the capital of the district of the same name, province of Chota Nagpore, presidency of Bengal, is situated 239 m. to the N.W. of Calcutta, and 189 to the S.E. of Benares, in lat. 24° N., and long. 85° 24′ E. Pop. (1871) 11,050. On the conquest of Scinde, H. was selected as the residence of the dethroned Amirs.

HAZEBROU'CK, a small but flourishing town of France, in the department of Nord, at the junction of the Calais and Dunkerque railways, 25 miles west-north-west of Lille. The parish church, built 1493—1520, is surmounted by a spire of open work, 240 feet high. Manufactures of linen-cloth and twist, soap, leather, refined salt, beer, oil, and lime, are carried on. A great linen-market is held here every Saturday. Pop. (1872) 5962.

HAZEL (*Corylus*), a genus of trees and shrubs of the natural order *Cupuliferæ*, of which the fruit is a nut in a leafy and laciniated cup, the enlarged involucre of the female flower. The male flowers are in cylindrical catkins; the female flowers appear as mere clusters of coloured styles at the extremities of buds; the male flowers are pretty conspicuous, the female flowers are very small.—The COMMON H. (*C. Avellana*) is a large shrub or low tree, with a bell-shaped fruit-cup, which is somewhat two-leaved, open, and spreading. It is a native of Britain, and of all the temperate parts of Europe and Asia; it is common also in North America. Hazel-nuts of improved varieties are grown to a considerable extent in the south of England, particularly in Kent; they are also imported in large quantities from the south of Europe. Hazel-nuts yield, on pressure, about half their weight of a bland fixed oil, often called *nut-oil* in Britain, the hazel-nut being popularly known by the term *nut* alone; but in Germany it is walnut-oil which is usually called nut-oil. Hazel-nut oil has drying properties, and is much used by painters; it is also used by perfumers as a basis with which to mix expensive fragrant oils; and it has been employed medicinally in coughs. The wood of the H., although seldom large enough for the purposes of the carpenter, is very tough and flexible, and hazel-rods are therefore much used for making crates, hurdles, hoops for small barrels, &c. The thicker stems of H. are used for making charcoal, which is in great request for forges, is much esteemed for the manufacture of gunpowder, and is the kind preferred by artists for crayons.



Hazel:
a, female flower; *b*, male flowers.

The value of the hazel-nuts annually imported into Britain is about £100,000. The quantity used for making oil is comparatively inconsiderable.

Most of the cultivated varieties of the hazel-nut are known by the names of *cob-nuts* and *filberts*; the former generally of a roundish form; the latter characterised by the greater elongation and laciniation of the fruit-cup; the name filbert being indeed regarded as a corruption of full-beard. The Red Filbert, or Lambert's Nut, is remarkable for having the pellicle which surrounds the kernel of a crimson-red colour. The finer kinds of H. are propagated by grafting and by layers. Hazel-plants for copses are obtained from seed.—The BEAKED H. (*C. rostrata*), a species having a very hairy fruit-cup prolonged into a long beak, is a native of the northern parts of America. Its kernel is sweet.—The CONSTANTINOPLE H. (*C. colurna*), the nuts of which are considerably larger than those of the common H., is a native of the Levant, from which the fruit is imported into Britain. It is much used for expressing oil, but is a less pleasant fruit than many kinds of cob-nut and filbert. A Himalayan species of H. (*C. ferox*) has a spiny fruit-cup, and an excessively hard nut.—*Barcelona nuts* are the nuts of a variety of the common H., kiln-dried before their exportation from Spain. Hazel-nuts not subjected to this process cannot be kept long without losing in part their agreeable flavour, and contracting a sensible rancidity, except in air-tight vessels, in which they are said to remain fresh even for years.

The larva of a weevil (*Balaninus nucum*) feeds on the kernels of hazel-nuts. The parent female makes a hole into the nut by means of her long snout, and there deposits an egg. Great numbers of nuts are thus destroyed.

HAZLITT, WILLIAM, a distinguished English essayist and miscellaneous writer, the son of a Unitarian clergyman, was born at Maidstone, in Kent, on the 10th April 1778. His father went to America with his family when H. was about five years of age, but returned in two years, and became pastor of a congregation at Wem, in Shropshire. In 1793, H. became a student in the Unitarian college at Hackney, but did not take kindly to theological pursuits. In 1795, he left the college, and returned to his father's house, where he devoted himself to metaphysics and painting; about this time he met Coleridge, and by the conversation of the poet was awakened to a keener intellectual life than he had before known. In 1802, he visited Paris, and studied in the Louvre, and on his return he attempted to support himself by portrait-painting; but as he could neither please himself nor his patrons, he relinquished the easel, and threw himself into literature, for which he was much better adapted. In 1803, he went to London, and shortly after published his essay *On the Principles of Human Action*. In 1808, he married, and retired into the country. In 1811, he was again in London. In 1813, he delivered a course of lectures on the History of English Philosophy, and he subsequently delivered courses on the English Poets. He wrote essays in the *Examiner* in conjunction with Mr Leigh Hunt, which were afterwards republished in a volume entitled the *Round Table*. Other essays he collected into volumes, entitled *Table-talk*, and the *Plain Speaker*. He also published *Characters of Shakspeare's Plays*, and the *Spirit of the Age*. In 1822, he was divorced from his wife, and two years afterwards married a second time. He died on the 18th Sept. 1830. His last work was the *Life of Napoleon*, of whom he was an enthusiastic admirer. An edition of his principal works was edited by his son; and *Memoirs of William Hazlitt* were published by his grandson in 1867.

The fame of H. rests upon his essays, which are in every sense remarkable. He exhibits great acuteness and penetration in his criticism, and every now and again a passage, by reason of passionate force and *abandon*, rises into the regions of poetry. On the whole, his essays are inferior to Lamb's and Hunt's, but they contain pages quite as striking and memorable as any to be found in theirs.

HEAD. See BRAIN, CONCUSSION, SKULL, CAROTID ARTERIES, &c.

HEAD, SIR EDMUND WALKER, Bart., for some years governor-general of Canada, was born in 1805, near Maidstone, Kent; educated at Oriel College, Oxford, where he was first-class in classics in 1827, and became Fellow of Merton; succeeded his father, the seventh baronet, in 1838; was appointed assistant poor-law commissioner, and in 1841 became poor-law commissioner. After the breaking up of the poor-law board, he was, in 1847, nominated lieutenant-governor of New Brunswick. He held this post until September 1854, when he succeeded the Earl of Elgin as governor-general of Canada. He was the author of *The Handbook of Spanish Painting*, a *Tour in the Manufacturing Districts*, &c. H. was made a privy councillor in 1857, and K.C.B. (civil) in 1860. He resigned his post in 1861, and died in 1868.

HEAD, SIR FRANCIS BOND, Bart., an author, and ex-governor of Upper Canada, was born at Hermitage, near Rochester, in 1793. He entered the corps of Royal Engineers, and had attained the rank of captain, when, in 1825, he accepted an engagement from a private company to work some gold and silver mines on the river Plate. He crossed the Pampas from Buenos Ayres to Chili, and on his return to London, published his *Rough Notes of a Journey across the Pampas*. He was made a major in the army in 1828; and in 1835, while holding the post of assistant-commissary of the army, on the urgent request of Lord Glenelg, then colonial secretary, he accepted the governorship of Upper Canada. He declared, in pursuance of his instructions, that an elective legislative council could not be granted, and that the crown reserves would not be abandoned, except on condition of an adequate and permanent civil list being voted. The House of Assembly stopped the supplies, as a means of obtaining redress for the alleged grievances of the province. H. thereupon dissolved the House, and the result of the dissolution was in his favour. An insurrection, which had its origin, as it was said, in his injudicious measures, broke out. He had, with well-founded confidence in his own resources, sent away from Upper Canada the whole of the Queen's army; and putting himself at the head of the militia, he succeeded in suppressing the insurrection. In 1838, he resigned his post, and was created a baronet. He published a *Narrative*, in answer to some severe strictures and imputations of rashness and want of judgment, to which his Canadian administration had given rise. He has since devoted himself to literary pursuits. He has frequently appealed to the public upon the defenceless state of the country; he has also written *Bubbles from the Brunnens of Nassau*, *A Fagot of French Sticks*, *A Visit to Ireland*, *The Emigrant*, *Life of Bruce the Traveller*, &c.; he has also been a frequent contributor to the *Quarterly Review*, some of his articles in which have been reprinted.

HEAD BOROUGH, in England, is the head of a borough, or high constable, the latter name being now exclusively used. In Scotland, the words 'head borough' are used in another sense—viz., as the head borough in the county where the sheriff holds his court and exercises his jurisdiction.

HEAD COURTS, in Scotch Law, were the sheriff courts where the freemen did suit and service annually, now abolished by the act 20 Geo. II. c. 43.

HEADACHE, a pain referred to the front, side, or back of the head, varying in intensity and other characters according to its cause and pathological relations. The most common varieties of headache are those which are dependent on, or connected with, derangements of the digestion, and frequently occur after meals. Such headaches are common among young persons, and especially young women leading lives of unnatural confinement within doors amid vitiated air. The subjects of this form of headache are usually pale and feeble, or delicate and easily flushed; they are often addicted either to sedentary occupations, or to balls, theatres, evening concerts, and other dissipations extending far into the night. The cure is so evident that it need not be insisted on as a matter of doctrine, but the practical application of the lesson is often difficult, owing to the blind devotion with which pleasure is often followed to the obvious detriment of health. Very different is the form of headache caused in older persons, and mostly in men, by a 'flow of blood to the head,' in connection with threatened apoplexy. In this case, the habit is usually full, the complexion florid; giddiness is apt to come on in stooping, and the pain and sense of fulness and throbbing characteristic of the complaint, increase; in some cases, there is an approach to insensibility or double vision, as an additional warning. In these cases, gentle purgation and restricted diet, with exercise, will usually bring about a cure, unless there is positive organic disease. The periodic headache, or *megrim* (Fr. *migraine*, from Gr. and Lat. *hemicrania*, i. e., half the head), otherwise called *brow ague*, is a curious variety which is closely connected with malaria (see AGUE), and recurs at more or less regular intervals, affecting exactly half of the head up to the middle line. This kind is very acute, and is commonly under the control of quinine, which must, however, be given in considerable doses. The sick headache described by Fothergill is among the most distressing and intractable forms, inasmuch as it cannot usually be referred to any distinct removable cause, and is but little under the control of remedies. It is to be met, however, like the other forms, chiefly by a regulation of the whole habits of life, especially as regards habitual exercise, which may, indeed, be regarded as the great specific for all kinds of headache.

HEALDS, or HEDDLES, AND HEALD MACHINES. In weaving, the threads of the warp are so arranged, that at each passage of the shuttle backwards and forwards, a certain number of the warp threads are raised up, and the remainder drawn down; this is done either with vertical threads, or lines, with a small loop in the middle, through which the warp thread is passed, there being one of the vertical threads for each horizontal or warp thread. The vertical threads are called healds; and as there is continual wear upon them, it is necessary they should be of considerable strength. They also require to be particularly smooth and round, in order that they may not, by their friction in moving up and down, chafe the threads of the warp. Hence the manufacture of heald yarns is a peculiar one, and employs the chief attention of several manufacturers, particularly in the neighbourhood of Bradford, in Yorkshire, where they have been brought to great perfection by Messrs Townend Brothers and others. For some purposes, the healds are made of metal, and this class of healds is also a special manufacture. Machines have been invented for the purpose of making thread healds without knots, as the knot made by the loop is a great impediment to the free action of the heald. Such a machine was invented by Mr Judkins of Manchester. It is so constructed as to double and twist the single yarn, and at certain points braid and plait the yarn forming the eye or loop of the heald without knot of any kind. By this machine a series of healds can be made in a continuous cord, only requiring to be cut into lengths for use. The same inventor also produced a machine which fits metallic eyes or loops in the heald.

HEALTH (from the same root as *heal*, *hale*, whole), the state of body or mind opposed to Disease (q. v.), and characterised by the integrity or soundness (Lat. *sanus*) of all the parts and functions which constitute a living being. In the more restricted and ordinary sense, health is understood as referring chiefly to the body, and as indicating that perfect and harmonious play of all the functions which permits a man to be all that his Creator intended. Even in this sense, however, it may readily be admitted that absolute bodily health is one of the rarest of endowments; in common language, accordingly, the term is accepted with an indefinite limitation, to indicate a state consistent with a life reaching its ordinary physiological limit without any manifest and considerable departure from the ideal standard.

As the absolute and extreme duration of human life is uncertain, it is usual to regard as a healthy state of the system that in which a moderate degree of activity, without pain or inconvenience, is maintained beyond the limit of threescore-years-and-ten, as indicated by the Psalmist. In point of fact, however, no considerable community of human beings can be said even to approach this term of life on an average of cases. Even where the adults are more than commonly long-lived, there is always a considerable mortality at very early ages, which tends to reduce the *statistical vitality*, so to speak, of the whole community below the point which would be indicated by an average of 70 years for the population at large. Thus, in a population dying at the rate of only 15 in 1000 annually (the lowest permanent rate in the returns of the registrar-general for England), the average age at death of the community, supposing the population to be absolutely free from change, would be only 66·6; and in the case of a death-rate of 20 in 1000, the average age at death would be 50; while a death-rate of 25 in 1000 (the actual death-rate of London, the healthiest of the great European capitals) would correspond to an average age at death of not more than 40. Setting aside fluctuations of population, which always exercise a certain influence on the result of such calculations, it may be said that the average duration of life in England and Wales is about 45 years, and in Scotland somewhat less than 50 years; and to the extent expressed by these figures, the health of these two great countries falls short of the ideal standard. This subject will be more fully considered under the article Vital Statistics, in which a view will be given of the phenomena of the death-rate, as affecting the calculation of premature mortality, with a view to the removal of its causes in great communities. This department of science has assumed great importance of late years, in consequence of the efforts that have been made to improve the sanitary condition of our great towns and country districts by improved drainage and sewerage, a regulated supply of pure water, and the inspection, in certain circumstances, of lodging-houses, and even of private dwellings, so as to prevent overcrowding, and the other manifest causes of the spread of epidemic disease. These, and other great practical reforms, constitute the object of what has been called the 'Public Health' movement in this country, some notice of the history, progress, and practical results of which is given under the head of Sanitary Science in Supp., Vol. X.

HEALTH, Bill of, in Scotch Law, means an application by a prisoner to be allowed to live out of the prison, on the ground of ill health. The application is now made to the County Prison Board, and if allowed, the prisoner is taken to a neighbouring house, and kept under surveillance. The same thing is done in England under the Prison Regulation Acts, though the phrase bill of health is not used there.

HEALTH, Bill of, in Shipping, means a certificate of a consul, &c., as to the health of the crew, when the ship has come from a suspected port. A clean bill, a suspected bill, and a foul bill, are the three short names given to the several degrees of health.

HEARING. See Ear.

HEARING IN PRESENCE, in the Law of Scotland, means a hearing of a difficult or important case before the whole of the thirteen judges of the Court of Session. It is competent for either division of the Court of Session, when equally divided in opinion on a case, to appoint a hearing before the whole judges, which is in fact a reargument. In England, it is not in general competent for any court, when equally divided, to order a case to be argued before all the other courts sitting together. The only case in which it occurs is where the Court of Criminal Appeals has heard a case, and the judges differ considerably, or think it a very important case, when it is ordered to be argued before the full court, which consists of all the fifteen common law judges. It is then called a hearing before the full court.

HEARING OF A CAUSE is the phrase used in the Court of Chancery, when the merits of the case and the arguments on both sides are entered upon. The same phrase is used in cases before magistrates. But at common law, if it is a jury case, the corresponding term is 'the trial;' and if it is a case before the judges in banc, it is called 'the argument.' In Scotland, it is called 'the debate,' if before the judges; if before the jury, 'the trial.'

HEARSAY EVIDENCE is the name given by lawyers to evidence given in a court of justice at second-hand, where the witness states not what he himself saw or heard, but what somebody else said. This evidence is, as a general rule, inadmissible, because the axiom is, that the best evidence that can be had must be produced, and therefore each witness must be confined to stating what he knows of his own personal knowledge, or what he has learned by the aid of his own senses; and as he is sworn to the truth, his truthfulness is thus secured, as far as human testimony can be so. If evidence were once admitted at second-hand, there would be no limit to its uncertainty, and there would be thus introduced vague statements of absent persons, who, not being sworn when they made them, are therefore incapable of being punished if they speak falsely, and cannot be cross-examined. Though such is the general rule, yet there are a few exceptions which are unavoidable, owing to the nature of the thing. Thus, in proving pedigrees, the hearsay evidence of persons connected with the family, and those only, is admitted in England; but in Scotland it is admitted though the persons were not connected with the family. A remarkable exception also exists in the case of dying declarations, i. e., statements made by persons mortally wounded and in the prospect of death; but in England such evidence is only admitted in criminal cases, on a charge of manslaughter or murder. In Scotland, such declarations are admitted in all cases of violence, and though the party at the time did not believe he was dying. There is another exception to the non-admissibility of hearsay evidence allowed in Scotland, but not in England, viz., where the person who made the statement is dead, and therefore cannot be produced as a witness. In England, there is no help for such a state of things, and the statements of the dead person cannot be admitted; but in Scotland, if there was no reason to suppose the contrary, it is presumed the dead witness spoke the truth, and what he said may be given in evidence for what it is worth, both in civil and criminal cases. A few other exceptions, of a less important description to the above general rule, exist in both countries, which are too technical to be here noticed.

HEART. See Circulation of the Blood.

HEART, Diseases of the, a class of serious, and often fatal disorders affecting the great centre of the circulation, the accurate knowledge of which may be dated from the application of Auscultation (q. v.) and Percussion to the purposes of diagnosis. The great names of Corvisart and Laennec stand foremost in the modern investigation of cardiac diseases, Dr Hope of London, and a great number of living physicians, having largely contributed to the existing knowledge of the subject, which had, however, been carefully studied by Morgagni and the great morbid anatomists of the 18th c., as well as by Senac and Testa, without the advantage of the more recent means of diagnosis. The limits of this article admit of only a very slight sketch of a subject of vast extent, and on which the literature of the last fifty years is unusually copious and exhaustive.

Diseases of the heart may be roughly divided into the functional and organic—in the former of which no appearances adequate to account for the symptoms are found in the dead body, while in the latter the contrary is the fact. To the former class belong simple palpitation, syncope, and the peculiar disorder termed angina pectoris; to the latter, hypertrophy of the heart, dilatation of the cavities, with various structural diseases of the endocardium and pericardium, of the muscular fibre, and of its nutrient arteries. To these may be added the diseases of the aorta, and especially aneurisms of its thoracic portion. We propose to review very briefly these different morbid conditions.

Palpitation, or undue and often irregular action of the heart, attended by uneasy sensations of movement, is a disorder common to many organic diseases of the heart, and not unfrequently also occurring in debilitated states of the system, without any organic disease whatever. In exhausted and anxious men of business, in hysterical and anæmic women, in habitual smokers, in dyspeptics, in persons debilitated by discharges from the mucous membranes, a degree of palpitation is quite common, and the symptom sometimes assumes the apparent form of an independent disease, especially when aggravated by mental anxiety in respect to its true significance. The treatment is entirely guided by the facts of the individual case; but generally speaking, the negative results of physical diagnosis, with the positive knowledge of the cause, suffice to reassure both practitioner and patient, and lead to a correct adaptation of means to the end in view.

Syncope, or swooning, is, as every one knows, much more commonly a functional than an organic disease. See FAINTING.

Angina pectoris, or breast-pang, also called *syncope anginosa*, is a peculiar painful or oppressive sensation, very characteristic of cardiac diseases, especially of such as are apt to prove suddenly fatal. It is needless to add that this form of disease is of great importance, and of very dreadful significance. The two leading elements in the sensation referred to, according to Dr Latham, are the pain and the sense of impending death. The sensation is entirely different from breathlessness, although often mixed up with this in the mind of the patient. Where the sudden, death-like paroxysm of angina comes on in the absence of medical assistance, the proper remedies are, warmth to the extremities, stimulants, and moderate doses of laudanum or opium; but no time should be lost in procuring the aid of instructed persons, as errors in the administration of these powerful remedies might be more rapidly fatal than the disease itself.

Asthma, and difficulty of breathing depending upon the lungs, especially that form of difficult breathing called *orthopnoea*, when the patient is unable to lie down in bed, are symptoms very characteristic of some kinds of disease of the heart and great vessels.

The organic diseases of the heart are very numerous; most of them are attended by one or other of the symptoms above mentioned, and almost all of them involve danger to life more or less considerable. It is nevertheless true that public opinion, now-a-days, is prone to overrate the tendency to death, and especially to sudden death, in some of these diseases. Strictly speaking, a sudden death—i. e., a death quite unexpected, and in the midst of apparent good health—is a rare and exceptional fact in organic disease of the heart; the most frequent instances being in connection with Aneurisms (q. v.) of the great vessels, fatty degeneration of the heart's fibre, and extensive calcareous degeneration of the coronary arteries of the heart, often producing marked symptoms of angina pectoris, as above referred to.

The *valvular diseases of the heart* are among the most frequent and the most easily recognisable of its organic disorders. They depend essentially upon changes in the endocardium, or internal lining membrane (endocarditis); in many cases these changes originate in attacks of rheumatic fever (see RHEUMATISM), which is therefore to be viewed with suspicion as a disease tending to shorten life, especially when developed during early youth. The valves affected are usually those of the left side, and the consequence may be either imperfect closure of the valve, leading to regurgitation of blood, or obstruction of the orifice. In either case, there is a mechanical impediment to the circulation, of a more or less serious kind, followed by dilatation of the cavities of the heart and hypertrophy of the walls, especially of the ventricles. For a time the circulation is kept up under these unfavourable conditions by increased efforts of the organ; but ultimately its balance is fatally disturbed, blood accumulates in the liver, the lungs, or others of the internal organs, and secondary diseases take place, of which Dropsy (q. v.), Albuminuria, and Hæmoptysis, or spitting of blood, are among the most frequent and formidable.

Pericarditis, or inflammation of the pericardium, i. e., the heart-purse, or fibrous sac investing the heart, is, like endocarditis, a frequent consequence of acute rheumatism. In numerous instances, it ends favourably, but in some cases it is fatal by large effusion of fluid, and in others by adhesions between the external membrane and the heart.

The treatment of all these diseases must be strictly regulated by medical advice.

HEART, SOUNDS OF THE. On applying the ear to the cardiac region of a living man or mammal, in a state of health, two successive sounds are heard, each pair of which corresponds with one pulsation. These are known as the *first* and the *second* sound. There is scarcely any interval between these two different sounds, the second one following immediately upon the conclusion of the first; but after the second sound there is a perceptible pause before the first sound is again heard. The *first* sound is dull and prolonged, while the *second* is short and sharp, and the difference between them is well expressed (as Dr C. J. B. Williams has remarked) by articulating the syllables lubb, dŭp.

The cause of the first of these sounds has been a subject of much discussion, at least thirty explanations of its mode of production having been offered. During the first sound, several distinct actions are taking place, to each of which it has been ascribed by different physiologists. Thus we have (1), the impulse of the apex of the heart against the side of the chest; (2), the contraction of the muscular walls of the ventricles; (3), the tension of the auriculo-ventricular (tricuspid and mitral) valves (see CIRCULATION); (4), the rush of blood through the narrowed openings of the aorta and pulmonary artery; and (5), the collision of the particles of blood with one another, and their friction against the sides of the heart's cavities.

The hearts of mammals being constructed like our own, give out sounds different in degree, but not in character, from the sounds heard in man. In birds (if we except the ostrich and the apterix, whose hearts approximate to the mammalian type), there is no perceptible difference between the first and second sound; and Dr Halford has ingeniously explained why this should be in his essay on *The Action and Sounds of the Heart.* The action of the heart in reptiles (the alligator, python, and turtle) seems to be accompanied with no definite sounds.

When the valves are changed by disease, the sounds undergo special alterations, which are of the highest importance in diagnosis.

HEARTH-MONEY, an old tax in England, abolished by 1 Will. and Mary, s. 1, c. 10.

HEAT, the unknown cause of the sensation of warmth, and of a multitude of common phenomena in nature and art. In considering this subject scientifically, it is necessary, at the outset, to discard the ideas conveyed by the popular use of such words as heat and cold. A number of bodies, however different, left for a long enough time in the same room, must, as we shall see further on, acquire the same *temperature*, or become in reality equally warm. Yet in popular language, some, as metals, stones, &c., are pronounced to be cold, and others, as flannel and fur, warm. The touch, then, is *not* a means by which we can acquire any definite idea of the temperature of a body.

Nature of Heat.—A heated body is no heavier than it was before it was heated; if, therefore, heat be a material substance, as it was long considered, it must be *imponderable.* And, in fact, under the name of caloric or phlogiston, it is classed, in almost all but modern treatises, as one of the family of imponderables. But if it were *matter*, in any sense of the word, its quantity would be unchangeable by human agency. Now we find that there are cases in which heat is produced in any quantity without flame, combustion, &c., as in melting two pieces of ice by rubbing them together, and also cases in which a quantity of heat totally disappears. This is utterly inconsistent with the idea of the materiality of heat. The only hypothesis that at all accords with the phenomena is, that *heat is a form of motion*, and with this idea we shall start.

Measure of Heat.—Whether it be a vibration, such as light and sound (in some cases, it certainly is), or consist in a succession of *impacts* of the particles of bodies on each other (as in some cases it has been considered to be), it is none the less certain that the *amount* of heat in a body is to be measured by the vis-viva (see FORCE) of moving particles. But as we cannot observe those particles so as to ascertain their vis-viva, we must have some means of measuring the temperature of a body, depending upon an *effect* of heat. Whatever that effect may be, it is obvious that, as the laws of nature are uniform, it will afford us a *reproducible* standard, by which we can estimate its amount at any time and in any place, and compare that amount with another observed somewhere else; just as the French Mètre (q. v.) is reproducible at any time, being the ten-millionth part of a quadrant of the meridian.

Dilatation or Expansion.—Now, the most general and notable effect which heat produces on matter is to *expand* it. The length of a metallic bar varies with every change of temperature, and is ever the same at the same temperature. The fixing of the tire of a cart-wheel is a very good instance. No hammering could fit an iron hoop so tightly on the wood-work of the wheel, as the simple enlarging of the tire by heat, and its subsequent contraction by cold. It is thus possible to *slip* it on, and an enormous force is secured to bind the pieces together. In almost every kind of structure, the expansion and contraction from changes of temperature require to be guarded against. In the huge iron tubes of the Britannia Bridge, the mere change of the seasons would have produced sufficient changes of length to tear the piers asunder, had each end of a tube been fixed to masonry. Watches and clocks, when not compensated (see PENDULUM), go faster in cold weather, and slower in hot, an immediate consequence of the expansion or contraction of their balance-wheels and pendulums.

If a flask *full* of water or alcohol be dipped into hot water or held over a lamp, a portion of the liquid runs over; a glass shell which floats in a vessel of water, sinks to the bottom when the water is heated; and as water is heated, the hotter water continually rises to the surface. Indeed, if the latter were not the case, it would be impossible to prevent explosions every time we attempted to boil water or any other fluid. If a bladder, partly filled with air, and tightly tied at the neck, be heated before a fire, the contained air will expand, and the bladder will be distended. As it cools, it becomes flaccid again by degrees.

These and like instances are sufficient to shew us that *in general* all bodies expand by heat. In order, then, to prepare a reproducible means of measuring temperature, all we have to do is to fix upon a substance (mercury is that most commonly used) by whose changes of volume it is to be measured, and a reproducible temperature, or rather two reproducible temperatures, at which to measure the volume. Those usually selected are—that at which water freezes, or ice melts, and that at which water boils. In both of these cases, the water must be *pure*, as any addition of foreign matter in general changes the temperature at which freezing or boiling takes place. Another important circumstance is *the height of the barometer.* See BOILING. The second reproducible temperature is therefore defined as that of water boiling in an open vessel when the barometer stands at 30 inches. In absolute strictness, this should also be said of the freezing-point, but the effect on the latter of a change of barometric pressure is practically insensible. The practical construction of a heat-measurer or *Thermometer* on these principles, the various ways of graduating it, and how to convert the readings of one thermometer into those of another, are described in the article THERMOMETER. In the present article, we suppose the Centigrade thermometer to be the one used.

If we make a number of thermometer tubes, fill them with different liquids, and graduate as in the Centigrade, we shall find that, though they all give 0° in freezing, and 100° in boiling water, no two in general agree when placed in water between those states. *Hence the rate of expansion is not generally uniform for equal increments of heat.* It has been found, however, by very delicate experiments, which cannot be more than alluded to here, that mercury expands *nearly* uniformly for equal increments of temperature. However, what we sought was not an *absolute* standard, but a *reproducible* one; and mercury, in addition to furnishing this, may be assumed also to give us the ratios of different increments of temperature.

We must next look a little more closely into the nature of dilatation by heat. And first, of its *measure.* A metallic rod of length l at 0°, increases at t° by a quantity which is proportional to t and to l. Hence k being some numerical quantity, the new length $l' = l(1 + kt)$. Here k is called the coefficient of linear dilatation. For instance, a brass rod of length 1 foot at 0°, becomes at t°, $(1 + {\cdot}000000187t)$ feet; and here k, or the coefficient of linear dilatation for one degree (Centigrade), is ·000000187; or a brass rod has its length increased by about $\frac{1}{5,000,000}$th part for each degree of temperature.

If we consider a bar (of brass, for instance) whose length, breadth, and depth are l, b, d—then, when heated, these increase proportionally. Hence,

$$l' = l(1 + kt),$$
$$b' = b(1 + kt),$$
$$d' = d(1 + kt);$$

and therefore the volume of, or space occupied by, the bar increases from V or lbd to V′ or $l'b'd'$.

Hence $V' = V(1 + kt)^3$,

$= V(1 + 3kt)$ nearly, since k is *very small.*

Therefore we may write $V' = V(1 + Kt)$, where we shall have as before K, the coefficient of *cubical* dilatation for 1° of temperature. And, as $K = 3k$, we see that, for the same substance, the *coefficient of cubical dilatation is three times that of linear dilatation.*

In the following table, these coefficients are increased a hundredfold, as it gives the proportional increase of volume for a rise of temperature from 0° to 100° Centigrade. It must also be remarked, that while the *linear* dilatation of solids is given, it is the cubical dilatation of liquids and gases which is always observed. Moreover, as the latter are always measured in glass, which itself dilates, the results are only *apparent;* they are too small, and require correction for the cubical dilatation of glass. This, however, is comparatively very small, and may in general be neglected.

Glass, . . .	·0000086	Water, ...	·0466
Iron, ...	·0000122	Alcohol, ...	·116
Zinc, ...	·0000294	Air, ...	·3665
Mercury, . . .	·01543	Hydrogen, . . .	·3668

There is one remarkable exception to the law that bodies expand by heat—viz., that of water, under certain circumstances. From 0° (Centigrade), at which it melts, it *contracts* as the heat is increased, up to about 4° C., after which it begins to expand like other bodies. We cannot here enter into speculations as to the cause of this very singular phenomenon, but we will say a few words about its practical utility. Water, then, is *densest* or *heaviest* at 4° C. Hence, in cold weather, as the surface-water of a lake cools to near 4°, it becomes heavier than the hotter water below, and sinks to the bottom. This goes on till the whole lake has the temperature 4°. As the cooling proceeds further, the water becomes *lighter*, and therefore remains on the surface till it is frozen. Did water not possess this property, a severe winter would freeze a lake *to the bottom*, and the heat of summer might be insufficient to remelt it all.

Specific Heat.—The thermometer indicates the *temperature* of a body, but gives us no direct information as to the *amount* of heat it contains. Yet this is measurable, for we may take as our Unit the amount of heat required to raise a pound of water from 0° to 1°, which is of course a definite standard. As an instance of the question now raised—Is *more* heat (and if so, *how much more*) required to heat a pound of water from zero to 10°, than to heat a pound of mercury between the same limits? We find by experiment that bodies differ extensively in the amount of heat (measured in the units before mentioned) required to produce equal changes of temperature in them.

It is a result of experiment (sufficiently accurate for all ordinary purposes) that if equal weights of water at different temperatures be mixed, the temperature of the mixture will be the arithmetic mean of the original temperatures. From this it follows, with the same degree of approximation, that equal successive amounts of heat are required to raise the same mass of water through successive degrees of temperature. As an instance, suppose one pound of water at 50° to be mixed with two pounds at 20°, the resulting temperature of the mixture is 30°; for the pound at 50° has lost 20°, while each of the other two pounds has gained 10°. Generally, if m pounds of water at t degrees be mixed with M pounds at T degrees (the latter being the colder), and if θ be the temperature of the mixture—the number of units lost by the first is $m(t - \theta)$, since *one* is lost for *each* pound which cools by *one* degree; and that gained by the second is $M(\theta - T)$, and these must be equal. Hence $m(t - \theta) = M(\theta - T)$, whence, at once,

$$\theta = \frac{mt + MT}{m + M};$$

But if we mix water and mercury at different temperatures, the resulting temperature is found *not* to agree with the above law. Hence it appears that *to raise equal weights of different bodies through the same number of degrees of temperature, requires different amounts of heat.* And we may then define the *specific heat* of a substance as the number of units of heat required to raise the temperature of *one* pound of it by *one* degree.

By the definition of a unit of heat, it is at once seen that the specific heat of water is unity; and, in general, the specific heats of other bodies are less, and are therefore to be expressed as proper fractions. For example, if equal weights of water and mercury be mixed, the first at 0°, the second at 100°, the resulting temperature will not be 50° (as it would have been had both bodies been water), but 3°·23 nearly—in other words, the amount of heat which raises the temperature of 1 pound of water 3°·2, is that which would raise that of 1 pound of mercury 96°·77, or the specific heat of mercury is $\frac{1}{30}$th of that of water. The following may be given as instances of the great differences which experiment has shewn to exist among bodies in respect of specific heat: Water, 1·000; turpentine, ·426; sulphur, ·203; iron, ·114; mercury, ·033.

It is mainly to the great specific heat of water that we are indebted for the comparatively small amount of it required to cool a hot body dropped into it; for its comparatively small loss of temperature when it is poured into a cold vessel, and the enormous effects of the water of the ocean in modifying climate.

It has been found generally, with a few exceptions, that the specific heats of bodies are nearly *inversely* as their Atomic Weights (q. v.). *Hence all atoms require the same amount of heat to produce the same change in their temperature.* Thus, for simple bodies, we have atomic weight of mercury, 100; its specific heat, ·033; product, 3·3; atomic weight of iron, 28; its specific heat, ·114; product, 3·2. A similar remark may be made, it appears, with reference to compound bodies of the same type; but, in general, the product of the specific heat and the atomic weight differs from one type to another.

Latent Heat, Fusion, Solution, and Vaporisation.—We are now prepared to consider the somewhat complex effects produced by heat on the molecular constitution of bodies; and, conversely, the relations of solidity, fluidity, &c., to heat. All bodies (except carbon, which has been *softened* only) have been melted, by the application of a proper amount of heat. The laws of this fusion are:

1. *Every body has a definite melting-point, assignable on the thermometric scale, if the pressure to which it is subjected be the same.*

2. *When a body is melting, it retains that fixed temperature, however much heat may be applied, until*

the last particle is melted. The last result is most remarkable. The heat applied does not raise the temperature, but *produces the change of state.* Hence it seemed to disappear, as far as the thermometer is concerned, and was therefore called *latent* heat.

A pound of water at 79° C. added to a pound of *water* at 0° C., produces, of course, 2 pounds of water at 39°·5. *But*, a pound of water at 79° C. added to a pound of *ice* at 0° C., produces 2 pounds of water at 0°. Heat, then, has *disappeared* in the production of a change from solidity to fluidity. And this we might expect from the conservation of energy (see FORCE), for actual energy in the shape of heat must be consumed in producing the potential energy of the molecular actions in the fluid. For every pound of ice melted, without change of temperature, 79 units of heat are thus converted into change of molecular arrangement.

We give a few instances of latent heat of fusion: Water (as above), 79·0; zinc, 28·1; sulphur, 9·4; lead, 5·4; mercury, 2·8.

In law 1, it is mentioned that constancy of pressure is necessary. In fact, the freezing (or melting) point of water is *lowered* by increase of pressure, while those of sulphur and wax are *raised;* but these effects, though extremely remarkable, are *very small.* Most bodies contract on solidifying; some, however, as water, cast iron, type-metal, &c., *expand.* Thus, a severe frost setting in after copious rain splits rocks, &c., by the expansion of freezing water; and thus also we obtain in iron the most delicate and faithful copy of a mould, and in the fusible alloy a clear-cut copy of a type. The modern dynamical theory of heat enables us to see that a perpetual motion would be procurable, if bodies which contract on solidifying had *not* their melting point raised by pressure, and *vice versâ.*

Analogous to the fusion of a solid is its *solution* in a liquid, or the mutual conversion into liquids of two solids which are intimately mixed in powder. Here, also, we should expect actual energy in the shape of heat, to be used up in producing the potential energy of the fluid state; and, indeed, such is always the case. Such changes of arrangement destroy heat, or produce cold; but this in many cases is not the effect observed, as heat is generally developed by the *loss* of potential energy, if there be *chemical* action between the two substances. Hence, in general, the observed effect will be the difference of the heat *generated* by chemical action, and that *absorbed* in change of state.

If a quantity of pounded nitrate of ammonia (a very soluble salt) be placed in a vessel, an equal weight of water added, and the whole stirred for a minute or two with a test-tube containing water, the heat required for the solution of the salt will be abstracted from all bodies in contact with the solution, and the water in the test-tube will be frozen. In this sense, the compound is called a *freezing mixture.* For additional illustrations of heat becoming latent, see FREEZING MIXTURES.

Of course the converse of this may be expected to hold, and latent heat to become sensible when a liquid becomes solid. As an example, when a saturated solution of sulphate of soda begins to deposit crystals of the salt, the temperature rises very considerably; and it is the disengagement of latent heat that renders the freezing of a pond a slow process, even after the whole of the water has been reduced nearly to the freezing-point.

Vaporisation.—Almost all that has been said on the subject of fusion is true of vaporisation, with the change of a word or two. Thus, however much heat we apply to a liquid, the temperature does not rise above the boiling-point. Heat, then, becomes *latent* in the act of vaporisation, or rather is *converted into* change of state. It is found by experiment that 540 units of heat (each sufficient to heat a pound of water 1° C.) disappear in the conversion of a pound of water into steam. Hence a pound of steam at 100° C. is sufficient to raise 5·4 pounds of water from zero to the boiling-point.

Communication of Heat.—There are at least three distinct ways in which this occurs, and these we will take in order.

Conduction.—Why is it that if one end of a poker and of a glass or wooden rod be put into a fire, we can keep hold of the other end of the latter much longer than we can of the former? The reason is, that heat is more readily transmitted in the iron from particle to particle, than it is in glass or wood. This is conduction. It is to be noticed, however, that in this experiment a great portion of the heat which passes along each rod is given off into the air by the surface. The mathematical theory of conduction has been most exquisitely investigated by Fourier, and after him by Poisson, but on the supposition that the rate at which heat passes from a warmer to a colder portion of a body is proportional to the *difference* of temperature. As most of the experiments which have been made with the object of ascertaining the *conductivity* (*not* conductibility, the erroneous word in common use) of different bodies have been made in this way, it is not surprising that our knowledge on this point is very meagre indeed. We know that silver conducts better than most other metals, and that the metals in general conduct better than other solids; but here our present information ends. It is satisfactory to know, however, that the defects of the old methods are now fully acknowledged, and that the important element of conductivity will shortly be accurately known for all important substances. Forbes has recently shewn that the conductivity of iron diminishes as its temperature increases; and the same is probably true of other bodies. This invalidates the conclusions of the mathematical theories above mentioned, but the necessary corrections will be easily applied when the experimental data are completely determined.

In conjunction with their radiating power (see next section), the conductivity of bodies is most important as regards their suitableness as articles of clothing for hot or cold climates, or as materials for building or furnishing dwelling-houses. We need but refer to the difference between linen and woollen clothing, or to the difference (in cold weather) of sensation between a carpet and a bare floor, in order to shew how essential the greater or less conducting power of bodies is to our everyday comfort.

Radiation.—By this is understood the passage of heat, not from particle to particle of one body, but through air or vacuum, and even through solid bodies (in a manner, and with a velocity quite different from those of conduction) from one body to another. There can be no doubt whatever as to radiant heat being *identical* with light, differing from red light, for instance, as red light differs from blue; i.e., having (see LIGHT) longer waves than those corresponding to red light. This idea might easily have arisen during the contemplation of a body gradually heated. At first, it remains dark, giving off only rays of heat; as its temperature increases, it gives us, along with the heat, a low red light, which, by the increase of the temperature, is gradually accompanied by yellow, blue, &c. rays, and the incandescent body (a lime-ball, for instance) finally gives off a light as white as that of the sun, and which, therefore, contains all the colours of sun-light in their usual proportions. In fact (see FORCE), there is great reason to believe that the sun is merely a mass of incandescent melted matter, and that the radiations it emits, whether called heat or light, merely differ in *quality*, not in *kind*. Taking this view of the subject at the outset, it will be instructive to compare the properties of radiant heat with those of light throughout.

Light, then, *moves* (generally) *in straight lines*. This is easily verified in the case of heat by the use of the Thermo-electric Pile (q. v.) and its galvanometer. Placing the pile *out* of the line from a source of heat to an aperture in a screen, *no* effect is observed; but deflection of the needle at once occurs when the pile is placed in the line which light would have followed if substituted for the heat.

A concave mirror, which would bring rays of light proceeding from a given point to a focus at another given point, does the same with heat, the hot body being substituted for the luminous one, and the pile placed at the focus. Heat, then, is *reflected* according to the *same laws* as light. A burning lens gives a capital proof of the sun's heat and light being subject to the same laws of *refraction*. When the Solar Spectrum (q. v.) is formed by means of a prism of rock-salt (the reasons for the choice of this material will afterwards appear), the thermo-electric pile proves the existence of heat in all the coloured spaces, increasing, however, down to the red end of the spectrum, and attaining its maximum *beyond* the visible light, just as if heat were (as it *must* be) light with longer waves.

Some bodies, as glass, water, &c., transmit, when in thin plates, most of the light which falls on them; others, as wood, metal, coloured glass, &c., transmit none or little. A plate of rock-salt, half an inch thick, transmits 96 per cent. of the rays of heat which fall on it; while glass, even of a thickness of one-tenth of an inch, transmits very little. In this sense, rock-salt is said to be *diathermanous*, while glass is said to be adiathermanous, or only partially diathermanous. Most of the simple gases, such as oxygen, hydrogen, &c., and *mixtures* of these, such as air, oppose very little resistance to the passage of radiant heat; but the reverse is the case with compound gases. Some recent experiments by Tyndall seem to shew that the vapour of water is exceedingly adiathermanous. The question, however, cannot be considered as finally settled, since some of Tyndall's results are so startling as to require further research and confirmation.

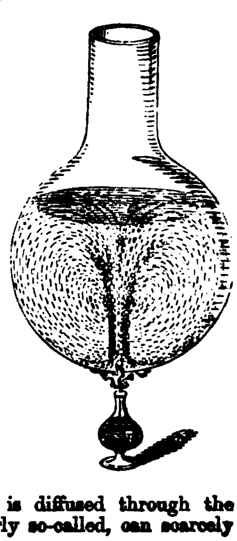
But there are other remarkable phenomena of radiant heat easily observed, which have their analogy in the case of light. 1. Unstained glass seems equally transparent to all kinds of light. Such is the case with rock-salt and heat. 2. Light which has passed through a blue glass (for instance) loses far less per cent. when it passes through a second plate of blue glass. Similarly, heat loses say 75 per cent. in passing through *one* plate of crown-glass, and only 10 per cent. of the remainder (say) in passing through a second. 3. Blue light passes easily through a *blue* glass, which almost entirely arrests red light. So dark heat passes far less easily through glass than bright heat does. These analogies, mostly due to Melloni, are very remarkable.

Again, light can be *Doubly Refracted*, *Plane Polarised*, *Circularly Polarised*. All these properties have been found in heat by Principal Forbes (q. v.).

The beautiful investigations of Stokes and Kirchoff on the solar spectrum have shewn us that bodies, which most easily *absorb* light of a particular colour, when heated, give off most freely light of that colour; and it is easily shewn by experiment, that those surfaces which absorb heat most readily, also radiate it most readily. Thus, it was found by Leslie, that when a tinned-iron cube full of boiling water had one side polished, another roughened, a third covered with lampblack, &c., the polished side radiated little heat, the roughened, more, while the blackened side radiated a very great quantity indeed. And again, that if we have (say) three similar thermometers, and if the bulbs be (1) gilded, (2) covered with roughened metal, (3) smoked, and all be exposed to the same radiation of heat, their sensibility will be in the order 3, 2, 1. A practical illustration of this is seen in the fact, that a *blackened* kettle is that in which water is most speedily boiled, while a polished one keeps the water longest warm when removed from the fire. Again, if a willow-pattern plate be heated white-hot in the fire, and then examined in a dark room, the pattern will be reversed—a white pattern being seen on a dark ground. This experiment of Stewart's is very remarkable, and virtually constitutes an anticipation of Kirchoff's results leading to the explanation of the fixed lines in the Spectrum (q. v.). It is this law of radiation and absorption that mainly gives rise to the superior comfort of white clothing to black in winter as well as in summer; radiating less in winter, it absorbs less in summer.

Much has been argued about the separate existence of *cold*, from such facts as these: A piece of ice held before the thermo-electric pile, produces an opposite deflection of the galvanometer to that due to a hot ball. If a freezing mixture be placed at one focus of a spheroidal mirror, and a thermometer with a blackened bulb at the conjugate focus, the latter will fall speedily, though very far off from the mixture. Now, the real explanation of such observations is to be found in what is called the 'Theory of Exchanges,' first enunciated by Prevost, and since greatly extended and carefully verified by Stewart, which is to this effect: 'Every body is continually radiating heat in all directions, the amount radiated being (nearly) proportional to its own temperature.' Hence the apparent radiation of cold in the experiments above mentioned is due to the fact of the pile or thermometer *radiating off more heat than it receives*, as its temperature is higher than that of the freezing mixture to which it is opposed. From this it is evident that any number of bodies left near each other, tend gradually to assume a common temperature. By this theory of exchanges, we explain the cold felt in sitting opposite a window in a frosty day, even when there is no draught.

Convection.—A hot body cools faster in a current of air than in a still atmosphere of the same temperature, evidently because fresh supplies of the colder air are continually brought into contact with it. It is by convection mainly that heat is conveyed from particle to particle in liquids and gases. Thus, when a lamp is applied to the bottom of a vessel of water, the heat does not diffuse itself in the water as it would (by conduction) in a mass of metal, but the expansion of the heated water at the bottom rendering it lighter, bulk for bulk, than the superincumbent fluid, causes it to rise to the surface; and thus, by convection, the heat is diffused through the mass. Conduction, properly so-called, can scarcely

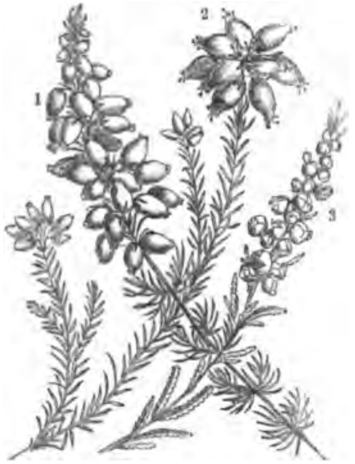


be shewn, even if it really exist, in liquids or gases, on this account. The tremulous appearance of any object, as seen by light which passes near a hot surface, as that of a boiler or a red-hot poker, is due to the convection of heat in the air, the warm current refracting light less than the cold air. See VENTILATION.

For the mechanical applications of heat, see STEAM-ENGINE, CALORIC-ENGINE, &c.

Sources of Heat.—They may be, so far as we know, ultimately reduced to two—chemical combination, and mechanical force; and, indeed, in all probability, the former is only a variety of the immensely different forms in which the latter is manifested. A more full examination of this point, and a general statement of the ultimate nature of the various sources of heat, will be found in the article FORCE above referred to. See also COMBUSTION, FUEL.

HEATH (*Erica*), a genus of small shrubs of the natural order *Ericeæ* (q. v.), distinguished by a calyx of four leaves, a bell-shaped or ovate—often ventricose—corolla, and a 4-celled, 4-valved capsule, with dissepiments from the middle of the valves. The leaves are small, linear, and evergreen. The genus, as thus defined, has been broken down by some botanists into a number of genera, but the old name, *Erica*, is still more commonly retained. The name H., however, is, in popular language, extended to many plants of genera nearly allied to *Erica;* and the little shrub which chiefly covers the large tracts named *moors* or *heaths* (Ger. *Haide*) in Britain and on the continent of Europe is *Calluna vulgaris* (fig. 3). The genus *Calluna* has been separated from *Erica*, chiefly on account of differences in the capsule, and of the presence of four bracts resembling an outer calyx. *C. vulgaris*, the common LING or HEATHER, is the only species known. It is found on arid places, and also in bogs. The flowers have much the appearance of being in spikes; they are of a lilac rose colour, rarely white. The various depth of colour in the flowers of different plants adds much to the beauty of a hillside covered with H. in the end of August. The flowers afford abundance of honey, and bee-hives are therefore transported to the moors when the heather is in bloom. In bogs, it contributes much to the formation of peat. In some of the Hebrides, a decoction of H. is used for tanning leather. The plant is applied to various other uses in the Highlands of Scotland. Cottages are often thatched with it, and some of the poorest are mostly built of it, in layers with the roots inward, and mixed with earth and straw. Beds are also made of it, placed in a sloping direction, with the tops upwards, and are said to be very soft and elastic. Besoms and scrubbing-brushes are made of it. In the island of Islay, ale is made by brewing one part of malt and two of the young tops of heather; and this is supposed to be the same beverage which was anciently used by the Picts.—Of the genus *Erica*, about 500 species are known; and these, with few exceptions, are natives of the south of Africa. None are found in America. The British Isles produce seven species, of which some have only been found in Ireland, and some in the south-west of England. CROSS-LEAVED H. (*E. tetralix*) (fig. 2) and FINE-LEAVED H. (*E. cinerea*) (fig. 1) are common plants in most parts of Britain, and like most of the genus, are very beautiful when in flower. The *heather-bells* of Scottish song are the flowers of one or both of these species. A sprig of *E. cinerea* was the badge of the Macdonalds at the time when they existed as a distinct clan. *E. Mediterranea* and *E. carnea*, common in the southern parts of Europe, are very frequent ornaments of British flower-borders, hardy plants, producing their flowers in great profusion in April. Many species, remarkable for the size and beauty of their flowers, are much cultivated in greenhouses; and heath-houses are sometimes erected for the special purpose of their cultivation. Some of the South African or Cape heaths attain in their native region a much greater size than any European H. except *E. arborea*, which in the Pyrenees sometimes grows to the height of twenty feet.



Heaths.

HEATH. The burning or setting fire maliciously to a heath in England is felony, and is punished by imprisonment for three years or less. The offence is technically called Arson, being one of its varieties. In Scotland, the offence is called Muirburn (q. v.).

HEAVEN, in popular Physical Science, means the expanse which surrounds the earth, and which to a spectator on the earth's surface appears as a vast arch or vault, in which are seen the sun, moon, and stars. The earliest idea entertained of this expanse was of a solid vault or hemisphere with its concavity turned downwards (see FIRMAMENT).—In Theology, the word 'heaven' may be explained to mean that portion of the infinite space in which the Lord of all things, although present throughout all, is supposed to give more immediate manifestations of His glory. Of the belief in the existence of some such special scene of the presence of the Deity, most of the known religions of the world, ancient and modern, present abundant evidence. Aristotle declares that all men, whether Greeks or barbarians, have a conception of gods; and all agree in placing the habitation of the gods in the most elevated region of the universe. Plato is equally explicit. Even Epicurus teaches the same doctrine; and one of the treatises deciphered from the papyri of Herculaneum is a treatise by him, in which the position and the other characteristics of the habitation of the gods are minutely discussed. The same may be said of the Persian, the Egyptian, the German, the Scandinavian, and in general of all the ancient religions in which the belief of the existence of a supreme being assumes any other form than the pantheistic; and even in the pantheistic religions, although the philosophers may have adhered to the strict pantheistic view, and may have denied that any special locality could be regarded as the peculiar seat of the Deity, yet we find the popular belief and the popular worship even of such religions plainly founded upon the contrary supposition. In addition, however, to the idea of its being the special scene of God's glory, the word heaven also designates the place, or the state or condition, of the blessed spirits, and of the souls of just men who are admitted into the participation or the contemplation of the divine beatitude. In the religious system of the Greeks and Romans, none were supposed to be admitted to the heaven of the gods except the deified heroes or demigods; but with them the Elysian Fields of the lower world held, morally speaking, the same place in relation to the great doctrine of the divine retribution for the good and evil actions of human life. The Elysium of the classic mythology is in all essential respects the natural equivalent of the heaven of the just. The Pythagorean doctrine of metempsychosis approached nearer to it in form, for it supposed that the soul, after the purification of successive transmigrations, was elevated to a higher and incorporeal condition in the cosmos. The doctrine of Plato was still more explicit. Although scepticism was rather the rule than the exception, it may be said in general that all the philosophical systems which included the belief of the immortality of the soul, also involved, at least in substance, the idea of a state of happiness as the reward of a virtuous life. The happiness, however, of the heaven of these various creeds differed widely from the spiritual delights of the heaven of revelation, each nation and each class forming to itself its own ideal of enjoyment. The delights of the classical Elysium were, at all events in part, delights of sense. The German warrior had his war-horse and his armour laid in his grave, that he might be able to pursue, after death, the fierce enjoyments in which he had delighted while in the world of the living. The paradise of the Indian hunter is but a richer and more extensive hunting-ground. Still, not only these, but even the more grovelling conceptions of the paradise of other races, must be regarded as a natural manifestation of the same instinct, or as a remnant, however overlaid by error and superstition, of the same primeval revelation upon which the scriptural notion of heaven is founded. Accommodating itself to the popular conceptions of the Jews, the biblical phraseology frequently implies the idea of the solid firmament already described; but the word, according to the common acceptation among Christians, is generally used simply to signify the abode of the Most High, and the special seat of His glory, in which the angels minister to Him, and the blessed spirits abide in perpetual praise and adoration. This abode of perfect bliss is believed to have been opened to the just after the passion of our Lord and his ascension into heaven. Out of the just of the old dispensation, only Enoch and Elias were directly admitted to heaven; the patriarchs, the prophets, and in general the just, before the new dispensation, were detained in a preparatory abode, which the Fathers call by the name *Limbus Patrum*, awaiting the coming of the common Redeemer. The common belief of Christians has been, that, since the coming of Christ, the just who are free from sin are admitted into heaven immediately after death. More than one controversy, however, has arisen on the subject; the most important of which are the Millenarian controversy (see Millennium), the Origenistic (see Origen), and that on the question whether the just are admitted to the beatific vision of God immediately after death, or only after the general resurrection. The latter controversy arose out of the question as to the nature of the happiness of heaven, a discussion which would be out of place here. The Koran adopts the Cabbalistic notion of seven heavens, which arise each above the other like the stages of a building; and it places the happiness of heaven in the enjoyments of sense. The Cabbalistic writers divide these seven heavens according to the successive degrees of glory which they imply. The seventh is the abode of God and of the highest class of angels; the sixth, fifth, fourth, and third, are the successive abodes of the various grades of angels, arranged according to the degrees of dignity. The second is the region of the clouds, and the first the space between the clouds and the earth. One of the apocryphal books of the fifth c., *The Testament of the Twelve Patriarchs*, contains a very curious exposition of the same notion. See Fabricius, *Codd. Pseudep. Vet. Test.* i. p. 545.

HEBBEL, Friedrich, a modern lyrical and dramatic poet of Germany, was born at Wesselburen, in Ditmarsh, duchy of Holstein, Denmark, 18th March 1813; studied at Heidelberg and Munich; and after travelling in France and Italy, settled at Vienna, where he married the actress Christine Enghaus in 1846. He died in 1863. His principal works are his *Gedichte* (2 vols. Hamb. 1842; Leip. 1848), remarkable both for their melody and beauty; and several dramas. H. had a rich imagination, great power of thought, and an energetic and original style, but too great a predilection for the horrible and the exaggerated.—Compare Henneberger's *Das Deutsche Drama der Gegenwart* (1853).

HE'BÉ, the goddess of youth, the daughter of Zeus and Here—according to others, of Here alone—was the wife of Hercules after he had been deified. She was the cupbearer in Olympus, before Zeus conferred that office upon Ganymede (q. v.); but she always retained the power of restoring the aged to the bloom of youth and beauty. According to Apollodorus, she became the mother of two sons by Hercules—Alexiares and Aniketos. In Homer, she always appears as a virgin. In Athens, altars were erected to her conjointly with Hercules. In Rome, she was worshipped under the name of Juventas, and a temple in her honour existed on the Capitoline Hill at the time of Servius Tullius. Statues of H. are extremely rare; she is to be recognised only by the drinking-cup.

HEBER, Reginald, an English poet, and second Bishop of Calcutta, was born at Malpas, Cheshire, 21st April 1783. In 1800, he entered at Brasenose College, Oxford; and three years after produced his prize-poem *Palestine*, the only prize-poem perhaps which holds a place in English literature. In 1804, he became a Fellow of All Souls. In 1807, he was inducted into the family-living at Hodnet, and entered upon his parochial duties with great zeal. He was a frequent contributor to the *Quarterly Review*, his political views being those of a Tory and High Churchman. In the course of 1812, he published a volume of *Hymns*. He was appointed Bampton lecturer in 1815, and two years after he received a stall in St Asaph Cathedral. He edited the works of Jeremy Taylor in 1819, and in 1822 he was elected preacher of Lincoln's Inn. Shortly afterwards, the vacant see of Calcutta was offered to him, and after much hesitation on account of his wife and child, it was accepted, and he embarked for India on the 16th June 1823. On his arrival, he entered upon his duties with exemplary zeal; and in June 1824, he began the visitation of his diocese. He spent about eleven months visiting stations in Upper Bengal and the north of Bombay. From April to August 1825, he remained at Bombay, and sailed from thence to Calcutta, where he arrived on the 21st October. In February 1826, he proceeded to Madras on a visit to the southern provinces. He reached Trichinopoly on the 1st April, and on the 3d, after confirming fifteen natives, and bestowing on them the episcopal benediction, he entered a cold bath, in which, half an hour afterwards, he was found dead. The Journal which he kept during his tour of visitation was originally published in three octavo volumes, and was afterwards reprinted in two volumes in Murray's *Home and Colonial Library*. His life was published by his widow in two volumes (Lond. 1830).

As a poet, his fame rests upon *Palestine* and his *Hymns*, the latest edition of which was published in 1855. They have not much force or depth, but they are pleasingly versified, and are illuminated by graceful fancy. As a poet, he will be remembered; but as the most learned and zealous of Indian bishops, he is mainly enshrined in the affections of his countrymen.—Richard Heber, half-brother of the preceding, was born in Westminster in 1773, and died in 1833. He was a famous bibliomaniac. Having succeeded to large estates by the death of his father in 1804, he was enabled to indulge his elegant hobby to the utmost. Dr Dibdin estimated his collection in England at 105,000 vols., in addition to which he possessed many thousands of books on the continent, the whole having cost him £180,000.

HÉBERT, Jacques René, commonly known as *Père Duchesne*, one of the most profligate characters of the French Revolution, was born at Alençon, in the year 1755. At an early age, he went to Paris, and became a servant in one of the small theatres, but was dismissed for embezzling money. He then entered the service of a physician, but was soon dismissed for the same fault. At the commencement of the Revolution, a person of the name of Lemaire, under the title of *Le Père Duchesne*, published a small popular paper for the diffusion of constitutional principles among the people. The success of this paper induced the Jacobins to establish another of the same name, and H. was appointed editor; and knowing the tastes of the class of people he addressed, he displayed such an exaggeration of principles and cynicism of language as ruined the enterprise of his honest rival. In consequence of the events of the 10th August, he became a member of the revolutionary council, and played a conspicuous part in the horrors of September. He and his associates, called Hébertists or *Enragés*, were likewise mainly instrumental in converting the church of Notre Dame into a temple of Reason. He was at length obliged to give way before the party of Robespierre, and perished on the scaffold on the 24th March 1794.

HE'BREWS [Heb. *Ibri*—either from Abraham, who came 'from the other side' of Euphrates (*Eber*, *Ibr*), or from Eber, the great-grandson of Shem, and one of Abraham's ancestors] is the distinctive name of that branch of the Semitic family which migrated from Mesopotamia into Palestine, thence went to Egypt, and, after a long period of bondage, reconquered Palestine, and finally settled there. Divided, at a later period, into two distinct states, that of Judah and of Israel, they were singly overcome, and led into exile. A portion, chiefly consisting of descendants of Judah (Jehudah), returned, and founded a new empire. From that time forward, all the members of the Mosaic commonwealth were known by the name of Jehudim, corrupted into Jews. A continuous sketch of their entire history from the days of Abraham to our own, as well as a brief outline of their language and literature, will be found under Jews.

HEBREWS, Epistle to the, one of the Epistles of the New Testament. Much discussion has arisen both as to its *canonicity* and *authorship*, the absence of the customary superscription rendering it impossible to attain certainty in regard to the latter, and naturally enough tending to throw doubt on the former also. In reference to the first and more important of these points, the canonicity, the case stands as follows: The earliest post-apostolic writer, Clemens Romanus, quotes from it in the same way as from the other books admittedly canonical. Justin Martyr, Pinytus (?), the Cretan bishop, the predecessors of Clemens Alexandrinus and Origen, and the framers of the Peshito version of the New Testament, accept it as authoritative; while the Gnostic heretics, Basilides and Marcion, are spoken of as distinctly rejecting it. No disbelief of its canonicity is expressed by any section of the orthodox church until after the middle of the 2d c.—though many writers are silent altogether about it—after which period, for the next two centuries, the Roman and North African churches reject its authority. Tertullian speaks of it as a good sort of apocryphal book; Cyprian does not include it in Paul's epistles; Irenæus, even while defending the divinity of Christ, declines to strengthen his argument, which he could very effectively have done, by borrowing armour from its stores; while the Muratorian Fragment on the Canon, Caius, Hippolytus, and Victorinus of Pannonia, also leave it out of the Pauline epistles. During the 4th c., however, its authority again began to revive, and it was received by Hilary of Poitiers, Ambrose of Milan, and later by Jerome, who, though frequently too hasty in his conclusions, was certainly the most learned and accomplished of the Latin Fathers. The immense authority of Augustine was thrown into the same scale; others soon followed, and in 416 A.D., a decretal of Pope Innocent III. placed its canonicity beyond cavil. In modern times, Cardinal Cajetan, the opponent of Luther, reopened the ancient controversy. He rejected the authority of the epistle. The great reformer did the same, affirming that it was the work of some disciple of Paul's, who had not been thoroughly grounded in his master's teaching, and had built his own 'wood, hay, and stubble' upon the apostle's 'gold, silver, and precious stones.' This opinion, however, met with small approval, and has never been adopted by any Protestant church.—*Authorship.* As we have already said, the author of the epistle is unknown, but is commonly supposed to be St Paul. This appears to have been the opinion of the Eastern church from the first; but the Alexandrian Fathers—the most critical and scholarly of the early Christian theologians—struck with the entire dissimilarity of style, phraseology, and mode of thought which it presents to the Pauline epistles, and which is abundantly manifest even in the English version, sought to fix its authorship on some other person, Luke being the favourite. Tertullian, again, states that, according to the traditional belief of the North African school, Barnabas was the author. The Roman Church, down to the middle of the 4th c., contented itself with a negative position, denying its Pauline authorship. The opinion of the Alexandrian school may be said to have prevailed, viz., that though Pauline in essence, the epistle was not Pauline in form. Thus the matter remained till the time of Luther, who suggested Apollos as the likeliest author. Since then, many scholars have inclined to the same opinion, among others, Le Clerc, Bleek, De Wette, Tholuck, Bunsen, and Alford.

Who were the 'Hebrews' to whom the epistle was sent, is also a matter of doubt; but the preponderance of probability is very strongly on the side of the church at Jerusalem, composed of those who were 'Hebrews of the Hebrews.' The date of the epistle can only be inferred from its contents. It must have been *before* the destruction of Jerusalem (70 A.D.), because the overthrow of the temple is not alluded to, which would have been one of the strongest links in the chain of argument to prove the temporary nature of the old national faith.

The purpose of the writer of the epistle is apparently to encourage the Jewish Christians of Jerusalem—perhaps of all Palestine—to persevere in the profession of their faith. In their own 'Holy Land,' and in the perpetual presence of services that time had hallowed, and which were associated with all that was glorious and dear in their national history, they were apt at times to look back with a melancholy yearning on the past, and thus were often tempted to apostatise from motives which they hardly dared to condemn. The writer, conscious, it would seem, of the existence of this feeling, opens up with bold unflinching eloquence the whole question of Judaism *versus* Christianity; exhibits the contrast between the two with sharp, incisive analysis, strips the former of all its accidental and superstitious attractions, and shews that what is really deep and valuable in it is its *prophetic* character; it is but the shadow of a 'better hope,' viz., 'the hope of the gospel;' and the great fathers and heroes of Judaism, from Abel downward, illustrate the truth of this, for 'these all died in faith, not having received the promises, but having seen them afar off.' But so vital and strong was their faith, that it may almost be said to have put them in spiritual possession of the realities to which they looked forward, for 'faith is the *substance* of things hoped for, the *evidence* of things not seen.' Thus they were 'Christians before Christianity,' and now that the things which they hoped for had come, the Jewish believers ought not to be grieved at parting with the old national worship, however dear, for the new worship really embraced the substance of the old, and thus bestowed upon it its own immortality. Such is, in the main, the course of thought. The style of the epistle in several passages is richly rhetorical.

HE'BRIDES, the name applied in a general sense to all the islands on the west coast of Scotland. They have been variously classified; but the most natural division seems to be into the Outer and Inner Hebrides. To the Outer belong Lewis, with Harris, North Uist, Benbecula, South Uist, Barra, Coll, and Tiree. The remote isle of St Kilda might be associated with this external series. The principal of the Inner islands are Skye, Eigg, Mull, Iona, Staffa, Ulva, Lismore, Kerrera, Easdale, Colonsay, Jura, and Islay. Bute, the Cumbraes, and Arran, though lying in the Firth of Clyde, are usually classed with the Hebrides. The whole are popularly spoken of as the Western Isles, the term H. being confined chiefly to literature.

The total number of the H. is about 490 (which number includes every islet that affords sufficient pasturage to support one sheep), but of these not more than 120 are inhabited. The entire area is not accurately known, but has been estimated at upwards of 3000 square miles, and the population, which is not increasing, was in 1871 about 100,000. Of the whole surface, only about 200,000 acres are arable, the rest is in pasture-land of little value, and in morasses, peat-mosses, lakes, and barren sands and rocks. The scenery of Skye is grand and picturesque; Mull is noted for its lofty mountains, Jura for its peaks, and Arran for its high rugged hills. Islay and Bute are comparatively level and arable. Staffa is remarkable for its basaltic columns and great cavern. Iona derives interest from its ruins and historical associations. Politically, all the Hebridean isles are attached to Scotland, in the civil and ecclesiastical systems of which they participate. The counties among which they are distributed are those of Ross, Inverness, Argyle, and Bute. The principal Hebridean towns are Stornoway in Lewis, Portree in Skye, Tobermory in Mull, and Rothesay in Bute. Though situated on the mainland of Argyle, Oban is usually considered a town of the H., and, next to Rothesay, is best known to tourists.

Enjoying the benefit of the Gulf Stream (q. v.), the climate of the H. is peculiarly mild. Snow seldom lies long on the sea-shores or low grounds, and in sheltered spots, tender plants are not nipped by winter frosts. But if genial, the climate is also humid. Drizzling rains are frequent, and mists often envelop the islands, or at least shroud the higher mountains from sight. With these drawbacks, the climate is pleasant and healthful, and is recommended for certain classes of invalids. Partaking of the old Celtic character, the humbler class of natives for the most part speak Gaelic, but latterly, through educational efforts and otherwise, English has made extensive progress. As in the mainland portion of the Highlands, many large estates have passed from old families of note into the hands of opulent modern proprietors, by whom extensive improvements have been effected. The greatest improvement of all, however, and which deserves to be spoken of as the parent of all others, has been the work of a Glasgow firm, David Hutcheson & Co., by whom has been established an extraordinary system of steam-navigation in connection with the H. calculated to develop the resources of the islands, and bring them, with the neighbouring coast, within the sphere of trade and the reach of tourists. Originated by David Hutcheson, a person of singular energy and capacious views, the system of Hebridean steamers embraces several distinct lines of route in connection with Glasgow; and opening up remote tracts formerly reached only with extreme difficulty, may be said to be gradually altering the character of, and giving a new value to, the Western Highlands and Islands.

The H. are the *Ebudæ* of Ptolemy, the *Hebudes* (of which the name H. is merely a corruption, said to be the consequence of a misprint in a Parisian printing-office) of Pliny, and the *Sudreyjar* (Southern Islands, as distinguished from *Orkneyjar*, Northern Islands) of the Norwegians. The latter epithet was Latinised into Sodorenses, and is still retained in the title 'Bishop of Sodor and Man.' The history of these islands forms an interesting episode in that of Scotland. According to the general account, the H. were first colonised in the beginning of the 9th c. by emigrants from Norway, who had fled from the iron rule of Harald Haarfager (863—936); they naturally settled in the greatest numbers on the first land that was reached, viz., the Shetland and Orkney Isles and Outer Hebrides; but some wandered as far south as the Isle of Man, colonising as they went. The consequence of this was the total absorption of the Celtic into the Norse element in the northern islands, while southward the Celtic element asserted the predominance. This colony after a time threw off swarms, which settled on the north and west coasts of Scotland, Cumberland, and Westmoreland, and in all probability founded the Norwegian kingdoms of Dublin, Waterford, and Limerick; it also sent a colony to Iceland in 874. At last the settlers became so powerful as to be a source of annoyance to the mother-country, whereupon Harald Haarfager, about 870 A.D., fitted out a great expedition, and subdued the H. and Man. They remained subject to Norway till 1266, three years after the battle of Largs, and were then transferred to Scotland. In 1346, one of the chiefs, named Macdonald, reduced the whole under his authority, and took the title of 'Lord of the Isles;' but in 1540 they were finally annexed to the Scottish crown by James V. The H. were ecclesiastically dependent on Norway as late as 1374, and Professor Munch argues that this relation lasted till 1472, when St Andrews was made the seat of a metropolitan. The influx of the Norsemen has had here, as elsewhere, great influence over the nomenclature; many places and islands having lost their original Celtic designations.

The H. have, from time to time, been visited by learned inquirers, among whom may be named Martin, Sir Joseph Banks, Pennant, Dr Samuel Johnson, and Dr John Macculloch, who wrote a geological account of the islands (2 vols. 8vo, with a volume of plates, 4to, 1819). Scott's *Lord of the Isles* contributed materially to attach a popular interest to these islands, which, by the aid of Hutcheson's steam-fleet, are now within the compass of summer pleasure travelling. The more important islands of the H. are described in separate articles. —For the early history of the H., consult *Chronica Regum Manniæ et Insularum*, edited from the MS. in the British Museum, by P. A. Munch, professor of history in the university of Christiania (Christiania, 1860).

HEBRIDES, New. See New Hebrides.

HE'BRON, one of the oldest cities in Palestine, belonging to the tribe of Judah, 21 miles south-south-west of Jerusalem; it may even be regarded as one of the oldest in the world, for it was in existence in the time of Abraham, nearly 2000 years before Christ. H. was anciently called Kirjatharba, i. e., city of Arba, from the progenitor of the *Anakim* (q. v.); at a later period, it was the residence of King David, before he conquered Jerusalem; its subsequent history is unimportant.—The modern town is a poor place, inhabited by about 5000 people, of whom about 50 families are Jews. It lies low down in a narrow and picturesque valley—the Valley of Eschol, famous now, as of old, for its thick clustering grapes, its olives, and other fruits. The church erected by the Empress Helena, the mother of Constantine, on the spot where Abraham is said to have been buried, has been converted into a mosque called *El-Haram*. The alleged tombs of the patriarch and of several members of his family are still shewn. They are all richly hung with palls of green or red silk, which are renewed from time to time; but it is believed that the real tombs are in a 'cave' below the building. The modern name of the town is *El-Khulil* ('the friend,' i. e., of God), in allusion to Abraham. About a mile from H., rising solitarily in the midst of vineyards, beside a well of pure water, is one of the largest oak-trees in Palestine. It is 23 feet in girth, and its foliage covers a space of about 90 feet in diameter. Some say that this is the very tree beneath which Abraham pitched his tent; but this notion is untenable, for the tree itself gives no evidence of such enormous antiquity; and besides, Jerome speaks of Abraham's oak having disappeared about the time of Constantine.

HECATÆ'US, the son of Hegesander, famed as an historian and a geographer, flourished most probably about 500 B. C. There is great difference of opinion as to the time of his birth and of his death, but the best critics conclude that he was born about 550 B. C., and that he died about 476 B. C. He belonged to an ancient and wealthy family of Miletus, and was thus enabled to gratify his natural passion for knowledge and travel. He seems to have visited Greece, Thrace, the countries bordering on the Euxine, and many of the provinces of the Persian empire, with parts of Italy, Spain, and Africa. The results of his foreign travels and of his private studies were embodied in two great works—his *Tour of the World*, and his *Histories* or *Genealogies*. His geographical work was divided into two great portions, one treating of Europe, the other of Asia, Egypt, and Libya. He improved the map of the world which had been made by Anaximander. His *Histories* was little more than a prose version of the poetical legends of the Greeks—about Deucalion and his descendants—Heracles and the Heraclidæ—the Peloponnesian traditions—and those of Asia. Herodotus seems to have set considerable value on the writings of Hecatæus. The fragments of the works of H. have been edited by Creuzer, Klausen, and others.

But the most interesting part of the life of H. is that which succeeded his travels. In the revolt of the Ionians against Persia, his extensive knowledge of the Persian empire and its resources enabled him to give sound advice to Aristagoras, the ringleader of the insurrection, which, however, was rejected. He dissuaded his countrymen from an attempt so far above their means; when that counsel was despised, he urged the formation of a fleet, but without effect. After defeat had humbled the Ionians, and Aristagoras, with others, contemplated flight to Sardinia, he wished them (though in vain) to fortify the island of Leros, and wait there the course of events. He afterwards went as ambassador to the Persian satrap Artaphernes, and induced him to treat the Ionians with leniency.

HE'CATÉ, an ancient Thracian goddess, afterwards adopted into the Greek Pantheon, is first mentioned by Hesiod, who calls her the daughter of the Titan Perses, and of Asteria, or Night. She was the only one of the Titans, under the rule of Zeus, who retained her former power. She appears on some occasions as the bestower of wealth, victory, wisdom, good-luck to sailors and hunters, and prosperity to youth, but able also to withhold these blessings. In connection with Persephone, she is described as a powerful infernal and cruel deity, who has all the magic powers of heaven, earth, and sea at her command. Particular honours were paid to her in Bœotia, at Ægina, and even in the Eleusinian mysteries. She played an important part in the mysteries of the Cabiri, which were celebrated principally at Samothrace and Lemnos. Her sanctuary in Samothrace was the Zerynthian Cave, and wherever she was worshipped along with the Cabiri, her temple was placed near a cave. As the bestower of good and averter of evil, her image was placed before the houses of persons of rank, in places of popular assembly, and at crossways, where at every new moon offerings of food were presented to her, which were consumed by poor people. As an infernal goddess, she appears in a hideous form. Serpents issue from her feet, serpents are twined in her hair, she bears a lighted torch and a sword in her hand, and two black shaggy dogs are her attendants; and sometimes she is represented with three heads, viz., those of a horse, a lion, and a dog. In this last form, she appears at the crossways. There is another important feature, which arose from the notion of her being an infernal divinity, viz., the belief in her being a spectral being, who at night sent from the lower world all kinds of demons and terrible phantoms, who taught sorcery and witchcraft, and dwelt at cross-roads, tombs, and near places where murder had been committed.

HE'CATOMB (Gr. *hecaton* and *bous*), in the worship of the Greeks, and in other ancient religions, means a sacrifice of a large number of victims, properly, although by no means necessarily, one hundred.

Originally, it would seem that the practice was to burn the entire victim; but even as early as the time of Homer, it was usual only to burn the legs wrapped up in the fat and certain parts of the intestines. The rest of the victim was consumed at the festive meal which succeeded the sacrifice. Besides, therefore, that the gods were believed to be propitiated in proportion to the number of victims, the increase of the number was also gratifying, not alone to the priests and servants of the temple, but also to the public, who were admitted to the sacrificial banquet. Hence in Athens the hecatomb was a most popular form of sacrifice (Athenæus, i. p. 3). On the contrary, the thrifty Spartans limited the number both of the victims and of the sacrifices; and while the other Greek states required that the victim should be of the most perfect kind, the Spartans were content with animals of a very inferior character. In the hecatomb, strictly so called, the sacrifice was supposed to consist of one hundred bulls; but other animals were frequently substituted.

HECKER, Friedrich Karl Franz, a leader of the democratic party in the German revolution of 1848, was born at Eichtersheim, Baden, September 28, 1811, and after studying law in Heidelberg, became in 1838 advocate of the supreme court in Manheim. Though rising to eminence as a pleader, when elected in 1842 a member of the second chamber in Baden, he abandoned his profession for political life, and soon grew popular among the more advanced sections of the opposition. In 1846 he began to side actively with the purely democratic and socialistic party outside of the chamber, and on the revolution breaking out in 1848, immediately began to employ his eloquence in revolutionary agitation. When the preliminary convention (*Das Vorparlament*) met, he endeavoured, with the influence of his whole party, to constitute it into a permanent republican assembly. The frustration of this effort led him to think of surprising the smaller governments of Southern Germany with the artisan bands which had been sent to the Rhine. Defeated at Kandern, April 20, 1849, he fled into the canton of Basel, where he conducted a newspaper against the constitutional party. On being refused admission into the parliament, though elected to represent Thiengen, he emigrated to America, where he had bought a farm. The Baden revolution (1849) brought him back to Europe, but finding the revolution over on arrival, he returned to America. He took an active part in the War of Secession.

HECKLES, or HACKLES, and GILLS. These are very important parts of various machines, employed in the preparation of animal and vegetable fibres for spinning. They consist of a series of long metallic teeth, through which the material is drawn, so that the fibres may be combed out straight, and so fitted for the subsequent operations. The manufacture of heckles and gills involves great care and nicety, as any imperfection may cause great loss, by damaging the fibre which passes through them. For flax, hemp, jute, and similar large and coarse fibres, the teeth of the heckles are large, being about eight inches long, and made of steel wire one-fourth of an inch in diameter. This is gradually reduced from the base upwards, until it ends in a fine point. The whole is beautifully polished, so as to prevent injurious friction. They are fixed in a wooden or metallic base, in several rows, alternating with each other at short distances apart, in heckles; but in gills the teeth are much finer, resembling needles, and fewer in number, being placed usually in two rows; they constitute a part of the spinning machinery. The manufacture of these articles is a special trade; the manufacturers are called Heck-makers.

HE'CKMONDWIKE, a thriving manufacturing village of England, in the West Riding of Yorkshire, is situated on the Lancashire and Yorkshire Railway, three miles north-west of Dewsbury, and ten miles south-west of Leeds. It is the chief seat of the carpet and blanket trades in the West Riding. Pop. (1871) 8300.

HE'CLA, or HEKLA, a volcanic mountain in Iceland, is of a conical shape, and stands isolated about 20 miles from the south-west coast. Its snow-clad summit is 5110 feet high. The principal crater, when visited by Sir George Mackenzie, was about 100 feet deep, and contained a large quantity of snow in the bottom. There are many small secondary craters near the summit. The sides of the mountain are broken by numerous deep ravines, forming channels for mountain torrents that are produced by the melting of the snow. The principal rocks are lava and basalt, covered with the loose stones, scoriæ, and ashes ejected from the volcano. The view from the summit is very desolate and wild. 'Fantastic groups of hills, craters, and lava, leading the eye to distant snow-covered jokuls; the mist rising from a waterfall; lakes embosomed amid bare bleak mountains; an awful and profound slumber; lowering clouds; marks all around of the furious action of the most destructive of the elements, give to the region a character of desolation scarcely to be paralleled.'

A record of the eruptions has been kept since the tenth century. They are few in number, only 43, but they have been always very violent, and generally continuing for a considerable time. One of the most tremendous occurred in 1783, when the immense quantity of lava and ashes ejected laid waste a large extent of country. The internal fire remained, as if exhausted, in a quiescent state till September 1845, when with terrific energy it again burst forth, and continued active for more than a year. At this time, it poured out a torrent of lava, which at the distance of two miles from the crater was one mile wide, and from 40 to 50 feet deep. A fine dust from this eruption was scattered over the Orkney Islands, a distance of 400 miles from Hecla.

HECTARE. See Are.

HE'CTIC FEVER (Gr. *hektikos*, habitual), (see Fever), a peculiar type of feverish disease, usually found associated with organic disease of the chest or abdomen, and above all with tubercular disease, or Consumption (q. v.). It can scarcely be called an independent form of disease, although carefully described as such by most of the older authors, and distinguished as a fever with morning and evening paroxysms, and intermediate remissions. Generally speaking, the evening paroxysm is the more marked; the patient becomes flushed after eating, or in the excitement of conversation; there is a preternatural vividness of expression, which, with the heightened colour, sometimes gives a very fallacious impression of health. The patient retires to bed, has tossing and uneasy sleep, and wakens in the middle of the night, or towards early morning, bathed in cold perspiration, and in a state of extreme languor. Next day, the whole of these changes are repeated, and under the slow but too sure progress of the fever, the patient gradually emaciates, and in the end dies exhausted. The treatment of hectic fever is substantially that of Consumption (q. v.).

HE'CTOR, the bravest hero in the Trojan army, was the son of King Priam and Hecuba, and married Andromache, the daughter of Eëtion, king of Thebes, in Cilicia, by whom he became the father of Astyanax or Scamandrius, and, as some say, likewise of Laodamas. His exploits are sung by Homer in the *Iliad*. H. having slain Patroclus, the friend of Achilles, the latter, forgetting his quarrel with Agamemnon, took up arms to avenge his beloved companion, and H. fell by his hand. His body was dragged in triumph by the conqueror round the tomb of Patroclus, but was afterwards ransomed by Priam, who caused it to be buried with great pomp. In Ilium, H. was honoured as a hero, and sacrifices were offered to him. In compliance with an oracle, his bones are said to have been subsequently conveyed to Thebes, in Bœotia. H. is incontestably the greatest hero in the *Iliad*. Yielding in valour to none, he is defeated by Achilles, not because the latter surpasses him in courage, but because, already wounded and exhausted with prolonged conflicts, he undertakes a single combat, trusting to the aid of Deiphobus. Minerva assumes the form of the latter, and H. is deceived and forsaken. In humanity, he is superior to all. One of the most beautiful episodes in the *Iliad* is that in which H. takes leave of his wife Andromache, and expresses his feelings as a husband, a father, and a prince.

HE'CŬBA (Gr. *Hekăbe*), the second wife of Priam, king of Troy. During the Trojan war, she witnessed the destruction of all her sons, with the exception of Helenus, and at last saw her husband murdered before her eyes by the savage Pyrrhus. After the destruction of Troy, she fell into the hands of the Greeks as a slave, and, according to one form of the legend, threw herself in despair into the sea. Euripides (in his tragedy of *Hecabe*) and other ancient tragedians describe her as a tender mother, a noble princess, and a virtuous wife, exposed by fate to the most cruel sufferings. In Sculpture, she is represented as a matron, whose face, furrowed by grief, betrays a character naturally ardent and passionate.

HEDGE (Sax. *hege*, Ger. *hag*, Fr. *haie;* in Ger., *hegen* is to fence, protect, cherish), a fence formed generally of growing shrubs. Hedges are very much used in some parts of the world, whilst others, equally cultivated, are almost destitute of them. Thus, whilst they are very common in many parts of Britain and of Italy, they are comparatively rare in France and Germany. For many situations, they are particularly adapted, owing to the protection which they afford from high winds; and the height to which they are permitted to grow ought to be accommodated to the requirements of the locality in this respect. They are also much more pleasant to the eye than dry stone walls or coarse palings; but there can be no doubt that where neither shelter nor ornament is intended, they cause great waste of land; as even when very trimly kept, they occupy a much more considerable breadth than other fences, and their roots draw nutriment from the soil on each side to a very considerable distance. It has been calculated that even such reduction of the breadth occupied by hedges as might be accomplished by moderate care in trimming, would add to the extent of land available for crops in England as much as a middling-sized county.

Hedges in Britain are generally formed of hawthorn (q. v.). The unsightly blanks in hawthorn-hedges, which are also injurious to their usefulness, are not easily filled up with hawthorn-plants, but in such circumstances, the barberry grows well, and is sometimes used with great advantage.—Hedges are also sometimes formed of barberry itself. See BARBERRY.—Beech-hedges are very common around gardens and pleasure-grounds, and a hedge of beech and hawthorn mixed is common in many places. Beech-hedges, closely trimmed, can be made almost as impervious as any kind of hedge known in Britain; and where shelter is needed, can easily be trained to a height of twenty feet or upwards.—Holly makes an excellent and ornamental hedge, much in use for gardens and pleasure-grounds.—Ornamental hedges are sometimes formed of yew, hornbeam, lime, and other trees, which can scarcely, however, be reckoned among hedge-plants. Privet is much used for ornamental hedges, but they are of little use as fences.

Hedges were in use among the ancient Romans, chiefly for the enclosure of vineyards and gardens. It is probable that they have existed in England since the times of the Romans, although not very common till the end of the 17th c.; but they are supposed to have been first introduced into Scotland and Ireland by the officers of Cromwell's armies. The first hedges planted in Scotland are said to have been at Inch Buckling Brae, in East Lothian, and at the head of Loch Tay, and that at the former place existed as a row of old hawthorns in the beginning of the present century.—(Loudon.)

HE'DGEBOTE, in English Law, means the right of a tenant to cut wood on the farm or land, to repair the hedges or fences.

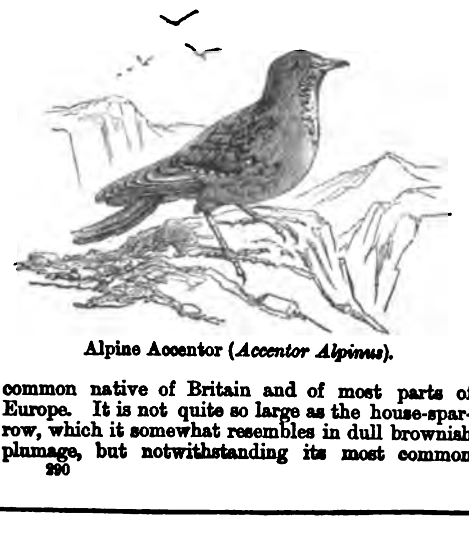
HE'DGEHOG (*Erinaceus*), a genus of insectivorous quadrupeds, the type of the family *Erinaceidæ*. The muzzle is rather elongated, the neck short, the limbs short, the feet five-toed, the claws strong, the tail short, the body covered on the upper parts with sharp spines, and with hair below, and capable of being rolled up into a ball by means of a powerful muscle extended under the skin. The teeth are 36 in number, 20 in the upper jaw, and 16 in the lower, but considerable difference of opinion has existed among naturalists as to the character of some of them. The middle incisors are very long, and stand forward; those of the upper jaw are widely separated; the lateral ones small. Like many other *Insectivora*, hedgehogs are by no means limited to insect food, but prey on larger animals, as reptiles, small quadrupeds, and birds; they are fond of eggs and of milk, and in confinement will readily eat soaked bread, cooked vegetables, or porridge. Their power of rolling themselves into a ball, from which the spines project on every side, is their means of protection from enemies. The spines are curiously bent near the root, and so set, that on the contraction of the muscle by which the animal rolls itself up, they are held firmly in their position, their points towards the adversary. They are very strong and sharp; their elasticity is also so very great, that the animal can sustain falls from great heights without apparent injury.

Hedgehog (*Erinaceus Europæus*).

The Common H. (*E. Europæus*) is a native of Britain and of most parts of Europe. A particular description is unnecessary. Its short ears are one of its distinctive specific characters. It is seldom above 9½ inches in length. Its spines are about an inch long. It readily kills snakes, and even vipers, which it eats, beginning always at the tail. It is said to be capable of resisting in an extraordinary degree not only the venom of serpents, but other kinds of poison, however administered. A H. has been known to eat great numbers of cantharides (Spanish flies) without injury, although one would have caused great agony to a dog. It brings forth from two to four young at a birth, and provides for the occasion a curiously constructed nest, of which the roof is capable of throwing off the rain, so as to keep them dry. The young are blind at first; their ears are also closed—a thing as unusual as the former is common among animals—their bodies are covered with soft incipient spines. In winter, the H. becomes torpid, retiring to some hole at the base of a tree, beneath roots, or in some such situation. It provides no winter store, and no other British animal hybernates so completely.—The H. is easily tamed, becomes very familiar, and is very useful in houses where *black beetles* are troublesome. Night is its period of activity.—The flesh of the H. is eaten in some parts of Europe, but in Britain only by gypsies, who roll it up in a ball of clay, and so roast it.—Other species of H. are found in different parts of Asia and Africa.

HEDGE-MUSTARD (*Sisymbrium*), a genus of plants of the natural order *Cruciferæ*, mostly annual or perennial herbaceous plants, with very various foliage, small yellow or white flowers, and a long roundish or 6-angled pod (silique). Several species are natives of Britain, of which one, the COMMON H. (*S. officinale*), was once employed in medicine for catarrhs and other ailments. It is said to be diaphoretic and expectorant. It has a mild pungency. It is sometimes cultivated as a pot-herb. It is an annual plant, plentiful in waste places and by waysides, sometimes two feet high, branched, with runcinate or deeply lobed leaves, stem and leaves hairy, flowers very small and yellow. The pods are erect, and closely pressed to the stalk.—BROAD-LEAVED H., or LONDON ROCKET (*S. irio*), is said to have sprung up in great abundance on the ground desolated by the fire of London in 1666.—FINE-LEAVED H., or FLIX-WEED (*S. Sophia*), is common in many parts of England and Scotland, growing in waste places. Its leaves are doubly or trebly pinnatifid. It is about two feet high, branched, with yellow flowers. It was formerly administered in dysentery and hysteria, and the seeds as a vermifuge.

HEDGE-SPARROW, HEDGE-WARBLER, HEDGE-ACCENTOR, or **DUNNOCK** (*Accentor modularis*), a little bird of the family *Sylviadæ*, a common native of Britain and of most parts of Europe. It is not quite so large as the house-sparrow, which it somewhat resembles in dull brownish plumage, but notwithstanding its most common name, in little else; its slenderness of bill, and its whole form, proclaiming it at once to be of a different family. It feeds principally on insects. It is one of the earliest spring songsters, having a sweet plaintive song; and the nest is one of the first that the school-boy finds in spring. The nest, of green moss, roots, and wool, lined with hair, is usually placed rather low in a bush or hedge. The eggs are four or five in number, of a delicate and spotless bluish green. The cuckoo very often lays its egg in the hedge-sparrow's nest. The hedge-sparrow is chiefly found in summer, in the northern temperate parts of Europe, migrating southward in winter; but in Britain it remains all the year.—Another species of the same genus, the ALPINE WARBLER, or ALPINE ACCENTOR (*A. Alpinus*), a rather larger bird, lighter and rather more varied in colour, has in a few instances been found in Britain. It is common in the Alps, and other mountains of France, Germany, and Italy.—Other species of Accentor are found both in the Old and New World. They are all of dull plumage. In this genus the bill is more conical than in the other *Sylviadæ*.



Alpine Accentor (*Accentor Alpinus*).

HEDJA'Z (the land of pilgrimage), a maritime province of Arabia, extending along the eastern shore of the Red Sea, and bounded on the N. by the Syrian desert and the Gulf of Akaba, on the E. by the province of Nedjed, and on the S. by that of Yemen. It is almost entirely unproductive, being chiefly sandy or stony. Containing the two sacred cities, Mecca and Medina—the former the birthplace of Mohammed, the latter the place in which he is interred—H. is the 'Holy Land' of Arabia. It is traversed annually by vast numbers of pilgrims.

HE'DJRAH (*Hegirah*), or, more fully, **HEDJRAT AL-NABI**, Arab. Emigration (not *flight*, as commonly translated) of Mohammed (q. v.). The tribe of the Koreish having resolved to slay the new prophet, their kinsman, he secretly left Mecca on the 13th of September 622 A.D., and repaired to Medina, where, partly from a feeling of jealousy towards Mecca, partly because his new doctrine had already found here many new adherents, he was so well received and so vigorously supported in the wars which he now began to wage against his adversaries, that the rise and progress of Mohammedanism was said to date in reality from the time of Mohammed's leaving Mecca. The Hedjrah, therefore, was made the starting-point of a new era—the Mohammedan (Tarikh Alhijrah)—by Calif Omar, who, in 639 or 640, with the aid of a Persian, Harmozan, instituted the new Moslem calendar. It does not, however, as is generally supposed, begin from the day of the flight itself, but from the first of the Moharram (the first month of the year) preceding it—a date corresponding to our 15th or 16th of July 622 A. D.

The Mohammedan year, as a lunar year, is shorter than ours by 10 days, 21 hours, and 14¾ seconds; and this circumstance renders the exact transfer of Mohammedan dates into dates of our own calendar a very difficult task. An elaborate method has been invented for that purpose by Ideler; an easy, although not minutely accurate way of finding the year, but not the month and the day, is by the deduction of 3 per cent. from the given Mohammedan year, and the addition of 622 to the sum so obtained; e. g., the year of the Hedjrah corresponding to 1862 A.D. being 1279, deduct 3 per cent., or about 39 = 1240, add 622 = 1862.

HEEM, JAN DAVID DE, the most celebrated painter of what is called 'still-life' that the Dutch school has produced, was born at Utrecht in 1600, studied under his father, and soon obtained immense sums for his pictures. Towards the close of his life, he removed to Antwerp, where he died in 1674. H.'s pictures represent, for the most part, splendid vases of fruits and flowers, musical instruments, and ornaments of various kinds. He painted a garland of flowers for a certain Jan Vander Meer, who refused 2000 guilders for it, but afterwards gave it to the Prince of Orange, who brought it with him to England. H.'s colouring is exquisite, and his use of *chiaroscuro* unsurpassable.

HEEN, CHOW, TING, AND FOO, Chinese geographical terms, used to designate the relative rank of cities and districts. *Heen* indicates the smallest division, although its city may be an important one; thus, Shanghai-heen is a large city and district, while the department in which it is situated, Sungkiang-*foo*, to which it is subordinate, is a smaller place. Generally speaking, however, the terms designate the rank of cities, from *foo*, the chief, to *heen*, the least in size.

HEEREN, ARNOLD HERMANN LUDWIG, an eminent German scholar, was born 25th October 1760, at Arbergen, near Bremen, where his father was at that time pastor, and received his education at the cathedral school of Bremen, and at the university of Göttingen. He first made himself known to the literary world by two philological works—viz., an edition of Menander's *De Encomiis* (Göttingen, 1785), and the *Eclogæ Physicæ et Ethicæ* of Stobaeus (4 vols. Göttingen, 1792—1801). In preparing materials for the latter of these works, he visited Italy, the Netherlands, and France, and by intercourse with various learned men of these countries, expanded and enriched his mind. In 1794, he was appointed Professor of Philosophy, and in 1801, Professor of History at Göttingen. He married in 1797 a daughter of Heyne, and died 7th March 1842. His lectures in the university referred, from the very first, more to Greek and Roman antiquities, and to the history of the fine arts, than to philology, strictly so-called. The latter, indeed, was finally quite thrown into the background. In 1793—1796, appeared at Göttingen his *Ideen über Politik, den Verkehr und den Handel der vornehmsten Völker der alten Welt* (4th edit. 5 vols. 1824—1826). This work has secured him a place among the most eminent modern historians. If his *Geschichte des Studiums der classichen Literatur seit dem Wiederaufleben der Wissenschaften* (2 vols. Gött. 1797—1802) proved less satisfactory to scholars, his *Geschichte der Staaten des Alterthums* (Gött. 1799; 5th edit. 1826), and his *Geschichte des Europ. Staatensystems und seiner Colonien* (Gött. 1809; 4th edit. 1822) abounded in new views and acute expositions. For his *Untersuchungen über die Kreuzzüge*, he received the prize from the National Institute of France. His *Kleine historische Schriften* (3 vols. Gött. 1803—1808) contain some very interesting treatises. In 1821—1826, he published an edition of all his historical works (*Historischen Werke*) in 15 vols. H. was a member of the academies of St Petersburg, Berlin, Munich, Stockholm, Dublin, and Copenhagen, and of the Asiatic Societies of London and Calcutta.

HEGEL, GEORG WILHELM FRIEDRICH, one of the greatest German philosophers, was born 27th August 1770, at Stuttgart, and became, in 1788, a student in the Tübingen theological institute, where his speculative abilities, however, were outshone by his younger companion, Schelling. After leaving the university in 1793, he was a family tutor at Bern and Frankfurt-on-the-Maine for six years, during which period he devoted himself chiefly to the study of Christ's life and the philosophy of religion. In the beginning of 1801, he left Frankfurt for Jena, where he published his first work, *Ueber d. Differenz d. Fichte'schen u. Schelling'schen Systems* (1801), and entered the university as *Privat-docent*. Next year, he joined Schelling, to whose philosophy he seems at this time to have adhered, in the editorship of *Das Kritische Journal für Philosophie*. His lectures in Jena did not attract much notice, but it was at this place, while the din of the battle in 1806 was sounding through the town, that he completed his first important work, *Die Phänomenologie d. Geistes* (1807), which he used afterwards to call his voyage of discovery. Shortly before the battle, he had been made extraordinary professor of philosophy; but the disaster which that event brought upon Jena compelled him to seek means of subsistence elsewhere, and he went, accordingly, at Niethammer's request, to Bamberg, where he edited a political paper for two years. In 1808, he was appointed rector of the gymnasium at Nuremberg, and there he had just completed his *Wissenschaft d. Logik* (3 Bde. 1812—1816), when he was called in 1816 to a professorship of philosophy in Heidelberg, where he published his *Encyklopädie d. philosophischen Wissenschaften* (1817; 3te Aufl. 1830), in which he first developed his complete system. In 1818, however, he was called to Fichte's place in Berlin, and it was here that he first began to gather around him a new philosophical school. His lectures, which were delivered in a stammering voice, and without rhetorical ornament, yet with the impressiveness of being the expression of laborious thought, attracted hearers from all ranks and professions. He rose to considerable political influence through his official connection with the Prussian government, and his philosophy in some respects lost credit from the generally conservative tendencies of his administration. Still, in his *Rechtsphilosophie* (1821), he demands representation of the people, freedom of the press, publicity of judicial proceedings, trial by jury, and the administrative independence of corporations. In the midst of an active life, he was suddenly cut off by cholera, 14th November 1831, and buried beside Fichte. A complete collection of his works was published in 18 vols. (Berlin, 1832—1841), and his life written by Rosenkranz (1844).

At first, as has been intimated, H.'s philosophy started from the same position as Schelling's—the principle of the identity of knowing and being; but at an early period he departed from Schelling's theory, that this identity can be apprehended only through an intellectual intuition, of which the understanding can render no account. Carrying out rigorously the principle from which both started, as embodied in the proposition of Spinoza, that the order and connection of thoughts are the same as the order and connection of things, H. sought to find the universal form which characterises the process both of existence and thought. This universal form he recognised as the process of becoming (*Werden*). But the process of becoming is only the union of position and negation; for all that becomes at once posits, and, by passing into something else, removes itself. Identical with this process is the process of thought; for every thought involves its contradictory. But the contradictory is not a mere negation; it is in itself positive; the conception of unity, e. g., is not more positive than its contradictory, the conception of plurality. Every thought therefore, as it involves its contradictory, adds to its own contents, and by the combination of the two contradictories, we rise to absolute knowledge. This process, involving in it the three stages of position, negation, and the union of both, determines the method of H.; for according to this method, his entire system is organically necessitated in all its parts to a threefold division corresponding to the three stages in the process of thought and existence. The point from which all knowledge must start is thought simply and in itself, the science of which, logic, forms, therefore, the first part of this system. But thought passes into something other than itself, exists out of itself in nature, and the philosophy of nature accordingly ranks as the second part. Returning again from its estrangement in nature, thought becomes conscious of itself in mind, and consequently the philosophy of mind forms the third part. It would be profitless to give a mere enumeration—and nothing more could be attempted here—of the various subdivisions, in their degrees of subordination, into which these three grand divisions are separated. For an account of the system, consult, besides the ordinary histories of philosophy, Vera's *Introduction à la Philosophie de Hegel* (Paris, 1855), and Haym's *Hegel u. seine Zeit. Vorlesungen über Entstehung u. Entwickelung, Wesen u. Werth d. Hegel'schen Philosophie* (Berlin, 1858).

Hegelianism is commonly employed to denote the direction of philosophical speculation in the large school which arose under the influence of Hegel. During H.'s life, and on till 1841, when Schelling came to Berlin, Hegelianism found a very efficient organ in the *Jahrbücher für wissenschaftliche Kritik* (1827—1847, ed. by Henning); and through the influence of the Prussian minister, Von Altenstein, a large number of the philosophical chairs in the Prussian universities were secured for Hegelian professors. In the second grand department into which H. had divided his system, the philosophy of nature, his speculations did not give the same impetus to inquiry as those of Schelling had given; but this may be accounted for from the consideration that the enthusiasm for physical investigations, which was rising when Schelling's early speculations appeared, had reached its culmination before H. began to attract notice. In logic, also, owing to H.'s own exhaustive treatment, little has been done by his disciples, except in the way of explication and apology, of which Schaller's, Erdmann's, and Hinrichs' works on the science are specimens. But in psychology we find developments of the Hegelian principles by Rosenkranz, Michelet, and Erdmann; in jurisprudence, by Gans; in ethics, by Michelet; in æsthetics, by Vischer, Hinrichs, Hotho, Rosenkranz, Ruge, and Schnaase; in the history of philosophy, notwithstanding H.'s own work, by Erdmann, Michelet, Rosenkranz, Schwegler, Zeller, &c. In the philosophy of religion, however, Hegelian speculation has been more widely and powerfully influential than in any other department; Daub, Marheineke, Rosenkranz, Conradi, Göschel, Vatke, and a host of other more or less known writers, joining with H. in seeking to elicit the eternal meaning embodied in the historical and symbolical forms of Christianity. But as soon as Hegelianism reached this sphere of speculation, it began to shew antagonistic tendencies. These became especially apparent four years after H.'s death, in the controversy raised by Strauss' *Leben Jesu* (1835), and continued by his *Christliche Glaubenslehre* (1840). The Hegelians then split into three sections, called severally the right, left, and centre, according as they represent supernaturalism, rationalism, or a mediating mysticism. Among those of the extreme left, known also as the *Young Hegelians*, and dubbed by Leo with the felicitous but untranslatable diminutive *Hegelingen*, the Hegelian philosophy, which had before been ecclesiastically and politically conservative, became thoroughly radical. In 1838, Ruge began to edit for them a special organ, *Die Halleschen Jahrbücher*, which was very influential among the youth of Germany, but was prohibited in 1847, after having been transferred to Leipsic under the title of *Die Deutschen Jahrbücher*. Weisse, Fichte (the younger), Ulrici, Fischer, and Carriere, are considered pseudo-Hegelians, because, though retaining the terminology and general principles of Hegelianism, they introduce at times an extraneous method and results. Beyond Germany, Hegelianism is represented in France by Vera, in Denmark by Heiberg, and in Sweden by Snellmann, Tengström, Bring, and others, and has not failed to exert an important influence on British and American thought.

HEGESI'PPUS, the earliest of the Christian Church historians. He was born of a Jewish family in Palestine about the beginning of the 2d c., but became a Christian at an early age, and was a member of the Church of Jerusalem. He went to Rome in the pontificate of Anicetus, visiting upon his journey many churches, and especially that of Corinth, where Primus was bishop. He remained in Rome till the death of Soter (176), and is supposed to have died in the year 180. It was during his sojourn in Rome that he composed his history, in five books, entitled *Memorials of Ecclesiastical Affairs*, which, however, appear not to have formed a complete and continuous history, although they extend from the death of Christ down to the writer's own age. Unhappily, the work, as a whole, has perished, and we know it only from some fragments which Eusebius has embodied in his own History, and the most important of which are his account of the martyrdom of St James and also of St Simeon of Jerusalem. Eusebius speaks highly of the doctrinal fidelity of H., and St Jerome, of the simplicity and purity of his style. Another work on the Wars of the Jews (also in five books), ascribed to H., is confessedly spurious. The most complete collection of the fragments of his writings is that of Gallandus in the second volume of his great collection. See also Grabe, *Spicilegium*, tom. ii.; and Fabricius, *Bibl. Græca*, vii. 156.

HEGI'RA. See HEDJRAH.

HEI'DÉ, a small town of Prussia, in the province of Slesvig-Holstein, is situated in Northern Ditmarsh, 32 miles north-north-west of Gluckstadt. It is a pleasant, well-built town, with a large market-place. The inhabitants are employed chiefly in agriculture and general trade. Pop. (1871) 6820.

HEI'DELBERG, an ancient city of Germany, in the grand duchy of Baden, is situated on the left bank of the river Neckar, in one of the most beautiful districts in the country, on a narrow strip of ground between the river on the north, and the northern extremity of the Geisberg Mountains on the south. It is 13 miles south-east of Manheim, and about 54 miles south of Frankfurt-on-the-Maine. The town consists mainly of one street about three miles in length. Among its most important buildings are the Church of the Holy Ghost, through which a partition-wall has been run, and in which service according to the Catholic and Protestant rituals is simultaneously carried on; the Church of St Peter's, on the door of which Jerome of Prague, the companion of Huss, nailed his celebrated *theses*, at the same time publicly expounding his doctrines before a multitude assembled in the churchyard; and the ruins of the castle, which was formerly the residence of the Electors Palatine, and which, in 1764, was set on fire by lightning, and totally consumed. In the cellar under the castle is the famous Heidelberg Tun, 36 feet long and 24 feet high, and capable of containing 800 hhds. H. is celebrated for its university, which, after those of Prague and Vienna, is the oldest in Germany. It was founded by the Elector Ruprecht I. in 1386, and continued to flourish until the period of the Thirty Years' War, when it began to decline. In 1802, however, when the town, with the surrounding territory, was assigned to the Grand Duke of Baden, a new era commenced for the university, and it rapidly became famous. It comprises faculties of theology, law, medicine, and philosophy. In 1868, it had more than 800 students in its classes. Its library, to which additions are always being made, consisted in the same year of 175,000 volumes and 2000 manuscripts. As an edifice, it is a plain, and not very large building, near the centre of the town. The Library, the Anatomical and Zoological Museums, and the Museum Club, are separate buildings. Connected with the university are numerous scientific collections, a chemical laboratory, a botanic garden, &c. The trade and manufactures of the town are inconsiderable. The cheapness of living, however, and the beauty of the environs, which are cultivated like a garden, have caused a great many foreigners to settle here. Pop. (1871) 19,988.

As the residence of the rulers of the Palatinate, H. underwent all the vicissitudes of that much-suffering electorate. See PALATINATE.

HEIGHTS, MEASUREMENT OF, may be performed in any one of four ways: by the aid of trigonometry; by levelling; by ascertaining the atmospheric pressure at the top and bottom of the height by the barometer; or by ascertaining the boiling-point of water at the top and bottom by the thermometer. As the second and third methods are treated of elsewhere (see LEVELLING and BAROMETER), the first and fourth alone are here considered. The first method is often more convenient than any of the others, as it does not require the ascent of the height, nor even a near approach to it. There are two cases of the problem:—Case 1 (when there is level ground in front). Let ACD be a height of irregular form, take O and M, two stations on the level ground in front, find the angles AOB, AMB, and measure OM; then as AOM, AMO (which is AMB subtracted from 180°), and OM are known, AO can be found; and since now AO and the angle AOM are known, AB can be found. If the height is regular in form, all that is necessary to be done is to measure OC, calculate CB, find AOB; then AB can at once be calculated by the ordinary rules.—Case 2 (when there is no level ground in front). Suppose the height of A above O (fig. 2) is to be found. Take another station M, from which A and O are visible, measure the angles AOM, OMA, and find OM by Levelling (q. v.), then OA can be found; at O take the angle AOB (the angular altitude of A), then from OA and AOB, AB can be known. If the height of one point above another—the latter not being the observer's station—be required, then the height or depression of the first, and the height or depression of the other above or below the observer's station, must be found separately as before, then the difference (if both are above or both below the observer's level) or sum (if one is below it) of these results gives the number required. For instance (fig. 1), the height of A or AB is first found, CE or the height of E is next calculated, and their difference, AB−CE, or AF, is the height of A above E.

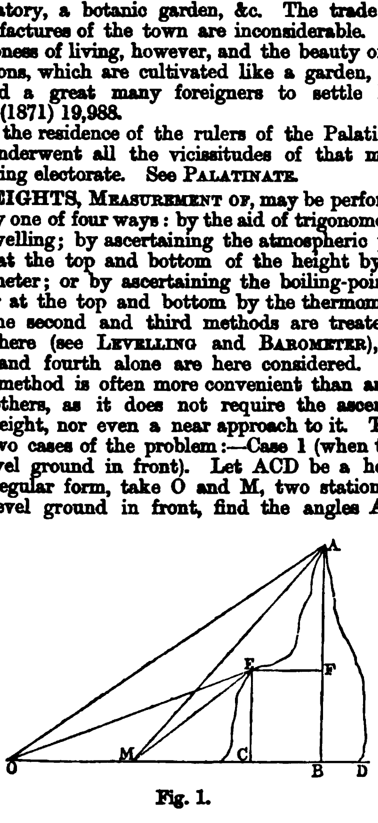


Fig. 1.

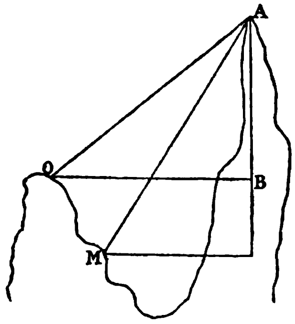


Fig. 2.

Besides this rigorous trigonometrical method, there are many ways of estimating pretty nearly the height of objects, with little or no calculation. For instance, if the height is perpendicular, and the ground in front on a level with the base, take two pieces of wood, hinged or jointed together at an angle of 45°, or a large pair of compasses opened to that angle; place one leg horizontal and directed to the base of the object, and move the instrument towards it, or from it, until the other leg point to the top; then the distance of the angle from the bottom gives the height.

The fourth method is often used in measuring the height of mountains when great accuracy is not required, or when the apparatus requisite in applying the other methods is not at hand; all the apparatus required in this method being two thermometers, a tin pot to boil the water, and a book of tables such as those given by Colonel Sykes in *Hints to Travellers.* The method depends upon the fact, that vapour of water or steam has a certain tension or elastic force according to its temperature, thus: at 32° it can support 0·2 of an inch of mercury; at 80° it can support 1 inch; at 150°, 7·42 inches; at 180°, 15·5 inches; at 212° (the ordinary boiling-point), 30 inches, or the whole pressure of the air. By observing, therefore, the temperature at which water boils, we can find, by means of a table of the elastic force of vapour at different temperatures, the pressure, in inches of mercury, to which it is subject at the time. Now, beginning at the level of the sea, it is found by experiment that a fall of 1° in the boiling-point corresponds to an elevation of 510 feet; at an elevation of 2500 feet, the difference for a degree is 520 feet; at 5000, it is 530 feet; at 17,000, it is 590 feet. An approximation for medium elevations may be made by taking 530 feet on an average for the difference corresponding to 1°, then 530 *multiplied by the number of degrees between the boiling-point and* 212° *will give, approximately, the height.*

HEIJN, or **HEYN**, PETER PETERSEN, a famous Dutch admiral, was born in 1577, at Delftshaven, near Rotterdam. Of low origin, he gradually advanced himself by his bravery to the highest dignities. As vice-admiral of the fleet of the Dutch West India Company, he in 1626 engaged and utterly defeated the Spaniards in All Saints' Bay, captured 45 of their ships, and returned to Holland with an immense booty. In consequence of this splendid victory, the Company raised him to the rank of admiral. Only two years after this, he captured, almost without requiring to strike a blow, the grand Spanish silver flotilla, the value of which was estimated at 12,000,000 Dutch guilders. As a reward of this unparalleled success, he was, in 1629, named Admiral of Holland. Shortly after, he met his death in a fight with two ships off Dunkerque. A marble monument is erected to his memory in the old church at Delft.

HEI'LBRONN (formerly, *Heiligbronn, holy well*), an important trading and manufacturing town of the kingdom of Würtemberg, in the circle of Neckar, is situated on the right bank of the river Neckar, in a beautiful and fertile valley, 28 miles north of Stuttgart. The church of St Kilian, built from 1013 to 1529, a noble edifice, partly Gothic and partly Renaissance; the old town-hall, *der Diebsthurm*—the Thief's Tower—in which Götz von Berlichingen was confined; and the house of the Teutonic knights, now a barrack, are the chief buildings. Though wine and field and garden produce are still cultivated by many of the inhabitants, trade and manufactures are the chief branches of industry now carried on here. Paper, chemical products, silk, dye-stuffs, gold, silver, and iron wares, tobacco, vinegar, &c., are manufactured for export. Gypsum and sandstone are quarried in the vicinity. Pop. (1871) 18,955.

HEI'LIGENSTADT, a regularly built and walled town of Prussian Saxony, is situated on the Leine, near the Hanoverian frontier, 50 miles north-west of Erfurt. It was the capital of the department of the Harz, in the kingdom of Westphalia, from 1807 to 1814. Weaving, dyeing, and paper-manufacture are carried on. Pop. (1871) 4883.

HEI'LSBERG, a small town of Prussia, in the province of Prussia, is very beautifully situated on the Alle, 43 miles south of Königsberg. It was originally the chief town of Ermeland, one of the old divisions of Poland. Pop. (1871) 5839, who manufacture cloth, leather, &c.

HEI'LSBRONN, a small town in the Bavarian circle of Middle Franconia (pop. 850), worthy of note as the ancient burial-place of the Hohenzollern Burggrafs of Nürnberg. The convent of Heilsbronn owes its origin in 1132 to Bishop Otho of Bamberg, and its subsequent rich endowment to the Counts of Ahenberg, from whom it passed in heritage to the Nürnberg princes, who thenceforward retained the lay-proprietorship of the institution. Nearly all the members of their House were buried here till the end of the 15th c., when it became the burial-place of the Franconian branch of the Hohenzollerns, till their surrender of their Franconian hereditary lands. Since the suppression of the monasteries in 1555, little has been done to keep up the splendour of H.; but the church still retains a large number of highly interesting monuments, at once commemorative of ancient German history, and illustrative of the progress of art in Germany during the middle ages. The village of Heilsbronn, which lies on the Schwabach, possesses mineral springs, and has manufactories of wax-cloth and woollen goods. The history and antiquities of Heilsbronn convent have been made the subject of several interesting treatises, of which the most complete is Hocker's *Heilsbronnisches Antiquitätenschatz*, and Stillfried's sequel to the same work.

HEIMSKRINGLA. See SNORRI STURLESSON.

HEINE, HEINRICH, a modern German poet and wit, was born at Düsseldorf, of Jewish parents; the date of his birth is variously stated as 1797, 1799, and (by himself) 1800. In 1819, he proceeded to the university of Bonn for the purpose of studying law; but he devoted himself with greater ardour to the study of modern and ancient German literature, under the auspices of his master and friend August Wilhelm Schlegel. He subsequently studied at Berlin and at Göttingen, at which latter place he took his degree as Doctor of Law in 1825. About this time, he abandoned Judaism, and was baptized in the Lutheran Church of Heiligenstadt. A visit to the Hartz and to Italy supplied him with materials for his *Reisebilder* (Pictures of Travel, Hamb. 4 vols. 1826—1831). This book obtained, on its first appearance, an extraordinarily brilliant success. 'Young Germany,' in particular, became drunk with enthusiasm. His *Buch der Lieder* (Book of Songs, Hamb. 1827; 10th edit. 1852)—a portion of which had first appeared as *Youthful Sorrows* in Berlin, 1822—was no less fortunate. Many of these songs are of the most exquisite and ethereal beauty. They are unmatched in German literature, except by the lyrics which Goethe wrote in his youth. The revolution of July threw H. into a violent fit of democracy, and in 1831 appeared his *Kahldorf über den Adel, in Briefen an der Grafen M. von Moltke* (Kahldorf on the Aristocracy, in Letters addressed to Count M. von Moltke). He now found it advisable to leave Germany, and at once proceeded to Paris, where he resided for the rest of his life, cultivating belles-lettres, both with a brilliancy and a malice hitherto almost unheard of. In 1835, he married a certain 'Mathilde,' who figures much in his writings, and in 1843—1844 visited his native country, to see his mother. On his return, he published *Deutschland; ein Wintermärchen* (Germany; a Winter's Tale), in which he recounts imaginary adventures and burlesque episodes, and in which a great number of his countrymen, kings, statesmen, professors, authors, artists, &c., are mercilessly satirised and abused. In 1847, H. was attacked by disease of the spine, and was almost constantly bedridden. He suffered the most acute pain, together with the loss of eyesight, with the most remarkable equanimity and even good-humour, till the day of his death, which took place at Paris, February 17, 1856. His will expressed a desire that no religious ceremonies should be celebrated at his funeral. 'This,' however, he adds, 'is not the weak fancy of a free-thinker. For the last four years, I have cast aside all philosophical pride, and have again felt the power of religious truth.' What faith is to be placed in this assertion, may easily be concluded from his subsequently designating the Deity as the 'mighty Aristophanes of Heaven,' who laughs at his calamities. Besides the works already mentioned, H. wrote *Französische Zustände*, *Der Salon*, *Shakspeare's Mädchen und Frauen*, *Neue Gedichte*, *Atta Troll*, *Romanzero*, &c. A complete edition of his works was published at Philadelphia, by John Weik, in 1856; another was published, by Hoffmann Campe, in Hamburg (1861—1863). A French edition of his works (Michel Levy, Paris) was prepared, with his co-operation, by Loewe-Weimars, Gererd de Nerval, and St René-Taillandier. English versions of some of these are Leland's translation of *The Pictures of Travel* (Philad. 1856), *The Book of Songs*, by J. E. Wallis (Lond. 1856), and the *Poems* of Heine, complete, translated in the original metres by Edgar Alfred Bowring (Lond. 1859).

HEINECCIUS, JOHANN GOTTLIEB, a learned jurist of Germany, born 11th September 1681 at

Eisenberg, studied theology at Leipsic, and law at Halle, where in 1713 he was made professor of philosophy, and in 1720 professor of law. In the latter capacity, he went in 1723 to Franeker, in 1727 to Frankfurt-on-the-Oder; but in 1733 returned, as professor of law and philosophy, to Halle, where he died 31st August 1741. His works display a thorough acquaintance with all the departments of jurisprudence, but especially with Roman and German law; and their varied learning, logical arrangement, and elegant Latin, long maintained for them a classical character. His *Antiquitatum Jus Romanum Illustrantium Syntagma*, has been re-edited so lately as 1841 by Mühlenbruch, and his *Elementa Juris Civilis secundum Ordinem Institutionum* (edited by Biener, 1815); his *Elementa Juris Civilis secundum Ordinem Pandectarum*, &c., are still studied by jurists.—H.'s son, Johann Christian Gottlieb H., born 1718 at Halle, died 1791 at Sagan, was for a long time professor in the academy for young noblemen at Liegnitz, and edited besides several of his father's works separately, a complete collection of them (*H. Opera Omnia*, 9 vols. Geneva, 1771).—H.'s brother, Johann Michaelis H., born at Eisenberg 1674, died 11th September 1722, was a celebrated pulpit orator in Halle, and also the first who studied seals scientifically. His theological writings are forgotten, but he is remembered by his *De Veteribus Germanorum aliarumque Nationum Sigillis* (Leip. 1710; 2d edit. 1719), and by the work edited in conjunction with Leuckfeld, *Scriptores Rerum Germanicarum* (Frankf. 1707).

HEIR, or **HEIR-AT-LAW**, in English Law, means the person who, in the event of no will being left by a deceased person which indicates a different person, is entitled by law to succeed to the real estate of such deceased person. The term is never used in the loose sense which prevails in Scotland, as including both heirs, properly so called, and executors or next of kin. When a person in England or Ireland does not think fit to exercise the undoubted right which belongs to him of leaving his real property by will to whomsoever he pleases, to be enjoyed after his own death, the law steps in, and appoints such a person for him, and this person is the heir-at-law. The law, in selecting these heirs, proceeds on certain fixed rules of primogeniture and relationship, preferring males to females. The eldest son is preferred to all the rest of the family, and his descendants; then the next eldest son and his descendants; and so on to the youngest son, after whom the daughters succeed equally or all together, and are then called coparceners. After the descendants of the deceased person, who may be called A, are exhausted, then A's father succeeds; after whom follow A's eldest brother and descendants; then A's next eldest brother; and so on to the youngest brother; after failure of whom and his descendants, then all A's sisters by the full blood succeed equally as coparceners; then A's half-brother by the father's side, and descendants, &c.; then A's half-sisters by the father's side, all as coparceners; after whom succeed A's paternal uncles and aunts in a similar order. Where there are no heirs whose relationship can be traced to the deceased person, then the real estate goes to the crown.

The moment a person dies leaving real estate in England, such real estate vests at once in the heir-at-law, whoever that may be, without any ceremony or formality being required. The heir-at-law, however, takes the property subject to the debts of the deceased, and must pay off all these, provided there is no personal estate sufficient to pay them, but in no case can he be liable beyond the value of the estate itself. The heir, it is true, may be sued for these debts in the first instance, by any of the creditors, but he may afterwards have the real estate exonerated, thereby shifting the liability to the personal estate. When the deceased had land which was subject to a mortgage debt, then that debt is a burden on the land, and must be borne by the heir; but the law was otherwise before 1854.

The law of succession in Ireland is entirely the same as in England. See Succession.

HEIR, in Scotch Law, is often used in a loose sense to denote the persons entitled to succeed to the heritable as well as to the movable estate. In Scotland, the same rule exists as in England, that if a person do not by deed *mortis causa* (which operates like an English will) dispone or convey his estate to some other person, the law points out who is to take such estate, and that person is the heir-at-law. The rules by which the heir to heritable estate in Scotland is pointed out differ considerably from the English rules. These rules are the same as to the descendants of the deceased person A. But after A's descendants are exhausted, differences begin, for then it is not the father, nor yet the eldest brother of A, but the next younger brother of A, who next succeeds; then the next younger again, until the youngest brother; after whom and his descendants comes A's next elder brother; and so on upwards to the eldest brother of all. In Paterson's *Compendium of English and Scotch Law*, the different order of succession in both countries is shewn in a map. There was a difference in Scotland as regards heritable estate which had been purchased by a person (in which case it was called Conquest), and who died leaving brothers both elder and younger: in such case, contrary to the general rule, the estate went first to the next elder brother. But after 1874 this distinction was abolished. In Scotland, when females succeed equally, they are called Heirs-Portioners (q. v.). In Scotland, though not in England, the mother never succeeds in any event, or any relatives, except brothers and sisters german, who trace through her.

There was an important difference in Scotland as to the vesting of the heritable estate of a deceased person. At the death of the owner, his heritable estate did not immediately vest in the heir, but lay in an intermediate state, then called the *hæreditas jacens*, and the person entitled to be the heir had to be served heir, or make up his titles, and enter to the estate. This was altered in 1874, and the estate now vests at once upon the death of the last owner, 37 and 38 Vict. c. 94, s. 9. The general rule also exists in Scotland, that the heir-at-law takes the estates subject to his ancestor's debts; indeed, he used to be liable for all the debts, though far exceeding the property left, provided that he did not take certain precautions to escape this passive representation, as it was called, for the barbarous maxim prevailed, *hæres est eadem persona cum defuncto*. The steps to be taken to guard against liability in such cases are matters of detail which do not require to be described, and are no longer necessary since the act of 1874. Another important distinction exists in Scotland, viz., that an heir need not be born in lawful wedlock, as in England, but it is enough if the father marries the mother afterwards, and so legitimates him.

The word 'heir' is often distinguished into several kinds. Thus, an *heir by destination* is a person who is pointed out by a certain deed to succeed in a certain order. So is an *heir of provision*. An heir-at-law is also often called an *heir of line*, because he succeeds according to a certain line or order; and an *heir-general*, because he is the general representative of the ancestor, in contradistinction to an heir-special, who is pointed out by deed. An *heir of* *entail* is the person who succeeds to an entailed estate by virtue of the deed of entail, which prescribes the order of succession. An *heir of conquest* meant, as above stated, the heir of an ancestor who acquired the estate in question by purchase, and not by succession. See SUCCESSION.

HEIR AND EXECUTOR, a short phrase to denote that branch of the law in which a leading distinction is made between the two kinds of property left by a deceased person, viz., real and personal. All a man's property falls under one or other of these heads. If real, it goes to the heir-at-law; if personal, it goes to the executors or administrators, often called the personal representatives. In Scotland, the same leading distinction exists under the head of heritable and movable, but in Scotland some things are classed among heritable, which in England would not be classed among real property. Thus, in Scotland, a lease is heritable property, and goes to the heir-at-law, while in England it is personal, and goes to the executor or administrator. So annuities in England are personalty, and in Scotland are heritable subjects, and there are some other differences not easily to be explained popularly.

HEIR-APPARENT, in English Law, means the person who is certain to succeed if he outlive his ancestor; thus the eldest son is so, because no other person can ever come between and obtain precedence. In Scotland, the phrase is sometimes used also popularly in this sense, but the words 'apparent heir,' when used technically there, mean quite a different thing, viz., the person who, after his ancestor's death, is entitled to succeed, provided he make up his titles, but who has not yet actually done so. The apparent heir has a year to deliberate, called the *annus deliberandi*, whether he will enter upon the property, because the responsibility is so much greater in Scotland than in England.

HEIRESS means a female heir when there are no male heirs to succeed. Where there are several females, all sisters, who are in that case equally entitled, they are sometimes called co-heiresses, but more properly *coparceners* in England, and *heirs-portioners* in Scotland.

HEIRESS. In Heraldry, a lady is accounted an heiress if she has no brothers who leave issue. The husband of an heiress is entitled to bear her arms in an escutcheon of pretence, i. e., a small escutcheon in the centre of his paternal shield, and the children of an heiress may quarter her arms with their paternal coat. Neither practice is of very early introduction in heraldry. See MARSHALLING OF ARMS.

HEIR-FEMALE means the female heir connected through a female.

HEIRLOOM, in English Law, means certain chattels which go to the heir-at-law by special custom, and have already come through several descents. The chattels included are the best of everything, as pots, pans, tables, &c. But the right is obscure. The word is more frequently used now to designate some chattel which a testator has bequeathed to the person, whoever he may be, who is to take the real estate. In Scotland, a somewhat similar, but by no means identical phrase is used, viz., *heirship movables*, which is a wider right, and includes the best articles of furniture in the house of a person who left heritable property. The extent of this right is also not clearly settled.

HEIR-MALE means the male heir connected through a male.

HEIR-PRESUMPTIVE, in English Law, means the person who would succeed if the ancestor were to die immediately, but who may ultimately be displaced if the ancestor live longer. Thus, an only daughter is the heir-presumptive until a son is born, who thereupon displaces her. In Scotland, though the phrase is also used popularly in this sense, yet in its technical sense it means the person who is certain to be heir if he outlive his ancestor. In short, a presumptive heir in Scotland would be called an heir-apparent in England.

HEIRS-PORTIONERS, in Scotch Law, mean either two or more females, being sisters, or sisters and the children, male and female, of deceased sisters, who are entitled to succeed to heritable estate. Thus, if A dies leaving three daughters, all three succeed equally if alive; or if some had already died leaving children, then the children represent the parent, and succeed to the parent's share along with the surviving sisters, all being called heirs-portioners. In such cases, the eldest heir-portioner is entitled to the mansion-house over and above her equal share of the rest. She alone also takes a peerage or dignity, if there is any in the family. In England, coparceners, though resembling heirs-portioners, have not identical rights. See Paterson's *Comp. of E. and S. Law*, s. 777.

HEIRSHIP MOVABLES. See HEIRLOOM.

HEL, the northern goddess of the dead, who dwelt beneath one of the three roots of the sacred ash Yggdrasil, was the daughter of the evil-hearted Loki (q. v.), by the giantess Angurboda. Hel, together with her brothers, the wolf Fenrir, and the serpent Jormundgand, was bred up in the giant's home of Jötunheim, where she remained, till at the request of the Æsir, or gods, the All-father sent for her and her brothers; when, knowing that by their origin these children must prove a great source of calamity, he resolved upon their destruction, and after casting the serpent into the deep ocean, which surrounds all lands, and where it has grown so large that it encircles the whole world, and bites its own tail, he hurled Hel into Niflheim (q. v.), over which he gave her authority, and in which she was to assign places to all who die of sickness and age. Her vast abode is surrounded by a high enclosure with massive gates. Her dwelling is *Elindnir*, dark clouds; her dish, *Hungr*, hunger; her knife, *Sullt*, starvation; her servants, *Gangläti*, slow-moving; her bed, *Kör*, sickness; and her curtains, *Blikiandaböl*, splendid misery. She is easily recognised by her fierce aspect, and her half-black, half flesh-coloured skin. Hel was inexorable, and would release no one who had once entered her domain. See BALDER.

After the introduction and diffusion of Christianity, the ideas personified in Hel gradually merged, among all the races of northern and German descent, in the local conception of a Hell, or dark abode of the dead. See Thorpe's *Northern Mythology*, Grimm's *Mythologie*.

HELDER, a thriving seaport and strongly fortified town in the province of Holland, Netherlands, stands on the *Marsdiep*, which unites the Zuider Zee and the German Ocean, and separates North Holland from Texel. It is 45 miles north-north-west of Amsterdam, with which it is connected by the Grand Ship Canal. See AMSTERDAM. H. is protected from the inroads of the sea by an enormous dyke, six miles in length, 40 feet broad at the top, on which there is a good road, and which presents to the sea a sloping side of 200 feet, inclined at an angle of 40°. This dyke is built entirely of huge blocks of Norwegian granite. Here alone, along the whole coast, is deep water found close to the shore, a fact accounted for by the rush or 'race' of the tide, the violence of which is so great here that no sand is allowed to accumulate. Fort Kykduin is surmounted by a tower and light-house. Its harbour, which is well sheltered by the dyke, can easily contain 300 large vessels. Pop. (1873) 20,104.

HELEN, the daughter of Zeus and Leda, wife of Tyndareus, king of Sparta. According to the ancient legend, she was so exceedingly beautiful, that at the age of ten she was carried off by Theseus and Pirithous, but was recovered subsequently by her brothers, Castor and Pollux. Tyndareus afterwards engaged her suitors, who numbered about 30, by a solemn oath, to unite together to aid the husband whom H. should choose, in case of any attempts being again made to carry her off. In accordance with this oath, her husband, Menelaus, when she was afterwards carried off by Paris, son of Priam, king of Troy, summoned all the princes of Greece to avenge the injury he had sustained, and thus gave rise to the Trojan war. The stories concerning the fate of H. are inexhaustible. The ordinary legend states that after the death of Paris, she voluntarily married his brother Deiphobus, and that on the taking of Troy, in order to recover the favour of Menelaus, she betrayed Deiphobus into his hands. On the fall of Troy, she returned with Menelaus to Sparta; but after his death was driven from the country, and having gone to Rhodes, was there murdered by the queen of the island. By her husband Menelaus, she had one daughter, Hermione. Greek artists have represented her in their works as the prototype of female beauty, and she has frequently been celebrated by the tragedians in their dramatic works.

HE'LENA, the name of several female saints of the Catholic Church, the most celebrated of whom is the Empress Helena, wife of Constantius Chlorus, and mother of Constantine the Great. The place of her birth is a subject of controversy: according to one account, she was born in Bithynia; but the English Church historians commonly claim her as a native of Britain, to which opinion some probability is added from the fact, that her first-born son, Constantine, was born in that country. She became a Christian during the youth of Constantine, and it is thought not unlikely that her example and her teaching co-operated with public motives in determining Constantine to embrace the Christian religion. It was not, however, till after the defeat of Maxentius that H. formally received baptism. She was at this time far advanced in years; but she survived her baptism for a considerable time, and deserved the gratitude of the Christian community by her zeal for the advancement of religion, and her many acts of piety and munificence. Among the public events of her Christian life, recorded by Catholic historians, the most remarkable is the discovery (according to the belief of the time) of the cross of Our Lord (see HOLY PLACES). She died in the year 328, or, according to another account, in 326.—Two other royal or princely ladies of the same name are honoured as saints. The first, whose honours are confined to the Russian Church, was the wife of the Grand Duke Igor, and at her baptism in Constantinople (955), changed her original name, Olga, into Helena. She is held in the highest reputation for sanctity in the Russian Church. The other was a native of Skofde, in West Gothland, and lived in the 12th century.

HELE'NA, ST, perhaps the best known of all the lonely islands in the world, is situated in the Atlantic, in lat. 15° 55′ S., and long. 5° 44′ W. Greatest length of the island, 10½ miles; breadth, 7 miles; area, 47 square miles. Pop. (1871) 6241. It is 850 miles from the nearest land, the island of Ascension, and about a half more from the nearest point of the African continent. The island was discovered in 1502, on St Helena's Day (22d May), whence its name, by the Portuguese navigator Juan de Nova Castella. It afterwards became a Dutch possession, was ceded by Holland about the middle of the 17th c. to the English East India Company, and made over by them to the British crown in 1833. Its value consisted in its being a convenient halting-place on the homeward voyage from India—a value enhanced by the fact, that the Cape of Good Hope had, ten years previously, been colonised by the Dutch. On the outward voyage, however, it was not available for sailing-vessels, which, under the influence of the easterly trade-winds, could reach it at last only after overshooting it far both to the west and to the south; and this difficulty of access peculiarly fitted it to be the residence of Napoleon Bonaparte, who here lingered in hopeless captivity from 1815 to 1821. The nature of the coast, too, would render a hostile landing next to impracticable, presenting, as it does, either a naturally scarped face of cliffs ranging from 600 to 1200 feet high, or the mouths of ravines protected by forts and other military works. There is one good inlet, called James's Bay, possessing a fine harbour. Here is situated James's Town, the only place of any note in the island.

About 6000 acres—one-fifth of the entire surface—are available for cultivation, but not more than 500 are actually under cultivation; while uplands of volcanic origin, rising in Diana's Peak, in the centre of the island, to the height of 2700 feet, feed large numbers of goats. There are several plains, the largest of which is Longwood, where stands the house in which Napoleon lived. Supplies of provisions, properly so called, are mostly imported, more especially for the resident population.

HE'LENSBURGH, a rising town and favourite watering-place of Scotland, in the county of Dumbarton, is pleasantly situated on the right bank of the Firth of Clyde, opposite Greenock, from which it is four miles distant, and 23 miles west-north-west of Glasgow by railway. It was founded in 1777 by Sir James Colquhoun, and named after his wife Helen. In 1858, direct railway communication was opened up between H. and Dumbarton and Glasgow, and since that time the town has greatly increased. Pop. (1871) 5975; but in summer, the numbers are nearly doubled.

HELI'ACAL RISING (from Gr. *helios*, the sun). A star is said to rise heliacally when it rises just before the sun. When the sun approaches a star which is near the ecliptic, the star becomes for a season invisible—the heavens being too bright in the quarters of sunrise and sunset, at the times of its rising and setting, to allow it to be seen. But when the sun, progressing in its orbit, separates from the star, and the latter begins to rise first, it in time rises so much earlier than the sun, as just to be visible before daylight. It is then said to rise heliacally.

HELIA'NTHUS. See JERUSALEM ARTICHOKE, and SUNFLOWER.

HELI'CIDÆ (Gr. *helix*, a spiral), a large family of gasteropodous molluscs, of the order *Pulmonata*, and of which Snails (q. v.) are familiar examples. The order is distinguished by having part of the mantle cavity formed into an air-sac or lung. The H. are land molluscs. They have a spiral shell, into which the body of the animal can be withdrawn. Most of the species pretty much resemble the common snails in their habits, feeding on vegetable substances of various kinds, and often proving troublesome to the farmer and gardener.

HE'LICON, a mountain, or rather a mountain-range in the south-west of the province of Bœotia, in Greece, may be regarded as a continuation of the range of Parnassus. It was celebrated by ancient poets as the favourite seat of the Muses. The loftiest summit (now called Paleovúni) is about 5000 feet high. At the bottom of H. stood the village of Ascra, the residence of Hesiod, and the seat of the earliest school of poetry in Greece. In ascending the mountain from Ascra (now Pyrgáki), the traveller passes the famous fountain of Aganippe, the waters of which were fabled to bestow inspiration. The Grove of the Muses is supposed to have been situated in a hollow at the foot of Mount Mirandáli, one of the summits of Helicon. Leake considers that its site is now occupied by the church and convent of St Nicholas. Twenty stadia above this was the fountain of Hippocrene, probably the modern Makariotissa, where there is still a fine spring.

HE'LIGOLAND, or **HELGOLAND** (Holy Land), a small island in the North Sea, belonging to Great Britain, is situated about 35 or 40 miles north-west of the mouth of the Elbe, in lat. 54° 11′ N., and long. 7° 53′ E. It is about a mile long from north to south, and one-third of a mile from east to west, one-fifth of a square mile in superficial area, and about 2¼ miles in circumference. The island consists of an upper and a lower quarter; the former, 'The Oberland,' is a rock 200 feet in height, and 4200 paces in circumference, on which stands a town of 350 houses, and 1913 inhabitants; the latter, 'Sandy Island,' is a patch of shore with 60 houses south-east of the cliff, and communicating with it by a flight of 173 steps. The surging of the sea, which has already greatly diminished the size of the island, is fast consuming its shores, and will probably, at no great distance of time, reduce it to a mere sand-bank. H. has two good ports, one on its north, and another on its south side. The inhabitants are supported chiefly by fishing and commerce, by serving as pilots, and by the strangers who visit H. for the excellent sea-bathing Sandy Island affords. A light-house stands on the cliff near the village. There is also a prison, but it is never occupied. The annual value of the fisheries is about £5000, and the chief products are lobsters and haddocks. H. is an important place in time of war, and commands the German trade in the North Sea. The island, which was taken by the English from the Danes in 1807, and was formally ceded to them in 1814, has an English governor, but the internal affairs are managed by a council of the islanders. Four batteries, manned by a garrison of British soldiers, are mounted on the cliff. The British establishment maintained on H. costs about £1000 a year. Steam-boats run between this and Hamburg.—H. was anciently sacred to the goddess Hertha, and was the island to which the tribe of the Angli, who inhabited the mainland opposite, went to perform religious rites in her honour. On a map discovered by Sir William Gell, the situation of many temples, villages, and large tracts of country, are delineated, all of which were swallowed up by the sea, between 700 A.D. and 1200 A.D., according to D'Anville. The sea continued its encroachments, and, before the end of the 17th c., had submerged several churches and monastic establishments. Christianity was first preached here by St Willibrod in the 7th c., after whose time the island received its present name. Before this, it was called Fosetisland, from the Frisian goddess, Foseta, who had a temple here. The inhabitants of H. are divided into two classes, differing both in race and occupation—the one being fishers, the other merchants, cultivators, &c. The first are Frisians, and, true to the habits of their ancestors, the Sea-kings of old, hold land-labour in utter contempt: they are bold and hardy sailors, and display great patience and endurance under privation. The merchant class consists of immigrants from Hamburg and other places on the mainland, or their descendants. The Frisian delights to call himself 'an Englishman,' but will by no means allow that title to his neighbour the merchant. The Frisians are a tall, muscular race, simple in their habits; while their marriage and funeral ceremonies are primitive in the extreme.

HELIOCE'NTRIC, a term in Astronomy, signifying that the sun (Gr. *helios*), is taken as the centre of reference or view. It is opposed to geocentric, which means that the earth is taken for centre. Thus, the heliocentric place of a planet is its place as seen from the sun: its geocentric, its place as seen from the earth.

HELIODO'RUS, the earliest and best of the Greek romance writers, was born at Emesa, in Syria, in the 4th c. A.D. He says that he belonged to a family who were priests of the sun, but he was himself a Christian, and became Bishop of Trikka, in Thessaly. The time and place of his death are not known. The work by which he is known is entitled *Æthiopica*. It was written in his youth, and extends to ten books. It narrates in poetic prose, at times with almost epic beauty and simplicity, the loves of Theagenes and Charicleia. The work is distinguished from the later Greek romances not more by its original vigour than by its pure morality. The best editions are those of Mitscherlich in his *Scriptores Græci Erotici* (1799), and the Greek Coraës (Paris, 1804). The *Æthiopica* has been translated into most modern languages.

HELIOGA'BALUS. See Elagabalus.

HELIO'METER, 'sun-measurer' (from *helios*, the sun, and *metron*, a measure), is an instrument invented by M. Bouguer in 1747, by means of which the diameters of the heavenly bodies can be measured with great accuracy. As improved by Dolland, the object-lens of the instrument is in two halves, each of which will form a perfect image in the focus of the eye-piece; and the images may be made to diverge, coincide, or overlap each other, by varying the distance between the half-lenses. If the diameter of the sun is to be measured, the two lenses are adjusted so that the images may touch each other, then the distance between the centres of the two object-glasses measured in seconds gives the diameter of the sun. The merit of the discovery of this instrument was contested by Mr Servington Savery, who had submitted a similar instrument to the Royal Society of London in 1743. Fraunhofer has made many remarkable improvements on this instrument.

HELIO'POLIS SY'RIÆ. See Baalbek.

HE'LIOS, the Greek name of the sun (corresponding to the Roman *Sol*), who was looked upon and worshipped as a god. He was, according to Homer, a son of the Titan Hyperion, and of Theia or Euryphaëssa, and is described by the same poet as giving light both to gods and men. He rises in the east, from the marshy borders of Oceanus, into whose dark abysses he also sinks at evening. The later poets, however, give him a splendid palace in the east, somewhere below Colchis, and describe him as being conveyed, after the termination of the burning labours of the day, in a winged boat of gold, along the northern coasts of the sea back to Colchis. After the time of Æschylus, he began to be identified with Apollo or Phœbus, but the identification was never fully carried out.

His worship was widely spread. He had temples in Corinth, Argos, Trœzene, Elis, and many other cities, but his principal seat was Rhodes, where a four-team was annually sacrificed to him. In addition, it was customary to offer up white lambs or boars on his altars. The animals sacred to him were horses, wolves, cocks, and eagles. Sculpture represents him, for the most part, as riding in his chariot, drawn by four horses.

HE'LIOTROPE (*Heliotropium*), a genus of plants of the natural order *Boragineæ* (q. v.); of the section, sometimes made a distinct order, *Ehretiaceæ*, the fruit separating only when ripe into four carpels. Many of the species have fragrant flowers. The Peruvian H. (*H. Peruvianum*), a small shrub, seldom more than two feet high, with oblong-lanceolate wrinkled leaves, and small lilac-blue flowers, is in almost universal cultivation for its fragrance, which resembles that of vanilla. The European or Common H. (*H. Europæum*), a native of the south and west of Europe, is an annual with small white, or rarely pale red, flowers. Important healing powers were once erroneously ascribed to it in cases of cancerous and scrofulous sores; it is, however, astringent and mucilaginous. Many hybrid heliotropes are now to be seen in flower-gardens and green-houses, exhibiting great variety in the size and colour of their flowers. They delight in a rich, light soil. The shrubby kinds are generally propagated by cuttings. Large quantities of the flowers are used by perfumers for making scents.—Classical fable accounts for the name H. (Gr. *helios*, the sun, and *trepo*, to turn), by representing Clytia as turned into this flower through gazing at Apollo.

HELIOTROPE and HELIOSTAT, names applied to instruments used by surveyors for rendering distant stations distinctly visible. This is managed by placing a mirror at the distant station, and adjusting it so that at a particular hour of the day (arranged beforehand), the light of the sun shall be reflected from the mirror directly to the surveyor's station. The surveyor must make his observation almost at the instant he sees the glancing of the mirror, as the constant change of the sun's position in the heavens produces a corresponding change in the direction of the rays reflected by the mirror. Gauss (q. v.) invented such an instrument about 1821, which is used abroad, especially in America, for geodetic surveys, and is said to possess such power, that a mirror one inch square is visible eight miles off, in average sunny weather, and appears as a brilliant star at a distance of two miles; while some heliotropes have been used so powerful as to be visible nearly 80 miles off. The term Heliostat, applied by Captain Drummond to an instrument invented by him for the same purpose, more properly belongs to an instrument invented by S'Gravesande, consisting of an equatorial revolving on its polar axis, so that the sun, when once accurately in the focus of the telescope, continues *steadily fixed* there. Drummond's heliostat is chiefly used in Britain.

HELIOTROPE, or BLOODSTONE, a variety of chalcedony or of jasper, of a green colour with red spots. The finest heliotropes consist of chalcedony, and are translucent, at least at the edges; the jasper bloodstones are opaque. H. is found in many parts of the world, as in Scotland, but the finest specimens of this mineral are brought from the southern parts of Asia. It was well known to the ancients, who obtained it chiefly from Ethiopia and Cyprus. It is much used for boxes, seals, &c.; and those specimens are most valued in which the ground colour is beautiful, and the spots bright and well distributed. It was much used in the early ages of the Christian Church for the engraving of sacred subjects, the figures being so managed that the red spots should represent drops of blood. Different accounts are given of the origin of the name H., none of them satisfactory.

HELL (Heb. *Sheol*, Gr. *Hades*, Sax. *Hell*, Ger. *Hölle*), originally a cavern or deep and dark abyss, and sometimes applied (as Gen. xxxvii. 35; Job xiv. 13) to the grave, is commonly used to signify the place, or the condition after death, of the souls of those who, having failed during life to fulfil the essential obligations imposed by the natural or the positive divine law, are consigned to a state of punishment or purgation. With the same unanimity which has existed as to a state of reward after death (see Heaven), almost all the various religions, whether ancient or modern, number among their most prominent doctrines the belief of a state of punishment after death—the nature of which is variously modified according to the peculiar tenets of each religion—for unexpiated guilt. Among early Christian writers, the word hell is variously employed, sometimes to signify a place of temporary purgation, in which sense it comprehends the Roman Catholic Purgatory (q. v.); sometimes the place (*Limbus Patrum*) in which the souls of the just of the old law awaited the coming of Christ, who was to complete their felicity; sometimes the place in which unbaptized children are believed to be detained, on account of the stain of unremitted original sin; and lastly, the prison of those who die stained with the personal guilt of grievous sin. Many controversies, which would be entirely out of place here, have arisen about the details of this doctrine, as to the place, the nature, and the duration of the punishment of hell. It will be enough to say that, although according to the literal sense of more than one passage of Scripture, and the popular notions of the various Christian communities, the place of hell would seem to be assigned to the interior abysses of the earth, or to the depths of the intermundane spaces, yet even the formularies of the Roman Catholic Church, with all their rigorous precision of detail, and still more those of other communions, have abstained from any formal declaration as to the locality of the punishment of the damned. As to the nature of the punishment to which they are subjected, whether it is confined to the 'pain of loss'—that is, to the remorseful consciousness of having forfeited the presence of God, and the happiness of heaven—or whether and to what degree it further includes the 'pain of sense,' there is some difference between the Eastern and the Western churches, and it is sometimes alleged that the Eastern Church altogether rejects the idea of punishment of sense. This, however, is a mistake; both churches agree that the punishment of hell includes the 'pain of sense,' the controversy between them having regarded not the existence of the pain of sense, but certain questions as to its nature, and especially whether it consists in material fire, a point which, in the decree for the union of the Greek and Latin Churches at the council of Florence, was left undecided. The controversy on the subject of the eternity of the punishment of hell dates from an early period, Origen and his school having taught that the punishment of hell was but purgatorial in its object; that its purifying effect having once been attained, the punishment would cease for all, even for the devils themselves; and that its duration in each case is proportioned to the guilt of the individual. This doctrine of the final restoration of all to the enjoyment of happiness, was the well-known Origenistic theory of the *apocatastasis*, to which so many of the early writers refer. It was rejected, however, by the common judgment of antiquity, and was formally condemned by the second council of Constantinople—a condemnation founded on the literal sense of many passages of the Scripture (see Matt. xviii. 8; xxv. 41 and 46; Mark ix. 43; Luke iii. 7; 2 Thess. i. 9; Apoc. xx. 10, &c.); and in the controversies between the Eastern and Western churches, on the subject of the punishments of hell, the belief of their eternity, in the most strict sense of the word, was always recognised as a common doctrine of both. In the New Testament, the name *Gehenna* is frequently used to designate the place of punishment of the damned (see Matt. v. 22, 29, 30; x. 28; xviii. 9; xxii. 13; Mark ix. 43; Luke xii. 5; James iii. 6). The latter word, indeed, unlike the Hebrew *Sheol* and the Greek *Hades*, is never found in any other signification than that of the place of punishment of the sinner after death.

HELL GATE, or **HURL GATE**, named by the Dutch settlers of New York *Helle Gat*, is a dangerous pass in the East River, between Great Barn Island and Long Island, east of the centre of New York Island, United States, America. At certain stages of the tide, there are whirlpools which used to throw becalmed vessels on pointed rocks, but these rocks have lately been removed, and the navigation rendered safe, by a new method of blasting, which consists in merely sinking the powder on to the rock, and exploding it by an electric spark.

HE'LLAS, the original home of the Hellenes, according to the received opinion, was first a town, and afterwards, under the name of Phthiotis, a well-known district of Thessaly. The ancients also sometimes applied this name to the whole of Thessaly. With the spread of the Hellenic people southwards, the term embraced a gradually increasing territory, until it came to denote the whole of Middle Greece or Greece Proper (modern *Livadia*). At a still later period, the Peloponnesus itself was included under the designation; and finally, H. came to be used in the broadest sense, as comprehending the whole of Greece, with its islands and colonies.—The Hellenes, or Greeks, as distinguished from the more ancient Pelasgians, received this name in the belief that they were descended from a certain Hellen. This mythical personage, a son of Deucalion and Pyrrha, or, according to others, of Zeus and Dorippe, and the father of Æolus, Dorus, and Xuthus, was said to have been king of Phthia, and to have ruled over all the country between the rivers Peneius and Asopus.

HE'LLEBORE, a name applied to two very different genera of plants. The genus to which it more properly belongs, and to which it has belonged, since very ancient times, *Hellebŏrus*, is of the natural order *Ranunculaceæ*, and is characterised by a calyx of 5 persistent sepals, often resembling petals; a corolla of 8 or 10 very short, tubular, honey-secreting petals; numerous stamens and 3—10 pistils; a leathery capsule, and seeds arranged in two rows. The species are perennial herbaceous plants, mostly European, generally with a short root-stock; the stem mostly leafless, or nearly so, but sometimes very leafy; the leaves more or less evergreen, lobed, the flowers terminal. A familiar example of this genus is the Black H.—so called from the colour of its roots—or Christmas Rose (*H. niger*), a favourite in our flower-gardens, because its large white flowers are produced in winter. The leaves are all radical; the stalks generally one-flowered; the flowers white or tinged with red. Black H. formerly enjoyed a higher reputation as a medicinal agent than it now possesses. Melampus is represented as employing it in the treatment of madness centuries before the Christian era. The root is the part used in medicine, and it is imported into this country from Hamburg, and sometimes from Marseille. It consists of two parts—the rhizome or root-stock, and the fibres arising from it. The former is nearly half an inch thick, several inches long, and knotty, with transverse ridges and slight longitudinal striæ; the latter are numerous, cylindrical, brown externally, and whitish internally. The taste is slight at first, then bitter and acrid. The chemical composition of the root is not very accurately known. It is not much employed at the present day, but it has been found of service (1) in mania, melancholia, and epilepsy; (2) as an emmenagogue; (3) in dropsy—its action as a drastic purgative, and its stimulating effect on the vessels of the liver, rendering it useful; (4) in chronic skin diseases; and (5) as an anthelmintic. Ten or fifteen grains of the powdered root act as a sharp purgative. The tincture, which is obtained by maceration in spirit, is usually given when its action as an emmenagogue is required. In an excessive dose, it acts as a narcotic acrid poison, and causes vomiting, purging, burning pain in the stomach and intestines, faintness, paralysis, and death.—Stinking H. (*H. fœtidus*) grows on hills and mountains in the south and west of Europe, in some of the chalk districts of England, and in several places in Scotland. It has a very disagreeable smell, and green flowers somewhat tinged with purple. The stem is many-flowered and leafy.—Green H. (*H. viridis*), also found in the chalk districts of England, has a leafy stem, with a few large greenish-yellow flowers. The celebrated H. of the ancients was probably a species peculiar to Greece and the Levant, H. *orientalis* or H. *officinalis*; all the species, however, have similar medicinal qualities. From the abundance of the plant around the city of Anticyra, hypochondriacal persons were said to need a visit to Anticyra.—Closely allied to the genus *Helleborus* is *Eranthis*, in which the flowers are surrounded with an involucre, and have a deciduous calyx. A well-known species is the Winter H., or Winter Aconite (*E. hyemalis*), of our gardens, whose yellow flowers, raised only a few inches above the ground, deck the flower-border about the same time with snowdrops. It is a native of the midland parts of Europe, but

Christmas Rose (*Helleborus niger*).

naturalised in many parts of Britain. It loves shady places.

White H. (*Veratrum album*) belongs to the natural order *Melanthaceæ*. The genus has polygamous flowers, with 6-leaved perianth, 6 stamens, 3 pistils cohering at the base, a 3-horned capsule separating into 3 many-seeded follicles, and compressed seeds winged at the apex. White H. has a leafy stem, sometimes 4 feet high, ovate-oblong leaves, a long terminal compound panicle, and yellowish-white flowers. It abounds in the mountains of the centre and south of Europe, but is not found in Britain. The root was once much used in medicine, but now rarely, although it seems to act powerfully in some diseases. It is a very acrid and active poison. Its powder is used to destroy lice, and by gardeners for killing caterpillars. A decoction and ointment of it are sometimes used in itch and ring-worm. Caution is necessary even in handling the powder of White H., and very unpleasant effects ensue from its getting into the eyes or nose.—American H., or Swamp H. (*V. viride*), known also as Indian Poke or Itch Weed, is frequent in damp grounds from Canada to Carolina. Its root has properties similar to those of white hellebore. These properties seem to depend chiefly on an alkaloid called *Veratria*.

HE'LLENIST (Gr. *Hellenistes*), the name given to those among the Jews, and afterwards in the Christian Church of Judea, who, either by birth or by residence, and by the adoption of the Greek language, manners, and usages, were regarded as Greeks, in opposition to the Hebrews properly so called, whether of Palestine or of the Dispersion. The name has sometimes been improperly restricted to persons of Greek parentage or descent; but like other Gentile names of the same form, it marks a class distinguished by the peculiar habits and language of Greece rather than by Greek descent. The Hellenists, in this sense, formed a distinct body, and stood in a relation of rivalry, if not of antagonism to the Hebrews (see Acts vi. 1, and ix. 29). There is also a clear distinction between Hellenes (Greeks—from Hellas, q. v.) and Hellenists. The latter might, it is true, be Hellenes by birth, but the prominent idea conveyed by the name was rather the adoption or affectation of Greek manners and language than Greek parentage or blood.

At the time of our Lord's crucifixion, the Jews of the Dispersion were to be found in almost every part of the Roman empire; but it was among the Jews settled in Alexandria that the Hellenising tendency found its freest development; and it is to that city that we must refer the formation as well of that peculiar dialect of the Greek language which is known as the Hellenistic, as of that singularly acute and speculative philosophy which exercised so large an influence on those early Christian schools, of which Origen is the most famous exponent.

The really characteristic element of the Hellenistic Greek consists in its foreign, and especially its Hebrew and Aramaic words and idioms. Although it was in its origin a purely popular form of the language, yet its being employed in the Alexandrian or Septuagint version of the Old Testament, has given to it all the fixedness and definite character of a written language. The Hellenisms of the Septuagint differ in many respects from those of the New Testament, which again present some points of discrepancy with those of the Alexandrian Fathers; but there are certain leading characteristics common to them all, which constitute the distinctive forms of the dialect, and which may also be described as peculiarities of structure and forms of thought derived from those Hebrew or Aramaic idioms which were the native modes of speech of the Greek-speaking Hebrews.

The influence of the Hellenistic modes of thought on the philosophy of the Alexandrian schools will be traced under the head of the Neo-platonic Philosophy.—See Frankel, *Monatschrift* (1855); also Winer, *Grammatik des N. Test. Sprachidioms* (2d edition).

HE'LLESPONT. See Dardanelles.

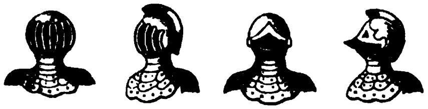
HELLEVOETSLUI'S, or **HELVOETSLUY'S**, a well-known fortified seaport of the Netherlands, in the province of South Holland, is situated on the Haring Vliet, an arm of the Maas, on the island of Voorne, 17 miles south-west of Rotterdam. It has an excellent harbour, as well as an arsenal, docks, and a naval school, and is one of the principal Dutch naval stations. By means of the New Canal of Voorden, leading from the Maas to H., and so out to sea, large vessels avoid the shallow bar at the mouth of the Maas. H. is to Rotterdam and the mouth of the Maas what the Helder is to Amsterdam and the Zuider Zee. Here William III. embarked for England, November 11, 1688. Pop. 3000.

HELLI'N, a town of Spain, in the province of Albacete, and 40 miles south-south-east of the town of that name, is situated in a hilly district near the eastern bank of the Mundo, a tributary of the Segura. Its houses are for the most part neatly painted, and, unlike most Spanish towns, it has an air of comfort and cleanliness. In the vicinity are productive royal sulphur mines. Pop. 10,200.

HELM, in Nautical Affairs, denotes the entire steering apparatus of a ship. This apparatus consists of three distinct portions—the rudder, the tiller, and the wheel; although in boats and small vessels the wheel is ordinarily dispensed with. The rudder is the instrument acting directly upon the water, and its mode of action and form will be described under Rudder (q. v.). The tiller is a lever, formed into a handle, by means of which the steersman can greatly multiply on the rudder (the position of which is almost identical with the fulcrum, the hinges) the power he exerts against the long end of the tiller. The wheel is an ordinary wheel and axle, moving the long end of the tiller from side to side by the agency of ropes, again multiplying the power, and being otherwise convenient as occupying a smaller space on the upper deck than the long tiller (in this case below) would have taken. The principles of Steering (q. v.) will be given under that head. To 'put up the helm,' is to let the ship go more fully from the wind; while to 'put down the helm,' is to exercise a contrary effect, and to bring up the ship's head to the wind.

HELMET, in Heraldry. From the early simple form known as the Norman, the helmet, at a later period, came to vary in shape according to the degree of the person who wore it, and helmets were set over coats of arms to bear the crest, and indicate by their form the rank of the bearer. The part of the helmet which opens to shew the face is called the *visor* or *beaver* (to allow of drinking). The following forms of helmet are in use in English

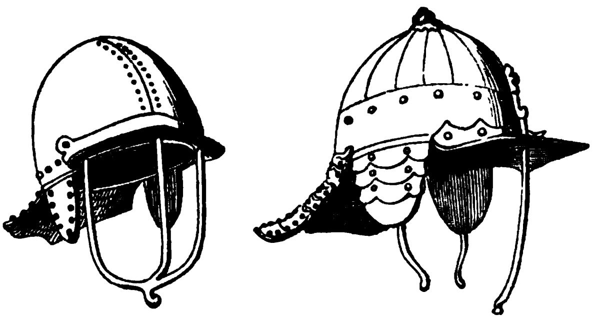
Helmets.



1 King. 2 Noble. 3 Knight. 4 Esquire.

heraldry: 1. The helmet assigned to the king and princes of the blood-royal, which is full-faced, composed of gold lined with crimson, and has the visor divided by six projecting bars. 2. The helmet of the nobility, of steel, with five bars of gold. When placed on the shield, it is exhibited in profile. 3. Knights and baronets have the full-faced steel helmet with the visor thrown back and without bars. 4. The helmet of esquires, always represented in profile, of steel with the visor closed. These distinctions are of comparatively recent date. A much greater variety of helmets is in use in continental heraldry. A helmet is never placed over the arms of any woman except the sovereign.

HELMET, a covering of metal or leather to protect the head in warfare. The earlier Greek and Roman helmets, as shewn by many extant sculptures, were surmounted by plumes, but unlike their modern successors, did not protect the face. During the middle ages, helmets were made of the finest steel, often inlaid with gold, and provided with bars and flaps, to cover the face in action, and to allow of being opened at other times. As the employment of firearms became more general, helmets naturally lost their utility, especially as regarded the face. Those still remaining are in military matters limited for the most part to heavy cavalry, afford no protection to the face, and must be considered as rather for ornament than use. Firemen wear a heavy head-piece of leather and brass, to protect them as far as possible from falling ruins at conflagrations. In India and other hot climates, helmets of white felt, with the additional screen of rolls of linen, are constantly worn by military men, to protect them from the rays of the sun.



Helmets, 1645:
From a Specimen at Goodrich Court, engraved in Skelton's *Armour*.

HELMHOLTZ, Hermann, one of the most distinguished scientific men of the present day, was born at Potsdam, in August 1821. He was at first a surgeon in the army, then assistant in the Berlin Anatomical Museum, and was a professor of physiology, from 1849 at Königsberg, from 1855 at Bonn, and from 1858 at Heidelberg. In 1871, he became professor of physics in Berlin. H. is equally distinguished in physiology and in experimental and mathematical physics. His physiological works are principally connected with the eye and the nervous system. Thus, we have his exhaustive treatise on Physiological Optics, his Speculum for the Examination of the Retina, his Discourse on Human Vision; and various papers on the means of measuring small periods of time, and their application to find the rate of propagation of nerve-disturbances. Of a semi-physical nature we have his Analysis of the Spectrum, his explanation of Vowel Sounds (*Klangfarbe der Vocalen*, see Sound); and his papers on the Conservation of Energy with reference to Muscular Action. In physical science, he is best known by his paper on Conservation of Energy (*Ueber d. Erhaltung d. Kraft*, 1847, translated [badly] in Taylor's *Scientific Memoirs*, New Series); a popular lecture on the same subject (1854); and by two memoirs in Crelle's *Journal*, on Vortex-motion in Fluids, and on the Vibrations of Air in open pipes. His *Populäre wissenschaftliche Vorträge* appeared in 1871.

HELMINTHO'LOGY (Gr. *helmins*, a worm, and *logos*, a discourse) is a term formerly used to denote the science of the natural history of worms generally, but now restricted to the red-blooded worms, such as the medicinal leech and earth-worm.

HELMONT, Jan Baptista Van, Lord of Merode, Royenborch, Oorschot, and Pellines, an eminent Belgian chemist, was born at Brussels in 1577, and died near Vilvorde in 1674. He went through the regular course of study at the university of Louvain, and on the completion of his education, he was offered and accepted the chair of surgery in that university, the duties of which he discharged for two years. The study of the works of Paracelsus seems to have turned his special attention to chemistry and natural philosophy, and in the pursuit of these sciences he spent several years in the different universities of Italy and France; after which he returned home, married Margaret van Ranst, a noble lady of Brabant, and settled down at his estate near Vilvorde, where he spent the remainder of his life in philosophic investigations of various kinds. It would be impossible, in the limits of this article, to sketch even an outline of his chemical discoveries. Writers of the history of chemistry regard him as the greatest chemist who preceded Lavoisier; and it is much to be regretted that his language is often so obscure, that it is not always easy to ascertain his meaning. He was the first to point out the imperative necessity for employing the balance in chemistry. He paid much attention to the study of the gases, and is supposed by some authorities to have been the first to apply the term *gases* to elastic aeriform fluids. Of these gases he distinguished several kinds. He was also the first to take the melting-point of ice and the boiling-point of water as standards for the measurement of temperature. By means of the balance he shewed, in many instances, the indestructibility of matter among chemical changes. For example, he demonstrated that a salt dissolved in water, or silver dissolved in aquafortis, could be recovered unchanged in quantity. It is in his works that the term *saturation* is first employed, to signify the combination of an acid with a base; and he was one of the earliest investigators of the chemistry of the fluids of the human body.

Along with other physiologists of his day, he speculated much on the seat of the soul, which he placed in the stomach. His reasons are chiefly these two: 1. It cannot exist in the brain, because that organ contains (according to H.) no blood; 2. It does exist in the stomach, because when we hear bad news, we lose our appetite. Those who wish to know the full value of his contributions to the knowledge of chemistry, may consult the Histories of Chemistry written by Kopp and Höfer.

The most important of his works is his *Ortus Medicinæ, id est initia Physicæ inaudita, progressus Medicinæ novus in morborum ultionem ad vitam longam*, which was published by his son four years after his death, passed through a very large number of editions, and was translated into Dutch, French, German, and English. A very curious volume, containing translations of some of his works, was also published by W. Charlton, in 1650, under the title of *The Ternary of Paradoxes; the Magnetic Cure of Wounds; the Nativity of Tartar in Wine; and the Image of God in Man.*

HELMSTEDT, a town in the north of Germany, in the duchy of Brunswick, 22 miles east-south-east of the city of that name, was formerly famous for its university, founded here by Julius Duke of Brunswick in 1575, and suppressed by Jerome Bonaparte in 1809. The university buildings now serve as court-houses. Manufactures of flannel, soap, hats, and grain-spirits are carried on. Here the first Saxons were baptized by St Ludgarus. Pop. (1871) 7571. H. was formerly a member of the Hanseatic League.

HELMU'ND, a river of Afghanistan, rises 35 miles to the west of Cabul, at an elevation of 11,500 feet. After a south-westerly course of about 650 miles, it loses itself in the salt lake of Seistan or Hamoon by several mouths, about 31° 30′ N., and long. 62° E. The immediate banks, generally bordered by deserts on either side, abound almost everywhere with traces of former cultivation and wealth. Like tropical rivers in general, the H. varies largely in volume according to the season, being, in many places, thrice as deep and broad in the rainy season as it is at other times.

HELOISE. See Abelard.

HE'LOTS. The population of ancient Sparta was divided into four classes, the lowest of which was formed of serfs or slaves, called Helots (probably meaning *captives*, from Gr. *helein*, to capture). These Helots are generally supposed to have formed the original population of the country, and to have been reduced to bondage by their Dorian conquerors, the numbers, however, being swelled from time to time by the conquest of enemies. They belonged to the state, which had the power to set them at liberty; but they toiled for individual proprietors, and were *bound to the soil*, i. e., they could not be sold away from the place of their labour. They were the tillers of the land (for which they paid a rent to their masters), they served at the public meals, and were occupied on the public works. In war, they served as light troops, each freeborn Spartan who bore heavy armour being accompanied to battle by a number of them, sometimes as many as seven. On rare occasions they were used as heavy armed soldiers. It is a matter of doubt whether after emancipation they could ever enjoy all the privileges of Spartan citizens. They were treated with much severity by their masters, and were subjected to degradation and indignities. They were whipped every year, to keep them in mind of their servile state; they were obliged to wear a distinctive dress (clothes of sheep-skin, and a cap of dog's skin), and to intoxicate themselves, as a warning to the Spartan youth; and when multiplied to an alarming extent, they were often massacred with the most barbarous cruelty. On one occasion, 2000 of them, who had behaved bravely in war, were encouraged to come forward for emancipation, and were then most treacherously put to death. The Spartans organised, as often as necessity required, *secret service companies* (Gr. *crypteia*) of young men, who went abroad over the country armed with daggers, and both by night and day assassinated the unfortunate Helots, selecting as their special victims the strongest and most vigorous of the oppressed race.

HELPS, Sir Arthur, K.C.B., an English essayist and historian, was born about 1817; and was entered at Trinity College, Cambridge, where he took the degree of B.A. in 1835. On leaving the university, he obtained a post in the civil service, and on his resignation, he retired to Bishop's Waltham, in Hampshire, where, in the possession of ample means, he enjoyed lettered ease. His first work of consequence, entitled *Essays Written in the Intervals of Business*, appeared in 1841. It was followed by two dramas, *Catherine Douglas*, and *King Henry the Second* (published in 1843), by an essay on the *Claims of Labour* (1844), and by *Friends in Council* (1847—1849). This last work has been, and still is, much admired by the selecter class of readers, and has gone through many editions. His *Conquerors of the New World and their Bondsmen* appeared in 1848, and *Companions of my Solitude* in 1851. Among his subsequent works are—*Oulita*, a play; *The Spanish Conquest in America* (1855—1857); *Friends in Council*, 2d series (1859); *Essay on Organisation; Life of Pizarro* (1869); *Casimir Maremna*, and *Brevia* (1870); *Life of Hernando Cortes; Thoughts upon Government* (1871); *Life and Labours of Thomas Brassey* (1872); and *Social Pressure* (1874). He was clerk to the Privy Council, and became a K.C.B. in 1872. He died in 1875.

H. is the most delightful essayist since Lamb and Hunt. He everywhere exhibits acuteness, humour, a satire which gives no pain, and a quiet depth of moral feeling manifesting itself mainly in an earnest recognition of man's social responsibilities; while his style, in qualities of purity and clearness, can hardly be matched amongst his contemporaries.

HE'LSINGFORS, a fortified seaport of Russia, capital of the government of Finland, and after Cronstadt, the most important naval station on the Baltic, is beautifully situated on a peninsula, surrounded by islands and rocky cliffs, in the Gulf of Finland, 191 miles west from St Petersburg by sea. A series of formidable batteries, called the fortifications of Sveaborg, and consisting of seven strongly fortified islands and numerous islets, protect the entrance to the harbour, and are of such strength, and so well appointed, as to warrant the application to them of the name of the Northern Gibraltar. The whole front presented by the successive works is about a mile in length, and, besides the casemates for small-arms, the united fortresses mount about 1000 guns, and are garrisoned by 12,000 men. The harbour itself is further defended by two forts. H. is the largest and handsomest town of Finland; the broad streets, consisting of houses painted externally yellow and green, intersect at right angles, and there are several fine public squares. Of the public buildings, the most striking are the residence of the governor, the senate-house, and the university buildings. The university, removed hither from Abo in 1829, where it had been founded in 1640, comprises five faculties, has 60 professors, and generally about 600 students. In connection with it are a library of 80,000 volumes, a hospital, a botanic garden, and a valuable observatory. Since 1840, H. has been a favourite bathing-place, and attracts many visitors during summer from St Petersburg. The town carries on a considerable trade in Baltic produce; it exports chiefly corn, fish, deals, and iron; and manufactures sailcloth and linen. Pop. (1867) 25,535, including the garrison.

H. was founded by Gustavus I. of Sweden in the 16th c., but the site of the town was removed nearer the shore in 1639. In 1819, it became the capital of Finland. During the late Russian war, Sveaborg was bombarded for two days and nights (9th and 10th August 1855) by a section of the allied fleet, without any material impression being made upon the forts.

HELST, Bartholomew van der, a Dutch painter, was born at Haarlem in 1613, and died at Amsterdam in 1670. He attained great celebrity as a portrait-painter, and his works are numerous in Holland; one in particular (in the Chamber of Justice at Amsterdam), representing thirty full-length figures of a train-band with the Spanish ambassador in the midst, was pronounced by Sir Joshua Reynolds to be 'the first picture of portraits in the world.'

HE'LSTONE, an old market-town and municipal and parliamentary borough in the county of Cornwall, England, is pleasantly situated on an elevation, at the head of a pretty valley opening to the sea, about 10 miles west-south-west of Falmouth. It was made a borough by King John in 1201, and from the reign of Edward I. to the passing of the Reform Act, it sent two members to parliament; since that, one only. May-games, or *Floralia*, once common throughout England, are still kept up here. Pop. (1871) 8760.

Helvella Esculenta.

HELVE'LLA, a genus of fungi, of the order *Ascomycetes* (see Fungi), closely allied to morels, but differing from them in having the *pileus* turned downwards, lobed and folded, and the surface of the *hymenium* even. Some of the Helvellæ are edible, and much used in Germany.

HELVE'LLYN, one of the highest mountains of England, in the lake district, Cumberland, between Keswick and Ambleside. It is 3055 feet high, is easy of ascent, and commands magnificent views of the surrounding country.

HELVE'TIC CONFESSIONS. See Creeds and Confessions.

HELVE'TII, a Celtic people inhabiting, according to Cæsar, the region between the mountains of Jura on the west, the Rhone on the south, and the Rhine on the east and north, the region corresponding pretty closely with modern Switzerland. They had 12 towns and 400 villages. The great and fatal event in their history is their attempted irruption into and conquest of Southern Gaul, in which they were repulsed by Cæsar with frightful slaughter. The story of this expedition is circumstantially narrated by the Roman commander. They collected three months' provisions, burned their twelve cities, 400 villages, and all isolated dwellings, and made a general rendezvous by Lake Leman in the spring of 58 B.C. Cæsar hastened to Geneva, destroyed the bridge, raised two legions in Cisalpine Gaul, and when the Helvetians sent delegates to demand a passage, delayed them until he had built a wall along the Rhone, 16 feet high and about 19 Roman miles in length, flanked with redoubts. Having vainly attempted to pass this barrier, the H. took another route, but were followed and defeated with a terrible slaughter at Bibracte (modern Autun, in Burgundy), and the remnant obliged to return to their own country, where they became subject to the Romans. Of 368,000 who left their homes, including 92,000 fighting-men, only 110,000 returned. In the commotions which followed the death of Nero, the Helvetians met with another terrible catastrophe. Remaining faithful to Galba, they were fallen upon by Cacina, a general of Vitellius, who gave them to the rapacity of his legions. They were massacred by thousands, multitudes were sold to slavery, and their towns pillaged and burned, their capital destroyed, and their governor executed. From this time they scarcely appear as a distinct people.

HELVE'TIUS, Claude-Adrien, sprung from a family of Swiss origin, as the name Helvetius implies, was born at Paris in 1715, and received a careful education. Intended for a financial career, he was sent, after the conclusion of his studies, to his uncle, D'Armancourt, *Directeur des Fermes*, at Caen, to obtain a practical knowledge of the subject, and at the age of twenty-three was appointed to the lucrative office of *Fermier-Général;* but the oppressive nature of the duties which it involved was not at all to the liking of H., who was of a very humane and easy disposition, and he quickly resigned it for the situation of chamberlain to the queen's household. He now led, like every other courtier of his time, a life of mere gallantry, which looks odious enough at this distance of time; but happily he soon grew tired of it, and after marrying in 1751 the beautiful and accomplished daughter of Comte de Ligneville, he withdrew to a small estate at Voré, where he spent the most of his life in the education of his family, the improvement of his peasantry, and literary labours. In 1758 appeared his celebrated work, *De l'Esprit*, in which he endeavours to prove feeling (*sensibilité*) to be the source of all intellectual activity, and that the grand lever of all human conduct is self-satisfaction. But he admits, at the same time, that self-satisfaction assumes different forms; e.g., the self-satisfaction of a good man consists in the subordination of private to more general interests—first, to the circle among which he lives; then to the community; and, finally, to the world at large. The philosophy of the book is, of course, materialistic. It was denounced by the doctors of the Sorbonne, and condemned by the parliament of Paris to be publicly burned. H. was much disgusted, and in 1764 left France to visit England and Germany, where Frederick II. received him with distinction. He died at Paris, 26th December 1771, leaving behind him a work, *De l'Homme, de ses Facultés, et de son Education*, which was published by Prince Galyzin (2 vols. London, 1772). Among the editions of his collected works, two deserve special notice, both published at Paris in 1795, the one in five and the other in thirteen volumes. His wife, who survived him many years, resided at Auteuil, near Paris, where she was visited by the most distinguished personages, and is often mentioned in the memoirs of that brilliant period.

HEMANS, Felicia Dorothea, an English poetess, was born at Liverpool, 25th September 1794. At an early age she manifested a taste for poetry, in which she was encouraged by her mother. Her first volume was published in 1808, when she was only 14 years of age, and contained a few pieces written about four years earlier; her second, entitled *The Domestic Affections*, appeared in 1812. In the same year she married Captain Hemans of the 4th Regiment, whose health had suffered in the retreat on Corunna, and afterwards in the Walcheren expedition, and who found it necessary a few years after to remove to Italy. After that period they never met. Although five sons were born of this marriage, it was not understood to have been happy. Mrs H. spent the rest of her life in North Wales, Lancashire, and latterly at Dublin, where she died, 26th April 1835. Her principal works are

—*The Vespers of Palermo*, a tragedy (1823); *The Siege of Valencia, The Last Constantine, and other Poems* (1823); *The Forest Sanctuary* (1827); *The Songs of the Affections* (1830); and *Hymns for Childhood, National Lyrics and Songs for Music*, and *Scenes and Hymns of Life.* A volume of *Poetical Remains* was published after her death, and subsequently a complete edition of her works, with a memoir by her sister, was issued by Messrs Blackwood.

Mrs H., without great daring or force, is sweet, natural, and pleasing. But she was too fluent, and wrote much and hastily; her lyrics are her best productions; her more ambitious poems, especially her tragedies, being, in fact, quite insipid. Still, she was a woman of true genius, and one or two of her little pieces, *The Graves of a Household, The Treasures of the Deep, The Homes of England*, and some others, are perfect in pathos and sentiment, and will live as long as the English language.

HEMEROCA'LLIS. See DAY-LILY.

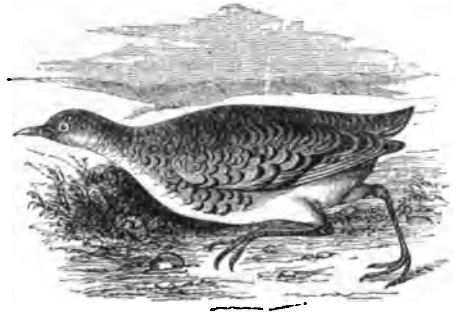
HEMICRA'NIA (Gr. *hemi*, one-half, and *kranion*, the skull; Fr. *migraine;* Eng. *megrims*), a variety of Headache (q. v.), distinguished by its affecting only one side at a time, and also frequently by its intermittent character; whence it has been termed, not very accurately, Brow-ague.

HEMIDE'SMUS, a genus of plants of the natural order *Asclepiadaceæ.* The root of *H. Indicus* is used in medicine, chiefly in India, and is known as Indian sarsaparilla. It is in some cases a good substitute for sarsaparilla, and appears to derive its properties from a crystallisable and volatile principle called *Hemidesmin* or *Hemidesmic* Acid. The plant is a climbing shrub, with leathery leaves and axillary umbels of flowers. It is common in almost all parts of India.

HEMIO'PIA (Gr. *hemi*, one-half, and *ops*, the eye), vision limited to one-half of an object—a peculiar and rare form of disease, very imperfectly understood.

HEMIPLE'GIA (Gr. *hemi*, one-half, and *plēssō*, I strike), Paralysis (q. v.) limited to one side of the face and body, and usually depending upon disease of the brain. Opposed in signification to Paraplegia (q. v.).

HE'MIPODE (*Hemipodius*), a genus of gallinaceous birds, nearly allied to quails, but distinguished by a more slender beak, and by the want of a hind-toe. They are the smallest of gallinaceous birds, and inhabit cultivated grounds and sterile sandy plains in warm countries. One species, the ANDALUSIAN H. (*H. tachydromus*), is found in Spain, Italy, Sicily, Africa, and Australia. Its whole length is about six inches.

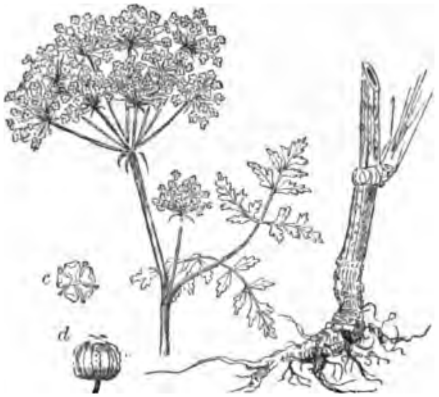


Andalusian Hemipode (*Hemipodius tachydromus*).

HEMI'PTERA (Gr. half-winged), an order of insects, with four wings, a mouth formed for sucking, undergoing imperfect metamorphoses, and having the first pair of wings either of a firm membranous substance without scales, or leathery at their base, and membranous at their tips. Those with the first pair of wings of the former character are the order *Homoptera* (q. v.) of many entomologists; the latter are the *Hemiptera* proper, the section or sub-order *Heteroptera* of Cuvier and others. The wings of the H. proper in general partly overlap each other, and are horizontal or slightly inclined when at rest. Some kinds are wingless, which, however, otherwise exhibit the characters of this order. Some of the H. feed on vegetable, and some on animal juices. The principal changes which they undergo in their metamorphoses are increase of size and development of wings. They are active in all stages. Some of them are aquatic. They are most abundant in tropical countries, and some of the tropical kinds are very splendid. Examples of this order are bugs, water-bugs, boat-flies, and water scorpions.

HE'MISPHERE, the half of a sphere, when it is bisected by a plane passing through its centre.

HE'MLOCK (*Conium*), a genus of plants of the natural order *Umbelliferæ*, having compound umbels of small white flowers, small general and partial involucres, the limb of the calyx merely rudimentary, and a compressed ovate fruit with five prominent wavy ridges and no *vittæ.* The best known and only important species is the COMMON H. (*C. maculatum*), which grows by waysides, on heaps of rubbish, and in other similar situations in Britain and on the continent of Europe, in some parts of Asia, and now also as a naturalised plant in North America and in Chili. It has a root somewhat resembling a small parsnip; a round, branched, hollow, bright-green stem, 2—7 feet high, generally spotted with dark purple; the leaves large, tripinnate, of a dark shining green colour; the leaflets lanceolate, pinnatifid. All parts of the plant are perfectly destitute of hairs, and it is the only British species of the order *Umbelliferæ* which has the stem smooth and spotted with purple. Both the general and partial umbels have many rays. The general involucres consist of several small leaflets; the partial involucres of three small leaflets, all on one side. The whole plant has a nauseous smell, particularly if rubbed or bruised.



Flowers and Root of Common Hemlock (*Conium maculatum*):
c, a flower; *d*, a seed.

The leaves are the only part of the plant employed in medicine. They should be gathered just before the time or at the commencement of flowering, and after the removal of the larger stalks they should be quickly dried by a heat not exceeding 120°. They should then be preserved in perfectly closed tin canisters. As, however, the dried leaves sometimes yield no *conia*, *conylia*, or *coniine* (a volatile alkaloid, which is the active principle in the plant), the fresh leaves are much more certain in their action.

The most important ingredient in H. is the *conia*, which is more abundant in the fruit (seeds) than in the leaves. From 40 lbs. of the ripe but green seeds, Dr Christison obtained two ounces and a half of hydrated conia. As it is volatile, it is obtained by distilling the seeds with water which contains a little potash in solution; conia, then, passes over with the water in the form of a yellowish oil, and when purified by redistillation, it is obtained as a colourless, transparent, oily liquid, having a specific gravity of 0·8, a penetrating, hemlock-like odour, communicating a burning sensation when applied to the tongue, and acting as a very energetic poison. It exhibits a powerful alkaline reaction, and precipitates many metallic oxides from their salts. Strong sulphuric acid causes its compounds to assume first a purple-red and then an olive-green colour; while nitric acid gives a blood-red colour, fading into an orange. Its composition is represented by the formula $C_{16}H_{15}N$. Wertheim has recently discovered a second alkaloid in H., which contains the elements of two equivalents more of water than conia. This substance, whose formula is $C_{16}H_{17}NO_2$, he names *conidrin*. It may be sublimed in beautiful colourless needles, and is much less poisonous than conia.

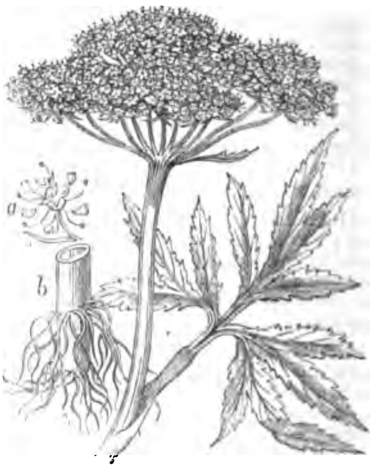
Conia has been introduced into the *Pharmacopœia Norvegica* under the name of *Coniinum*, the dose being from the one-fortieth to the one-sixtieth part of a grain. The following illustrations will give an idea of its activity as a poison: One drop placed in the eye of a rabbit killed it in nine minutes; three drops employed in the same way killed a strong cat in a minute and a half; while five drops poured into the throat of a small dog began to act in thirty seconds, and in as many more, motion and respiration had ceased. It seems to exhaust the energy of the spinal cord, and thus to cause muscular paralysis.

The uses of H. in medicine may be arranged under two distinct heads: 1. Those which depend upon its resolvent and alterative powers; and, 2. Those which have reference to its influence over the nervous system. 1. It has been found useful in mammary tumours and profuse secretion of milk, in bronchocele, in enlargements of the liver, spleen, and pancreas, in scrofulous affections, &c., and at one time had a high reputation in cases of cancer. 2. It is useful as an antispasmodic and anodyne in hooping-cough, spasmodic cough generally, asthma, neuralgia, &c.

In large or poisonous doses it sometimes gives rise to coma (such as opium does), and sometimes to convulsions or violent delirium. Kercher relates the following singular instance of delirium from its use: Two priests ate hemlock-root by mistake; they became raving mad, and fancying that they were geese, plunged into the water. For three years they were afflicted with partial palsy and violent pain.

It may be administered internally in the form of powder (of the leaves), tincture, or extract, while externally it may be applied as a soothing application to ulcers, painful piles, &c., in the form of ointment or poultice. The conia being volatile, often escapes from the powdered leaves and from the extract, and of the three preparations named, the tincture is the best. The *succus conii*, or *Preserved Juice of Hemlock*, prepared by Bentley and other pharmaceutical chemists, is more certain in its action than any of the pharmacopœial preparations.

In cases of poisoning by H., the evacuation of the stomach is the first thing to be attended to. Among the ancient Greeks, poisoning by H. was a common mode of death for condemned criminals, and thus it was that Socrates died; but whether it was the juice of the Common H. or the Water H. that was used, is unknown.—WATER H., or COWBANE (*Cicūta virosa*), is also an umbelliferous plant, of a genus having much vaulted umbels, a 5-toothed calyx, and almost globose fruit, each carpel with five broad flattened ribs and evident single *vittæ*. Water H. grows in ditches, the margins of ponds, and wet grounds in Europe and the north of Asia. It is more common in Scotland than in England. It has a large fleshy white root, covered externally with fibres; an erect much branched stem, 2—5 feet high; tripinnate leaves, with linear-lanceolate regularly and sharply serrated leaflets, no general involucre or only a single small leaflet, partial involucres of many short narrow leaflets, and white flowers. It is a virulent narcotic acrid poison. Serious accidents have occurred from eating the root. Another species, *C. maculata*, is common in North America, growing in marshy places. It has a spotted stem, like that of true H., the name of which it very generally receives in North America. The leaves are tri-ternate, the leaflets ternate. It is a very poisonous plant, and is the cause of many deaths.—*Cicuta*, in Latin, seems to have been the name of the same plant called *Coneion* by the Greeks, but it is not known whether this or the previous plant was so denominated.



Water Hemlock (*Cicūta virosa*):
a, a flower, the petals separated; *b*, root.

HEMLOCK SPRUCE. See FIR.

HEMP (*Can'nabis*), a genus of plants of the natural order *Cannabinaceæ* (q. v.), having the male and female flowers on different plants; the male flowers with 5-partite calyx and 5 stamens; the female flowers with a spathe-like calyx of one leaf, rolled round the ovary and partially split along one side, and two threadlike stigmas. There is only one known species (*C. sativa*), varying considerably, however, from soil, climate, and cultivation. It is an annual plant, a native of the warmer parts of Asia, but has been cultivated in Europe from the earliest historic times, and is now naturalised in many parts of Europe and America. Like flax, it wonderfully adapts itself to diversities of climate, and is cultivated equally under the burning sun of the tropics, and in the northern parts of Russia. It is, however, readily injured by frost, particularly when young; and in many countries where it is cultivated, it succeeds only because their summer is sufficient for its whole life. H. varies very much in height, according to the soil and climate, being sometimes only three or four feet, and sometimes fifteen or twenty feet, or even more. Notwithstanding the nettle-like coarseness of its leaves, it is an elegant plant, and is sometimes sown on this account in shrubberies and large flower-borders. The stem is erect, more or less branched; the leaves are 5—9-fingered. The flowers are yellowish green, small, and numerous; the male flowers in axillary racemes on the upper parts of the plant; the female flowers in short axillary, and rather crowded spikes. The female plants are higher and stronger than the male, for which reason the female plants are popularly known in Germany as *Mastelhopfen*, and the male as *Femelhopfen*, the names being derived from the Latin *mas* and *femella*, and perpetuating an error which probably is as old as the time of the Romans. The stem of H. is hollow, or only filled with a soft pith. This pith is surrounded by a tender, brittle substance, consisting chiefly of cellular tissue, with some woody fibre, which is called the *reed*, *boon*, or *shove* of hemp. Over this is the thin bark, composed chiefly of fibres extending in a parallel direction along the stalk, with an outer membrane or cuticle.

Hemp (*Cannabis sativa*):
A, male inflorescence; B, female inflorescence.

H. is cultivated for its fibre in almost all countries of Europe, and in many other temperate parts of the world; most extensively in Poland, and in the centre and south of European Russia, which are the chief hemp-exporting countries. French H. is much esteemed in the market, as is also that of England and Ireland, of which, however, the quantity is comparatively inconsiderable. *Bolognese H.* and *Rhenish H.* are varieties remarkable for their height; and a fibre of very fine quality, eight or nine feet long, is known in commerce by the name of *Italian Garden Hemp*. In Britain, the cultivation of H. is almost confined to Lincolnshire, Holderness, and a few other districts of England, of which the moist alluvial soil is particularly suited to it. In cultivating H., it is very necessary to have the soil so rich, and to sow the seed at such a season, that the plants shall grow rapidly at first, as they thus form long fibres. A crop of short scrubby H. is almost worthless. The finer kinds of H. are used for making cloth; the coarser, for sail-cloth and ropes. H. sown thin produces a coarser fibre than H. sown thick. Something also depends on the time of pulling, for the crop is pulled by the hand. When a rather fine fibre is wanted, and the seed is not regarded, the whole crop is pulled at once, soon after flowering; otherwise, it is usual to pull the male plants as soon as they have shed their pollen, and to leave the female plants to ripen their seed, in which case the fibre of the female plants is much coarser. The treatment of H., by *retting*, &c., is similar to that of Flax (q. v.). The fibre of H. is generally used for coarser purposes than that of flax, particularly for sailcloth, pack-sheet, ropes, and the caulking of ships.

The seed of H. is produced in great abundance. It is commonly sold as food for cage-birds; and birds are so fond of it, that not only the ripening fields, but the newly sown fields, must be carefully guarded against their depredations. A fixed oil, *oil of hempseed*, is obtained from it by expression, which is at first greenish yellow and afterwards yellow, and has an acrid odour, but a mild taste. This oil is used in Russia for burning in lamps, although the wick is apt to get clogged; also for making paints, varnish, and a kind of soft soap.

H. is cultivated in warm countries, not so much for its fibre as for a resinous secretion, which has narcotic or intoxicating qualities. See HASHISH.

H. is also used as a therapeutic agent under the name of INDIAN H., or BHANG. In this country, it is administered in the form of resinous extract or of tincture; and it is usually prescribed (like opium) for its hypnotic, anodyne, and antispasmodic properties. Although less certain in its action than opium, it possesses these advantages over that drug—that it does not constipate the bowels, create nausea, or check the secretions, and that it is less likely to occasion headache.

The name Hemp (Ger. *Hanf*) is probably derived, along with the Greek and Latin *Cannabis*, from an oriental name, of which one form is the Arabic *Kinnub*. The name H. is often extended with some distinctive prefix to many of the fibres used for ropes and coarse fabrics, a practice which produces not a little confusion. Thus the fibre of *Apocynum cannabinum* (see APOCYNACEÆ) is called CANADIAN H., as well as the plant itself; BOWSTRING H. (q. v.) is the fibre of the species of *Sanseviera;* Sunn (q. v.) is often called SUNN H.; it is also known as BENGAL H., BOMBAY H., MADRAS H., and BROWN H.; JUBBULPORE H. is the produce of another species of *Crotalaria* (q. v.); the fibre of *Hibiscus cannabinus* (see HIBISCUS) is called BROWN H. and DECKANEE H. at Bombay; MANILLA H. or ABACA (q. v.) is the fibre of a *Musa*.

HEMS, HOMS, or HUMS (Lat. *Emesa*), a city of Syria, is situated about a mile east of the right bank of the Orontes, in lat. about 34° 44′ N., long. 36° 43′ E. It is 65 miles north-east of Baalbek and 110 miles west-north-west of Tadmor (Palmyra). It is clean, compactly built, and surrounded by old walls; and although there are now no ancient buildings remaining, the antiquity of the city is attested by numerous fragments of columns, by several Greek inscriptions, and the foundations of ancient baths with specimens of mosaic pavement. In ancient times, it was chiefly celebrated for its splendid temple of the Sun, one of the priests of which, Elagabalus or Heliogabalus, was raised to the imperial throne of Rome. Under the walls of H., Zenobia was defeated by the Emperor Aurelian in 272 A. D. In 636, the city was taken by the Saracens, when its old Semitic name H. was revived; and in 1099 the Crusaders rode through its opened gates. Since then, H. has experienced many vicissitudes of fortune, all of which, however, it has survived, and is now the seat of a flourishing trade, and of several manufactures. Pop. between 20,000 and 30,000.

HEMSTERHUIS, TIBERIUS, a celebrated Dutch philologist, was born at Groningen, 9th January 1685. He became professor of Greek and of history at Leyden in 1740, where he died 7th April 1766. One of the greatest Greek scholars of his time, H. may be said to have created a new school of Greek philology, to which belong his distinguished pupils Ruhnken and Valkenaer. His editions of the *Onomasticon* of Pollux (1706), of the *Select Dialogues* of Lucian (1708 and 1732), and of the *Plutus* of Aristophanes (1744, by Schäfer 1811), are his principal literary works. A beautiful picture of his life is given in Ruhnken's *Elogium Hemsterhusii* (Leyd. 1768 and 1789), republished in Lindemann's *Vitæ duumvirorum T. Hemsterhusii et D. Ruhnkenii* (Leip. 1822). From H.'s MSS., *Anecdota Hemsterhusiana* (1825) have been edited by Geel, and *Orationes et Epistolæ* (1839) by Friedemann.

HENBANE (*Hyoscyamus*), a genus of plants of the natural order *Solanaceæ*, having a five-toothed calyx, an irregular funnel-shaped corolla, and a capsule opening by a lid, and enclosed in the hardened calyx. The species are mostly annual and biennial herbaceous plants, and natives of the countries near the Mediterranean Sea. The only species found in Britain is the COMMON H. (*H. niger*), which is not uncommon in waste places, and in the neighbourhood of towns and villages, particularly in calcareous soils, and on the sandy shores of Scotland. It is an annual or biennial plant, somewhat bushy, about two feet high; with large sinuated or sharply-lobed leaves without leaf-stalks, and large dingy-yellow flowers, with brownish-red or purple veins. The whole plant is covered with unctuous hairs, and has a nauseous smell, which gives warning of its strong narcotic poisonous quality. Cases of poisoning by H. are, however, not rare; but are more frequently owing to the proceedings of quacks, than to any mistake of the plant for an esculent.

Henbane (*Hyoscyamus niger*).

The seeds contain in largest quantity the peculiar alkaloid on which the properties of the plant chiefly depend, *Hyoscyamia* or *Hyoscyamine*, which crystallises in stellated acicular crystals of a silky lustre. The symptoms of poisoning by H. are similar to those produced by other narcotic poisons, and the proper treatment is the same as in cases of poisoning by opium. In medicine, H. is employed both externally and internally. The leaves are the part commonly used: they are gathered and quickly dried when the plant is in full flower. Fomentations of H. are applied to painful glandular swellings, parts affected with neuralgia, &c., and are often found to afford relief. An extract of H. is sometimes employed instead of belladonna to dilate the pupil of the eye. Tincture and extract of H. are often administered in cases of annoying cough, spasmodic asthma, and other diseases requiring sedatives and antispasmodics. H. is also employed to calm mental irritation, and to induce sleep. For many cases, it has one great advantage over laudanum, in not producing constipation. The smoke from the burning seeds of H. is sometimes introduced into a carious tooth, to relieve toothache.

The other species of H. possess similar properties. The dried stalks of *H. albus* are used by smoking in Greece to allay toothache.

HENGST AND HORSA. See ANGLO-SAXONS.

HENGSTENBERG, ERNST WILHELM, a celebrated modern German theologian, was born 20th October 1802, at Fröndenberg, in Westphalia, where his father was clergyman. Prepared by his father for the university, he devoted himself at Bonn chiefly to oriental and philosophical studies, whilst at the same time he took an enthusiastic part in the *Burschenschaften*. Though sympathising thus in his early years with liberal and rationalistic movements in Germany, soon after going to Basel, in 1823, he came under the influence of the missionary institution there, and, before he had begun the professional study of theology, was drawn into the theological tendency which he afterwards represented. Going to Berlin, in 1824, as theological *Privat-docent*, he put himself at the head of a rising orthodox party, and, with most conscientious devotedness, made the scientific defence of their principles the aim of his labours in the university, and through the press. Though known as a theological author only by two little treatises—*Ueber d. Verhältniss d. innern Wortes zum äussern* (1825), and *Ueber Mysticismus, Pietismus und Separatismus* (1826)—he was made, in 1826 extraordinary, in 1828 ordinary professor; and in 1829, doctor of theology. Through the press, his influence was exerted chiefly as editor of the *Evangelische Kirchenzeitung*, which was begun in 1827, and still combats rationalism even in its mildest forms, seeking to restore the orthodoxy and church-discipline of the 16th and 17th centuries. With the same view are written all his principal works; his *Christologie d. A. T.* (3 Bde. 1829—1835; 2te Aufl. 1854—1857); *Beiträge zur Einleitung ins A. T.* (3 Bde. 1831—1839); *Commentar über d. Psalmen* (4 Bde. 1842—1845; 2te Aufl. 1850); *Die Geschichte Bileams u. Seiner Weissagung* (1842); *Das Hohelied Salomonis ausgelegt* (1853); and others are devoted to the defence of the old interpretation and criticism of the Scriptures against the results of modern biblical science in Germany. H.'s influence in ecclesiastical matters also, which was very great during the reign of the late king of Prussia, was employed in the carrying out of the high Lutheran dogmas of the church, of church-offices, and of the sacraments, by persecution of sectaries, by opposition to the union of Lutherans and Reformed, and by attempts to depose from their chairs Gesenius, Wegscheider, De Wette, and other rationalistic teachers in the universities. His latest works were *Evangelium des heil. Johannes* (1869); *Geschichte des Reiches Gottes unter dem Alten Bunde; Das Buch Hiob erläutert* (1870). A number of his works have been translated. H. died May 28, 1869.

HE'NNA, or **HINNA**, a name originally Arabic, and sometimes found with the Arabic article incorporated in the form *Alhenna* or *Alkanna*, belongs equally to *Lawsonia inermis* and *L. spinosa*, shrubs of the natural order *Lythraceæ*. They differ in little, but that the one is unarmed and the other thorny, the latter being also the larger plant. Many botanists unite them into one species, under the name *L. alba*. H. grows in moist situations throughout the north of Africa, Arabia, Persia, and the East Indies. It is cultivated in many places for the sake of its flowers, which are much prized for their fragrance, particularly by the Egyptian ladies; but still more for the sake of the leaves, which abound in colouring matter, and which, being dried, powdered, and made into a paste with hot water and catechu, are very generally employed by women throughout the east to stain the nails and tips of the fingers of an orange colour; also by men to dye their beards, the orange colour being converted into a deep black by indigo; and for dyeing of the manes and hoofs of horses, and to dye skins and leather reddish-yellow. Powdered H. leaves form a large article of export from Egypt to Persia, and to various parts of Turkey, from which they find their way to more northern countries, and even to Germany, to be employed in dyeing furs and some kinds of leather. The use of H. for staining the nails appears—from allusions in ancient poets, and from some of the Egyptian mummies—to have prevailed from very ancient times.

HE'NNEGAU. See HAINAUT, or HAINAULT.

HENRY I., King of England, the youngest son of William the Conqueror, was born in 1068. When his brother, William II., was found dead in the New Forest, where they had both been hunting, on August 2, 1100, with a broken arrow in his breast, Prince Henry at once seized the reins of government, which, according to the then but imperfectly understood law of primogeniture, should have passed into the hands of his elder brother, Robert, Duke of Normandy, who was at the time in Italy, on his way home from crusading in Palestine. H. was crowned at Westminster, the third day after his brother's violent death. Regarding it he instituted no inquiry, possibly because he was privy to it; and he successfully held the crown against his brother Robert, at first negotiating with him, and granting him a pension to resign his pretensions, but finally making war upon his badly-governed duchy. Robert was defeated in a bloody battle before the walls of Tenchebray, on September 28, 1106, taken prisoner, and shut up in Cardiff Castle during the remaining twenty-eight years of his life. The acquisition of Normandy, the ancient patrimony of his family, had been a point of ambition with H., as he despised England and the English; but he had some trouble in keeping it, as the French king, Louis VI., and the Counts of Anjou and Flanders, took part with William, Robert's youthful son, whose virtues and misfortunes secured him friends. H., however, brought over to himself the Count of Anjou, by betrothing his only son to the count's daughter; he rendered neutral, by his eloquence and fair promises, Pope Calixtus II., whose intervention in the interests of justice had been besought; and he defeated the French king and his mailed knights in the almost bloodless battle of Brenneville, in 1119. Next year his successes in arms and intrigue were darkened for life by the death of his only son William, who was drowned at sea on his passage from Normandy to England, unregretted by the English, who knew of his hatred towards them, his arrogance, and his gross vices. H. himself died from a surfeit of lampreys, on 1st December 1135, as he was preparing to leave Normandy, to repress an incursion of the Welsh. He was very anxious that his daughter Matilda, who had married Geoffrey Plantagenet, the boy Count of Anjou, on the death of her first husband, Henry V., emperor of Germany, should succeed him on the throne, and had twice made the English nobles swear fealty to her; but on his death the crown was seized by Stephen of Blois, the son of Adela, the Conqueror's youngest daughter.

Henry I. was styled Beauclerc, or the Scholar, in honour of his learning, which, for a king in his age, was not undeserving of distinction. He had great natural ability, especially in the line of state intrigue. Law was administered with considerable fairness, and not a little rigour, during his reign, and his administrative ability restrained the spirit of rebellion which had been seething incessantly since the Conquest. The punishment of crimes during his reign was capricious and barbarous; death, the loss of eyesight (which he is alleged to have inflicted on more than one of his relatives), and perpetual imprisonment, being the most usual penalties of the law.

HENRY II. of England was the grandson of Henry I. by his daughter Matilda, and her second husband Geoffrey Plantagenet, and was born in 1133. His mother, assisted by her illegitimate brother the Earl of Gloucester, in the early part of Stephen's reign, and towards its close by H. himself, had made war against Stephen, as a usurper, who had no good title to the throne. In 1153, when the rival armies were drawing near each other, a treaty for a compromise was set on foot, and in the course of it the only son of Stephen having died, it was agreed that Stephen should reign during his life, and that H. should succeed him, which he did on Stephen's death next year. He was crowned 19th December 1154, along with his Queen Eleanor, whom, at the age of eighteen, he had married within six weeks after she was divorced by Louis VII. of France. She was Countess of Poitou, and Duchess of Aquitaine, in her own right. H. inherited from his father Anjou, Touraine, and Maine, and his father and mother succeeded by force of arms, in keeping and taking possession of Normandy for themselves and him; so that, by one method and another, he came to be possessed of a large portion of France as well as England. His chief rivals in power were the clergy, who could use their weapon of excommunication with terrible effect, and who being tried by their own courts were not amenable to the common laws of the realm, and were protected from the punishment due to their crimes, which were too often of the deepest dye. To aid him in reducing the church to subjection to the civil power, he appointed his trusted chancellor, Thomas-à-Becket, to the see of Canterbury, and compelled him and the other ecclesiastics to agree to the 'constitutions of Clarendon;' a set of laws enacted by a sort of prototype of a parliament, or council of the barons, and having for their object to render the crown and the civil law (such as it had grown to be) superior to the church. Becket, however, proved to be a true churchman, and the long and obstinate struggle between him and his monarch was only terminated by his murder. See BECKET, THOMAS À. H. did penance at his grave, allowing himself to be scourged by monks; but though the 'Constitutions of Clarendon' were formally repealed, the king was ultimately successful in reducing the church to subordination in civil matters. During his reign, occurred the conquest of Ireland. That country was then the home of a number of tribes or clans of the ordinary feudal type, and Pope Adrian IV., in 1156, by a bull, gave H. authority over the entire island, and ordered the inhabitants to obey him. He had not leisure at the time to conquer them, but afterwards, English aid being solicited by one of the Irish petty kings, Dermot of Leinster, H. gave leave to any of his subjects to aid him; and Robert Fitzstephens, constable of Albertivi, Maurice Fitzgerald, and Richard de Clare, surnamed Strong-bow, Earl of Strigul, went over with a very few hundred trained Englishmen, and in one year conquered Ireland. They succeeded so well, that H. became jealous, and recalled them; and next year (1172) he went over himself, to conquer in a royal way, and was everywhere loyally received, except in Ulster. This was the nominal conquest of Ireland, but the majority of the Irish tribes and chieftains continued to be independent barbarians for centuries.

During this reign, also, the first considerable ascendency of England over Scotland was gained. H.'s sons, incited by their jealous mother, Queen Eleanor, rebelled against him, and their cause was espoused by the kings of France and Scotland. The latter, William the Lion, was ravaging the north of England with an army, when he was surprised at Alnwick, and taken prisoner, 12th July 1174. To obtain his liberty, he stipulated to do homage to H. for Scotland, to cede for ever to him the fortresses of Roxburgh and Berwick, and the castle of Edinburgh for a limited time. In the course of this filial rebellion, Henry, the eldest son, died of a fever, exhibiting great remorse, and Geoffrey was killed in a tournament at Paris. Richard, surnamed Cœur de Lion, with King Philip of France, obtained some advantages over his father. A treaty of peace was concluded between them, of which one of the stipulations was for an indemnity for all the followers of Richard. The sight of the name of his favourite son John in the list, acting upon a constitution weakened by many cares, threw the king into a fever, of which he died, 6th July 1189.

Upon the whole, H. was an able and enlightened sovereign. The barons were indeed overawed, but the monarch did not use his power despotically. Law made very great progress in his reign; circuit courts were established, and other improvements effected. The earliest writer on English law, Ranulph de Glanville, was H.'s chief justiciary. In intellect and character, he resembled his grandfather, Henry I., but his violations of the moral law were fewer, and less heinous. Still he had some illegitimate children, his mistress, the fair Rosamond, being the mother of two that are remembered: William Longsword, Earl of Salisbury, and Geoffrey, who became Archbishop of York, and who was faithful to him when his four legitimate sons took up arms against him.

HENRY III. of England, grandson of Henry II., and eldest son of King John, was born 1st October 1206, and succeeded to the throne on his father's death at the age of ten. He inherited his father's weakness, and he managed everything ill both at home and abroad. A war with France cost him Poitou, and might have been more disastrous, but for the virtuous disposition of the French king, Louis IX., commonly called St Louis. In his boyhood, under the direction of the judicious Earl of Pembroke, he ratified the Magna Charta; and he did so in manhood, to appease the discontent of his parliament, and obtain allowances of money. But he kept no vows. He was beset with favourites chiefly from the country of his queen, Eleanor of Provence, and he allowed exorbitant exactions on the part of the clergy and the pope. His misrule roused the people and the barons in parliament, headed by his brother-in-law, Simon de Montfort, Earl of Leicester, who forced him to transfer his power temporarily to a commission of barons. He agreed to this by the provisions of Oxford in 1258. The barons were somewhat tardy in reforming the state, and the king desired to regain a power which he alleged, with truth, had been taken from him by compulsion, though wearing the appearance of free-will. The question of the validity of these provisions was submitted by both parties to St Louis of France, whose conscientiousness was such that foreigners could trust him. He annulled the provisions. Leicester and his party disregarded their agreement to be bound by his judgment, and took up arms against the king. They defeated him, and took him prisoner in the battle of Lewes, on 14th May 1264. The battle was followed by an agreement called the Mise of Lewes, more humiliating to the king than the provisions of Oxford. Leicester, being virtually king, summoned a sort of parliament; and to extend his popularity, which was already great, he intimated that boroughs should be represented, and this kind of representation was realised in embryo for the first time in English history. But his supremacy did not last long. Within a year, the powerful Earl of Gloucester deserted his party, and enabled Prince Edward, the talented son of the king, who had been taken prisoner at Lewes, to escape from captivity. They led an overwhelming army against Leicester, who was defeated and slain at Evesham, on 4th August 1265. The king died on 16th November 1272, and was succeeded by his son Edward. The weakness of H. and his father had allowed the development of the power of the barons, and the counterpoise of these two forces, regal and aristocratic, was approached in these reigns by a method which has developed into the British parliament. Statute law dates from the time of Henry III.; the 'Provisions of Merton,' passed in the 20th year of H.'s reign, being the first enactment on the English statute-book.

HENRY IV., of the House of Lancaster, on the deposition of his cousin Richard II. by the parliament, usurped the crown in 1399, in the beginning of which year he had succeeded his father, John of Gaunt, in the duchy of Lancaster. He was surnamed Bolingbroke, from the place (in Lincolnshire) where he was born in 1366, and had no valid title to the crown, or the pretence of it, except that he was the son of the fourth son of Edward III. The peace of his reign was disturbed by the Welsh, under Owen Glendower (q. v.), and by the Scotch, who were defeated, however, at Nesbit Moor on 22d June, and at Homildon Hill on 14th September 1402. Henry Percy (surnamed Hotspur), the conqueror in the latter engagement, and his family shortly after broke with the king, and leagued with the Scotch Earl Douglas and Glendower against him; but this coalition was destroyed by the battle of Shrewsbury on 21st July 1403. Other two insurrections followed, which were easily suppressed. The king grew to be afflicted with leprosy and epilepsy, and died of a fit in Westminster Abbey on 20th March 1413, in the 47th year of his age, having found a usurped crown to be a heavy burden, even for a strong head.

HENRY V., who succeeded his father Henry IV., was born at Monmouth (whence his surname), in 1388. In his youth he had acquired great military distinction in operations against Glendower, and after his military work was put an end to, through his father's jealousy and distrust of him, he became almost equally celebrated for dissipation. But when he became king (21st April 1413), he shook himself in great measure free of bad habits and companions, and in an endeavour at the outset of his reign to be both just and generous, he liberated from the confinement in which his father had placed him the young Earl of March, who was the true heir to the crown, and restored the son of Hotspur to the lands and honours which his father had lost by rebellion. He paid a tribute to religion also, or rather to the orthodoxy of the age, by persecuting the Lollards by fire and halter. The great effort of his reign was an attempted conquest of France, in which he virtually succeeded. He had no right to the French crown; but in these days of usurpation and unsettled laws of succession, when might and right were practically identical, he seems to have believed sincerely that he had a right. In his first campaign to vindicate it, he besieged and took the town of Harfleur, and gained the battle of Azincourt (q. v.), October 25, 1415, against such enormous odds as to make his victory one of the most notable in history. Two years after, he again invaded France, and made Normandy once more subject to the English crown. An incapable king and civil discord aided him greatly. On the 20th May 1420, there was ratified at Troyes 'perpetual peace' between H. and the French. H. demanded and had conceded to him the regency of France, the eldest daughter of the king and queen to be his queen, and the succession to the French crown on the death of the king. He had hardly returned to England, and been married to this French princess, Catherine, when the defeat at Baugé, in March 1421, of his brother the Duke of Clarence, whom he had left governor of Normandy, by a force consisting largely of Scotch, and commanded by the Scotch Earl of Buchan, who killed the duke with his own hand, rekindled the hopes of the French, who supported the contention of Charles the dauphin against the treaty of Troyes, to which he had not agreed. H. returned to France for a third campaign, and his wonted success in arms was following him, when he was seized with illness, and died in a month on the 31st August 1422, in the 34th year of his age, leaving an infant to succeed him, and a splendid reputation for all those qualities that constitute a magnanimous monarch.

HENRY VI., the only child of Henry V. and Catherine of France, was born at Windsor on 6th December 1421. As he was not quite nine months old when his father died, his uncle John, Duke of Bedford, was appointed to govern France, and another uncle, Humphrey, Duke of Gloucester, to be 'Protector of the realm and Church of England,' with a council appointed by parliament to aid and control him, the parliament declining to appoint him regent, though the late king had desired it. The incapable Charles VI. of France having died, his son the dauphin assumed the title of Charles VII., and went on fighting with the English. His army, commanded by the Scotch Earl of Buchan, who had been appointed constable of France for his victory over the Duke of Clarence in the previous reign, and consisting of 14,000, half Scotch and half French, was almost annihilated by the English under Bedford, at Verneuil, on August 27, 1424. The Scotch auxiliaries ought not to have been there, as peace had been made with the Scots a year before, and their young king, James I., had been set at liberty, after a useful captivity of twenty years, and had returned to his kingdom with Lady Jane Beaufort, a daughter of the Duke of Somerset, and relation of the royal family, as his queen.

The victory of Verneuil was the last great success obtained by the English in France, and their power, which only force could support or justify, gradually crumbled down. In 1428, they laid siege to Orleans, but the siege was raised next year by the French, inspired by Joan of Arc (q. v.); and although she was burned as a witch by the English in 1431, their power continued to decline. Normandy was completely lost by the fall of Cherbourg in 1450; and ultimately, in 1453, they were expelled from all France (Calais excepted), greatly to the true advantage of both that country and England.

Disputes between Gloucester, the regent, and his uncle, the powerful Bishop of Winchester, as well as war with France, prevailed during the minority of the king. As he grew up, he manifested no tendency to either vicious or intellectual activity. He inherited, in fact, the imbecility of his grandfather, Charles VI. of France. In 1445, the weak king found a wife in the strong-minded Margaret of Anjou; and in 1447 the Winchester party, supported by her, succeeded in having Gloucester thrown into prison for high-treason, where he was soon found dead in his bed, without external mark of violence, but most likely murdered, as Edward II. had been, by thrusting a red-hot iron through his bowels. Winchester did not long survive his nephew and rival; and in 1450 the Duke of Suffolk, the queen's favourite minister, being impeached by the Commons, was condemned to be banished from the kingdom, but was shortly after taken, and executed on board one of the king's ships. The want of strength in the king, as well as in his title to the crown, was an invitation to every form of faction to display itself. Jack Cade, an Irish adventurer, who pretended to be a Mortimer, obtained a temporary possession of London; but the citizens overcame him and his pillaging followers, and he was taken and beheaded in a garden by the sheriff of Kent. The true representative of the Mortimers was Richard, Duke of York, and he was one of the unquiet spirits of the reign. As a descendant of Lionel, Duke of Clarence, the third son of Edward III., his title to the crown was superior to that of the king, who was descended from the Duke of Lancaster, the fourth son of that monarch, and he laid claim to the crown with more or less openness, according to circumstances. His influence and address was so great that in 1454, on the occasion of the king's weak mind being entirely eclipsed, he was appointed protector by parliament. On the king's recovery, he was indisposed to give up his power, and levied an army to maintain it. On May 22, 1455, the battle of St Albans was fought, and the Yorkists were victors; 5000 of the supporters of the House of Lancaster being killed, the Duke of Somerset, the queen's favourite minister for the time, being among them; and the king himself being taken prisoner. This was the first battle of twelve that was fought between the Houses of York and Lancaster, in the wars commonly called the Wars of the Roses, from the emblem of York being a white rose, and of Lancaster a red rose. (For a brief account of the struggle, see EDWARD IV.) H., after a checkered career, died May 22, 1471. In his cradle, he was proclaimed king of both France and England; but he lost both, having in intellect scarcely advanced from his cradle all his days, though throughout amiable and pious.

HENRY VII., the conqueror and successor of Richard III., was born at Pembroke Castle, the seat of his father, the Earl of Pembroke, on January 21, 1456. His father, Edmund Tudor, was the son of Owen Tudor, and of his wife, Queen Catherine, the widow of Henry V. His mother was a granddaughter of John of Gaunt, parent of the House of Lancaster, and through her he derived his right (such as it was) to the crown. He was, indeed, the nearest heir, after Richard III. had murdered his nephews, the sons of Edward IV., except their sister Elizabeth, and Richard himself. The popular detestation against Richard's crimes was so great in England, that H., while residing abroad and bearing the title of Earl of Richmond, was invited to invade England, and rescue it from the tyrant. On the 7th of August 1485, he landed at Milford Haven, and marched across the country to Bosworth, in Leicestershire, where a battle took place on the 22d of August, in which Richard was slain. H. now ascended the throne. His reign was troubled by several impostors claiming the crown: first, Lambert Simnel, a joiner's son, who professed to be Earl of Warwick, was proclaimed king in Ireland, but was defeated at Stoke in 1487, taken prisoner, and turned into a scullion in the king's kitchen by H., who had a talent for turning everything to the most profitable purpose; second, Perkin Warbeck, who pretended to be the boy Duke of York, who had *not* been murdered in the Tower by Richard III., and was patronised by the Duchess of Burgundy, and supported by James IV. of Scotland, but was finally captured; and third, Ralph Wulfurd, who also pretended to be Earl of Warwick, but did not succeed in carrying his enterprise far, being almost at once taken and hanged in 1499. In this year H., apparently to free himself from further trouble from pretenders, had Warbeck, whom he had pardoned, and the true Earl of Warwick, a youth who had known captivity only all his days, convicted of a plot to recover their liberty, and executed. The execution of the latter is the chief blot in H.'s conduct, but his execution of Lord Stanley, who had helped him to the throne, also shewed a callous heart. Indeed this king was cunning and selfish, but prudent and not intemperate in revenge or in any vice except avarice, which led him to sell offices and pardons, commuting sentences passed by his corrupt and infamous Exchequer judges, Empson and Dudley. His avarice kept him from engaging in foreign war, a very small quarrel with France being all that he attempted in that way. It also kept him from returning the dowry of Catharine of Aragon, who had married his son Arthur, Prince of Wales, a boy of 14, just before he died, and led him to betroth her to his next son, who became Henry VIII., a betrothal from which flowed most important consequences. He married his eldest daughter, Margaret, to James IV. of Scotland, foreseeing that it might bring about a union of the crowns, and this was one of the most fortunate and prudent schemes of his reign. His wife having died, he was engaged looking out for another for himself, with a large dowry, when he died of consumption, on April 22, 1509. Bacon wrote a history of his reign, in which he represents him as a wise king, but does not conceal his avarice, explaining it rather by observing that the necessities and shifts of other great princes abroad set off to him the felicity of full coffers. Hume reckons his reign 'the dawn of civility and science' in England. Bacon says, that in it 'justice was well administered, save when the king was partie.' Some fresh light is thrown upon this and the preceding reign by a volume of state-papers, recently published by Longman.

HENRY VIII., King of England, second son of Henry VII. and Elizabeth of York, was born in 1491. On the death of his elder brother Arthur in 1502, he became heir-apparent to the throne. In his twelfth year, he was betrothed to his brother's widow, Catharine of Aragon, sister of Philip I. of Spain, thus early commencing a union afterwards so fertile in evil-fortune. On his father's death, in 1509, H. was found to possess many accomplishments with no practical ability. Leaving Dudley and Empson, the instruments of his father's economic extortions, to fall a sacrifice to popular indignation, he proceeded to squander his treasures to his own high satisfaction, and to the great content of his people. He indolently allowed his ministers to manage everything for him, even to his marriage with Catharine. But if he knew nothing of the foreign relations of the kingdom, he could speak several languages with ease; and if he despised domestic business, never was there a monarch who presided more gracefully in the court, or behaved more gallantly at the jousts or in the hunting-field. His tastes were otherwise innocent enough. He was passionately fond of music and of display, and he indulged in no other excess than that of physical exercise, sometimes, it is said, exhausting four or five horses in the field in one day. It is especially noteworthy, that the early years of the king were spent with scarce a stain on the purity of his life.

For the first twenty years of his reign, England had no reason to be dissatisfied. The period, indeed, was not an eventful one. In the beginning of it (1513) there were two short wars—one with France, in which Terouenne and Tournay were taken, and one with Scotland, in which the victory of Flodden was won. The following years were of that calm which comes before the storm. Wolsey was then minister; and from 1515, when he was made Archbishop of York and chancellor, till his fall in 1529, he is wholly responsible for the government, and it was the best governed portion of H.'s reign. The foreign policy, it is true, was somewhat tortuous, guided to some extent, perhaps, by the aspirations of the cardinal to the triple crown; and it may be that, in his home-government, Wolsey often exhibited a jesuitical preference for accomplishing honest ends by dishonest means. The country, notwithstanding, was kept free from foreign embarrassments, and at home justice was administered.

Of the king, it cannot be said that during this period he did anything of consequence. When satiety and diminished means had checked the pursuits of his youth, he had betaken himself to those well-known theological studies which earned for him (1521) the honour of Defender of the Faith. His book, in defence of the seven sacraments, against Luther, although a work of some erudition, contributed nothing to the solution of the questions it touched. Timidity in examining received opinions was accompanied by corresponding vigour in denouncing those who, possessed of more courage, had proceeded from examination to dissent.

It is impossible not to connect these theological studies with the origin of the suit between H. and Catharine. The joyous temperament of H. had passed away, and in its place had come discontented gloom. In his now superstitious mind the fancy dwelt, that the early deaths of all his male children had been the judgment of Providence on some sin. From these dark thoughts the queen had not the power of weaning him. Older by six years than he was, her beauty had faded, and, haughty in her manners, she exacted all the stately etiquette of the Spanish court from one who had at no time felt for her more affection than was due to a bride selected for him by others. The nation, too, had grown dissatisfied with the union. The prospect of a succession left to be disputed around the person of a girl—the Princess Mary, who was the immediate heiress to the throne—was viewed with anxiety. Men remembered the horrors of the wars of the Roses, and feared that their children might see them repeated. The doubt as to the validity of

H.'s marriage with his brother's widow, which had been started at the time of its celebration, was one certain to be revived on the slightest occasion. A strange mixture of public spirit, religious or superstitious feeling, and selfish desire, now determined H. to seek a divorce.

In suing for the divorce, the king unexpectedly found a zealous assistant. Wolsey saw in it a means of detaching England from the alliance with Spain, odious to him as the power that thwarted his ambition, and ruled the papacy while pretending to obey it. Already his acute mind saw that the influence of the priesthood was decaying. Enthusiast as he was, he believed he could restore it. While sounds of reformation were echoing from Germany from beyond the walls of the church, Wolsey, almost alone in England, saw the danger; but he believed there was strength enough within the church to accomplish her own amendment, and he trusted now that the lost affections of the people might be brought back by a gracious exercise of the dispensing power, freeing them from a felt danger. Already the active schemer had arranged that when the work was done, the king should marry a daughter of France, converting an old enemy into a strong ally. With such ends in view, Wolsey (1527) prosecuted the divorce before Clement.

The pope found himself in difficulty. On the one hand, Francis I. supported England; on the other, Charles V. threatened. Clement pursued the traditional policy of Rome, and temporised. To gain time, he issued a commission to Cardinal Campeggio and to Wolsey to try the question. Meanwhile, Wolsey's fair projects were rendered impossible. Anne Boleyn had been for many years about court, and when H.'s conscience grew too scrupulous to permit his cohabiting longer with Catharine, Anne lived constantly with him. When the king announced his intention of marrying her, Wolsey's desire for the divorce was at an end. The connection promised little to the nation, and he himself had every reason to dislike her, as her relatives belonged to those reformers who sought reform from without, and as such religious sympathies as could find a place in her frivolous mind leaned also to the new learning. He was now as anxious to procrastinate as Clement. The legates' court had been opened, argument had been heard; but on one excuse or another, judgment was delayed, till the changeable Clement revoked the commission, and (1529 A.D.) advocated the cause to Rome.

The revocation of the papal commission to try the divorce question, virtually ended the papal power in England, and the steps that follow are merely the working out of inevitable results. Wolsey, suspected on the best of grounds of having thwarted the divorce, was deprived of power, and a new ministry was formed (October 1529), in which, for the first time, laymen held the highest places. Sir Thomas More was chancellor. The chief adviser of the king was Wolsey's old servant, Cromwell. Parliament was called, and the members, finding that royal approbation was now given to their complaints, made out a formal list of grievances against the clergy. Their humble petition to his majesty set forth how the bishops cared for nothing but the episcopal revenues, and how they converted everything, from the powers of the diocesan courts downwards, into a means of extorting money. The king solemnly sent the document to convocation, and while the reply was under consideration, the Commons proceeded. Bills were passed, with little opposition, dealing with what were wont to be thought purely ecclesiastical matters, such as fixing the fees to be exacted in the probate courts, and abating some peculiarly obnoxious imposts made in performing the last ceremonies for the dead. Parliament touched the clergy more closely still when they forbade them to follow secular employments, or to hold pluralities, and enjoined them to live in their parishes and perform their duties. These bills passed the Lower House with little opposition; in the Upper House, where the spiritual lords were numerous, they passed with difficulty. The king gave his assent willingly. When the bills became law, they were received by the people with great satisfaction.

Though these measures were significant enough of what might follow from his refusal, the pope still delayed. Time was suffered to wear on, and nothing made progress except the unpopularity of the clergy. Rome still shewing no symptoms of yielding, the king's political necessities again made him a reformer, and that of a very unscrupulous kind. He imposed a heavy fine on the clergy, under an old statute, for having recognised the legatine authority of Wolsey without express royal sanction. Going still further, the Defender of the Faith declared himself the head of the church, and induced the clergy to recognise the title in consideration of his graciously remitting a portion of their fine (22 Hen. VIII. c. 15).

Parliament having again met (1530), advantage was taken of the king's disposition still more to limit the clerical power. The clergy had long ago forced the state to give up to them the right to try their brethren when accused of crimes. Their theory was, that he on whom consecration had wrought its mystic office, was too high for the secular arm. The practice was, that every one who claimed the character of clerk, from the highest dignitaries of the church to the crowds of mendicant friars, escaped with small fines after committing the gravest crimes. Parliament was thought to have gone far when it enacted that all below the rank of priest should be dealt with by the ordinary courts of the realm. The same parliament passed other acts, regulating the jurisdiction of the ecclesiastical courts, and making stricter provisions against bequests to the church.

These measures, bold and unusual as they were, affected Rome only indirectly. As it was evident that something to be more closely felt was requisite, one of the pope's highest and most lucrative privileges was attacked. The pope had long maintained that no high ecclesiastical dignity could be conferred without his approval, and in return for granting it, he received the first year's fruits of the benefice. These payments, called annates, amounted to a large sum, increased even beyond its legitimate amount by the dishonourable expedient of sanctioning the appointment of none but very old men. A bill passed both Houses abolishing these payments (23 Hen. VIII., c. 20). To make the measure serve its purpose more effectually, power was given to the king to call it into effect at any future time, while the hope was privately held out that this power would not be exercised if the divorce were granted.

While such measures were being passed, it may be believed that Sir Thomas More held office with pain and reluctance. Finding at last his influence powerless to restrain the advancing tide of secularism, he resigned, and a ministry was formed (1532) of which Cromwell was now the nominal as well as real head. The new ministry were prepared to push measures of reform as far as the temper of the king and the nation would permit. They desired nothing better than an open rupture with Rome. H., on the other hand, exhausted every effort of diplomacy to preserve the alliance with the church. Embassies, intrigues, plots of all kind, in Paris and

Rome, abounded in endless confusion at this time, making it impossible to determine the immediate cause of the separation, long since certain to ensue.

In the beginning of 1533, H., either impatient at the long delay, or as others say, and as the dates render not improbable, 'discovering that an illicit intercourse he carried on with Anne Boleyn had resulted in her pregnancy,' was privately married to her. Within three months afterwards, the marriage was made public; and to complete matters, Cranmer, recently appointed Archbishop of Canterbury, held a court, as the highest ecclesiastical authority in England, and pronounced sentence of divorce, declaring the marriage of H. and Catharine to have been null from the beginning. In England these doings were accompanied by much rejoicing, and the king's former taste for pageantry revived in the magnificent ceremonial of crowning his new queen.

The news produced other effects in Italy and Germany. When the news of the marriage reached the Vatican, H. was cited to appear before the papal court. He refused, and appealed to a general council. When Cranmer's sentence reached Rome, the pope at once declared it illegal, and soon after, almost closed the door for further negotiation by rejecting the appeal to the council. The next steps on each side were taken almost simultaneously. The English parliament met, and under Cromwell's guidance, far outdid its predecessors. It passed an act entirely abolishing the papal authority within the realm (24 Hen. VIII. c. 12), giving the king, as on a former occasion, power to call the act into operation when he pleased. It then settled the succession on the issue of Anne Boleyn, to the exclusion of that of Catharine. Scarcely had these measures passed, when news came from Rome that the pope had pronounced judgment in the long pending divorce case, finding H.'s marriage to Catharine to have been valid. On the day following, H. called into operation the act abolishing the pope's authority.

H. having as yet done comparatively little to forfeit his early popularity, the sympathy of most was with him in the steps taken against those of his subjects who were disaffected with these changes. Among these steps, however, were some not easily defended, even according to the standard of the times. Minor victims fell unheeded, but all Europe was shocked when More and Fisher (Bishop of Rochester) were put to death for refusing to acknowledge the new succession, and to admit the king's right to the headship of the church. Even Henry's ally, Francis I., remonstrated. The worst effect of the cruelty was the alienation of the German Protestants, who ever afterwards held aloof from H. in spite of all Cromwell's efforts to cement an alliance. After this and other similar acts, which were not unfrequent, it may be said that H. never again received human sympathy. He pursued his course, however, aided by those from whom the dust of the conflict concealed his cruelty.

The state of the monasteries having long been a public scandal, Cromwell (1535) sent a commission to examine them. Acting on the reports of the commission, parliament abolished the smaller monasteries, which happened to be at once the weakest and the worst (27 Hen. VIII. c. 28). The disbanded monks made a large addition, both directly and indirectly, to the ranks of the disaffected; and to create further discontent, the swarms of vagabonds who had subsisted on the monastic alms were suddenly thrown for support on the yeomen.

The disaffection burst out in the rebellion known as the Pilgrimage of Grace (1536). Crowds who had collected in Lincolnshire with hardly a definite aim, dispersed on the promise of redress in a parliament to be held at York. Redress, however, came not, and the crowds again gathered, this time under more skilful leaders, and with more definite purposes. The king's forces sent against them were insufficient. The whole of the north of England was in the hands of the rebels. Their grievances were a strange medley. Complaints of the law regarding the tenure of land were mixed with complaints that low-born men (such as Cromwell) advised the king, that the monasteries were being dissolved, and that the old faith was being altered. H., through certain commissioners, again negotiated with the insurgents, and terms were agreed on, the most important of which was a general amnesty, the benefit of which, however, Aske and the other leaders did not receive. The suppression of this rebellion was followed by the dissolution (in 1537) of the larger monasteries (31 Hen. VIII. c. 13).

In the midst of these civil commotions, two events took place both bearing on the Reformation, but of very different import. An order in council (1537) appointed the English translation of the Bible to be placed in every church, that all might read it. But as if to correct the idea that every one was thus to have the right of judging for himself in religious questions, an act of uniformity was passed. H. having now broken with many old professions, reduced his new professions to a creed, to be enforced by penalties, if more rational means should fail to commend it to the nation. Certain articles of religion were drawn up, and after some modifications, were framed into those known as the 'bloody six articles.' The statute (31 Hen. VIII. c. 14) containing these articles—named, with much simplicity, 'An act for abolishing diversity of Opinions'—is very brief, but very formidable. The doctrines were substantially those of the Roman Catholic Church. The articles made no pretensions to form a complete or systematic creed; they embodied the points as to which most conflict of opinion prevailed; and formidable, indeed, were the sanctions enforcing them. Whoever denied the first article (that embodying the doctrine of transubstantiation) was to be declared a heretic, and burned without opportunity of abjuration; whoso spoke against the other five articles should, for the first offence, forfeit his property; and whosoever refused to abjure his first offence, or committed a second, was to die like a felon. To this act Cromwell himself fell a victim. He had been silent in face of the combination which carried it; but having secretly used all his influence as a member of government to thwart its execution, by staying proceedings and giving pardons, he lost H.'s confidence, and was put to death.

The last years of the reign of H. were disturbed with small wars with Scotland and France, inimical to progress. He died on 28th January 1547, unhonoured, unmourned; and yet few rejoiced, for his policy had left England so divided at home, so friendless abroad, that no man could look with confidence to the future.

The character of H. has of late been discussed at greater length than the subject deserved. The mere recital of the occurrences of his private life is sufficient to justify most of the infamy which tradition has attached to his name. The divorce of Catharine and the marriage of Anne Boleyn have already been told. Within a short time after the birth of the Princess (afterwards Queen) Elizabeth, H.'s affection for Anne ceased. He suspected her—not, it must be admitted, without ground—of adultery, and, after a hurried trial, had her condemned and executed (1536). On the day after the execution, he married Jane Seymour, against whom nothing more is known than that she was the king's partner in this revolting proceeding. Jane Seymour died (1537) in giving birth to Edward VI. The story of Anne of Cleves follows. The marriage, a political one, arranged by Cromwell to connect H. with the German Protestants, was unfortunate from the beginning. H. was deceived as to her personal attractions, and (1540) obtained a divorce to free himself. His fifth wife, Catharine Howard, was (1541) within a few months divorced and executed for an adultery well-enough established. His sixth wife, Catharine Parr, survived him, and so the catalogue ends. Passing from the domestic circle to that of his immediate associates, H. is found as incapable of friendship as he was either of feeling or of evoking love. He had three great ministers—Wolsey, More, and Cromwell—all men of high talent and worth, and all on terms of the closest intimacy with the king, yet all in the hour of need thrown aside. Disease and a broken spirit saved Wolsey from a worse fate; but it is little wonder that every Catholic should detest the memory of him who sent More to the scaffold for adhering to opinions which he himself had held shortly before, or that Protestants should execrate the memory of the man who violated justice and consistency to put to death the first great Protestant minister. If such were the mercies he vouchsafed to those who were with him, it may easily be imagined how he dealt with those who were against him. Claims of political necessity cannot excuse the cruelty with which he persecuted every relative of Cardinal Pole, from the aged Countess of Salisbury to lesser victims. It may, however, be safely admitted, that tradition has exaggerated H.'s cruelties—that there is no truth, for example, in the tale which gives 73,000 as the number of executions in his reign; and it may be further admitted, that he did not wantonly commit murders—that he had always before him in his crimes some object, either of misconceived justice, or of policy; but after allowing for everything, enough remains to explain the universal detestation in which Protestant and Catholic have combined to hold his name.

HENRY II., King of France, was born in 1518; married Catharine de' Medici in 1533; succeeded his father, Francis I., in 1547. The money which his father left was rapidly squandered among his favourites and mistresses. A revolt in Guienne, where the people had risen against the *gabeleurs*, or collectors of the salt-duty, was the first event that roused the king and court from their slothful ease. This disturbance was, however, speedily put down by Montmorency. Through the influence of the Guises, whose sister, the dowager-queen of James V., sought the aid of France to support her against the ambitious designs of the English government, a French alliance was cemented with Scotland, and war declared against England, which began in 1550 with the recovery of Boulogne, and ended in 1558 with the taking of Calais, after that city had been 210 years in the hands of the English. Curiously enough, while the king tried to put down heresy with fire and sword at home, he made treaties of alliance with the German reformers, and sent an army of 38,000 men to aid Maurice of Saxony against the emperor; and taking the command in person, made himself master of Toul and Verdun, while Montmorency, through the treachery of the garrison, seized upon Metz. After the abdication of Charles V. (1556), and the division of his vast empire between his brother Ferdinand and his son Philip II., H. seized the opportune occasion of attacking the Netherlands and Italy before Philip II. had time to consolidate his newly acquired powers, but the results of this step were disastrous to France at every point. In Italy, the attack on Naples, made by Guise at the head of 20,000 men, utterly failed through the pusillanimity of the pope, and the energetic advance of Alva; while in the Low Countries, the French under Montmorency sustained a total defeat, in 1557, at St Quentin, where the flower of the French chivalry were either slain or taken captive by the troops of Philip, who were commanded by Philibert-Emmanuel, Duke of Savoy.

These reverses were followed by the treaty of Château-Cambresis (1559), in which H. agreed, in exchange for the restoration of Ham, St Quentin, and Castelet, and the liberation of Montmorency, to resign nearly all his conquests in the Low Countries, Piedmont, and Southern Italy, including 190 fortresses and strongholds. Shortly after, he was mortally but accidentally wounded in a tournament by Count Montgomery, a Scottish nobleman, and captain of his guard. He died 10th July 1559.

HENRY III., the third son of Henry II. and Catharine de' Medici, was born in 1551, and succeeded his brother Charles IX. in 1574. On the death of the Constable Montmorency, he received the chief command of the army, and his first campaign, fought in his 16th year, was signalised by two decisive victories, gained over the Protestants at Jarnac and Moncontour. In 1573, the intrigues of the queen-regent secured to him the election to the vacant throne of Poland. He failed, however, to secure the attachment of the Polish nobles; and on receiving the tidings of his brother's death, he fled by night from Cracow, and on his return to France, was proclaimed king of that country. His mother and the Guises had little difficulty in persuading him to continue the religious civil war. The union of the Protestants with the party of discontented nobles, headed by the king's brother, the Duke d'Alençon, compelled the alarmed sovereign to grant the former the free exercise of their religion, and various other rights. This exasperated the Catholic party, who, headed by Henry of Guise, formed the confederation known as the *Sainte Ligue*, the object of which was not merely to assert the undivided supremacy of Catholicism, but also to secure the reversion of the throne to Guise, and civil war again and again burst out with renewed violence.

H. availed himself of his intervals of quiet to indulge his own vicious propensities; and while his mother ruled the state, and the Guises were undermining his throne, his days and nights were spent in an alternation of the most dissolute excesses, and the wildest outbreaks of fanaticism. One day he might be seen passing, to the sound of music, through the streets of Paris, accompanied by a band of young men as effeminate as himself, known as the Mignons, and surrounded by parrots, monkeys, and pet dogs, while the next day he and his companions would shew themselves clad in a penitent's dress, wearing masks, and carrying in their hands scourges, with which they flagellated one another as they sang aloud penitential psalms.

The assassination of the Duke of Guise in 1588 finally aroused the hatred of the nation. The doctors of the Sorbonne declared the people to be relieved of the duty of obedience to the king, and the Leaguers dissolved the parliament. H., who was now, for the first time, thrown on his own resources—his mother had just died—was distracted by the difficulties of his position; and in his perplexity at hearing that Guise's brother, the Duke of Mayenne, had been declared lieutenant-general of the kingdom, threw himself under the protection of Henry of Navarre. The newly reconciled kings advanced at the head of 40,000 Huguenots on Paris, which, although gallantly defended by Mayenne, would probably have had to capitulate, had not the current of events been suddenly checked through the agency of a fanatical young dominican-brother, named Jacques Clement, who, on 1st August 1589, on pretence of having important tidings to communicate to H., killed him by plunging a knife into his body. The murderer was slain on the spot by the royal guard, and his victim died the following day, after having declared his kinsman, Henry Bourbon of Navarre, his successor.

HENRY IV., King of France and Navarre, surnamed 'The Great,' and 'The Good,' was born in Bearn in 1553. H. was the third son of Antoine de Bourbon and Jeanne d'Albret, daughter and heiress of Henry, king of Navarre and Bearn. His father's death placed him under the sole control of his mother and grandfather, at whose court he was trained to the practice of knightly and athletic exercises, and inured to the active habits and rude fare common to the Bernais mountaineers. His mother, who was a zealous Calvinist, was careful to select learned men holding her own tenets for his instructors; and having discovered that a plot was brooding to remove him to Spain by force, to train him in the Catholic faith, she conducted him, in 1569, to La Rochelle, and presented him to the assembled Huguenot army, with whom he participated in the battle of Jarnac. H. was now chosen chief of the Protestant party, although, on account of his youth, the principal command was vested in Coligny (q. v.). Notwithstanding the defeats which the Huguenots had experienced in this campaign, the peace of St Germain which followed was apparently most advantageous to their cause, and was speedily followed by a contract of marriage between H. and Margaret of Valois, the sister of Charles IX. After much opposition on the part both of Catholics and Protestants, the marriage was celebrated with great pomp in 1572, two months after the sudden death of the Queen Jeanne, which was probably due to poison, and within less than a week of the massacre of St Bartholomew. It had been originally intended that H. was to share the fate of his friends and co-religionists; but his life was spared on condition of his professing himself a Catholic. Three years he remained at the French court, virtually a prisoner; but at length, in 1576, H. contrived to elude the vigilance of the queen-mother, and escaped to the camp of the Huguenots in Alençon, where, having revoked his compulsory conversion, he resumed the command of the army, and by his address gained several signal advantages, which constrained the king to consent to a peace highly favourable to the cause of the reformers. The death of the Duke of Anjou (late Alençon) gave H. the rank as first prince of the blood-royal, of presumptive heir to the crown, while the murder of Henry III., in 1589, made him, in right of the Salic law, and as the nearest lineal male descendant of the royal house of France, rightful king of France. As a Protestant, lying under the ban of papal excommunication, he was obnoxious to the greater part of the nation; and finding that the Dukes of Lorraine and Savoy, and Philip II. of Spain, were prepared, each on his own account, to dispute his claims, he retired to the south until he could collect more troops and obtain reinforcements from England and Germany. His nearly hopeless cause, however, gradually gained strength through the weakness and internal dissensions of the Liguists, who, in their anxiety to circumvent the ambitious designs which Philip II. cherished in favour of his daughter (niece of Henry III.), notwithstanding her exclusion by the Salic law, proclaimed the aged Cardinal Bourbon king, with the Duke of Mayenne lieutenant-general of the kingdom, and thus still further complicated the interests of their party. In 1590, H. won a splendid victory over Mayenne at Ivry. In 1593, the assembly of the States-general, by rejecting the pretensions of Philip II., and insisting on the integrity of the Salic law, smoothed H.'s way to the succession, although it is probable that he would never have been generally acknowledged had he not, by the advice of his friend and minister, De Rosny, afterwards Duke de Sully (q. v.), formally professed himself a member of the Church of Rome. The ceremony of his recantation of Protestantism, which was celebrated with great pomp at St Denis in July 1593, filled the Catholics with joy, and was followed by the speedy surrender of the most important cities of the kingdom, including even Paris, which opened its gates to him in 1594. The civil war was not, however, wholly put down till four years later. In the same year, 1598, peace was concluded between Spain and France by the treaty of Vervins, which restored to the latter many important places in Picardy, and was otherwise favourable to the French king; but important as was this event, it was preceded by a still more memorable act, for on the 15th April, H. had signed an edict at Nantes, by which he secured to Protestants perfect liberty of conscience, and the administration of impartial justice. H. was now left at liberty to direct his attention to the internal improvements of the kingdom, which had been thoroughly disorganised through the long continuance of civil war. The narrow-minded policy that had been followed during the preceding reigns had left the provinces remote from the capital very much at the mercy of the civic governors and large landed proprietors, who, in the absence of a general administrative vigilance, arrogated almost sovereign power to themselves, raising taxes, and exacting compulsory services. These abuses H. completely stopped, and by making canals and roads, and thus opening all parts of his kingdom to traffic and commerce, he established new sources of wealth and prosperity for all classes of his subjects. The mainspring of these improvements was, however, the reorganisation of the finances under Sully, who, in the course of ten years, reduced the national debt from 330 millions to 50 millions of livres, although arrears of taxes to the amount of 20 millions were remitted by the king during that period. On the 14th May, the day after the coronation of his second wife, Mary de' Medici, and when about to set out to commence war in Germany, H. was assassinated by a fanatic named Ravaillac. Nineteen times before attempts had been made on his life, most of which had been traced to the agency of the papal and imperial courts, and hence the people, in their grief and consternation, laid Ravaillac's crime to the charge of the same influences. The grief of the Parisians was well-nigh delirious, and in their fury they wreaked the most horrible vengeance on the murderer, who, however, had been a mere tool in the hands of the Jesuits, H.'s implacable foes, notwithstanding the many concessions which he made to their order.

Time has strengthened the high estimate which the lower classes had formed of their favourite king, for although his faults were numerous, they were eclipsed by his great qualities. Inordinate love of women was his worst fault, and the cause of much evil in his own and succeeding reigns, for his prodigality and weak indulgence to his favourite mistresses, Gabrielle d'Estrées and Henrietta d'Entragues, and his affection for the natural children which they bore him, were a scandal to the nation, and a source of impoverishing embarrassment to the government. As authorities in regard to Henry II., III., and IV., in addition to the general histories of France, the following works may be consulted: Anquetil, *Esprit de la Ligue;* Petitot's *Collection of Mémoires;* De la Saussaye, *Histoire de Blois; Documents de l'Hist. de France;* Matthieu, *Hist. de Henri IV.;* Memoirs and Letters of De Thou, D'Aubigné, Pasquier, Duplessis-Mornay; Capefigue, *Hist. de la Réforme et de la Ligue;* Péréfixe, *Hist. de Henri IV.*

HENRY III., Emperor of Germany, of the Salo-Franconian line, and the son of the Emperor Conrad II., was born in 1017, elected king of the Germans in 1026, Duke of Bavaria in 1027, Duke of Swabia and Burgundy in 1037, succeeded his father as emperor in 1039, and died in 1056. H., who was possessed of natural abilities, which had been cultivated as far as the age permitted, was one of the most energetic and efficient rulers of Germany. By his vigour he maintained his ascendency notwithstanding the encroachments of the church and the subordination of the princes of the empire. Having summoned a council at Sutri in 1046, he availed himself of the influence which he had acquired in Italy, by his judicious reconciliation of antagonist parties, to secure the recognition of a new pope, Clement II., and thus brought to an end the scandalous dissensions which were disturbing Christianity through the intrigues of three rival popes, Benedict IX., Sylvester III., and Gregory IV. By his energetic maintenance of the integrity of the empire, he gained opportunities of adding new territories to the imperial states, for having retaliated on the Duke of Bohemia for the hostilities which he had carried on against the Poles during the intestine disorders of Poland, his decisive successes compelled the Bohemian duke to acknowledge himself vassal of the empire; while H.'s campaign against Hungary had a similar result, terminating in 1047 in the recognition of the supreme power of the emperor over the kings of Hungary. He also secured powerful vassals in Italy, in the Norman conquerors of Apulia and Calabria.

H. devoted the short intervals of peace which he enjoyed to the eradication of numerous abuses in the church, but his schemes of ecclesiastical reform were secretly frustrated by Hildebrand, afterwards Gregory VII. (q. v.); and on the sudden death of H., who is supposed to have been poisoned, the papal chair was found to have already entered upon decisive measures for its emancipation from imperial influence. H. distinguished himself as the zealous promoter of learning and the arts, especially music. He also founded numerous monastic schools, over which he placed learned monks of Brittany, and built several churches, and the cathedrals of Worms, Mayence, and Spires, in the last of which he was interred.

HENRY IV., Emperor of Germany, the son and successor of the former, was born in 1050, elected king of the Germans in 1054, during the lifetime of his father, crowned emperor 1084, and died 1106. As he was only five years old at the death of his father, the regency was, in accordance with the wishes of the latter, confided to the child's mother, Agnes of Poitiers. H.'s perpetual quarrels with the Saxon princes and peers occupied his best years, and were the principal cause of the subsequent troubles and mortifications which have given a memorable interest to his history. Unhappily for him, he was induced in 1074, after having suffered defeat and various insults at the hands of his Saxon vassals, to appeal to the pope for his intervention; and Gregory VII., who was only too happy to have an opportunity of interfering in the matter, despatched plenipotentiaries to settle the differences in Saxony, and availing himself of the occasion to prosecute his own plans, commanded the king to abstain from the sale and granting of benefices while this quarrel was pending. Before these directions reached Germany, H. had, however, settled his own affairs by defeating the Saxon insurgents in a great battle at Hohenburg, taken their princes captive, and rebuilt all the strongholds which they had dismantled; while his councillors had prosecuted a vigorous business in the interdicted sale of benefices. H. not only approved their conduct, but responded to the pope's remonstrances on the subject, and his summons for his appearance at Rome, by declaring, through an assembly of German bishops and abbots, which met at Worms in 1076, that the pontiff was deposed. Gregory VII. retaliated by excommunicating and deposing H., and absolving his subjects from all future obedience towards him. The king at first made light of the sentence, but when he found his vassals and princes gradually falling away from their allegiance, while the electors held a diet in which they declared that unless the ban were removed within a twelvemonth, they would deprive him of the crown, he submitted; and accompanied only by his faithful consort and their eldest son, he hastened, under grievous difficulties, in midwinter, to Italy, where he sought the pope. For three days in January 1077, H., barefooted, and clothed only in the haircloth shirt of a penitent, was compelled to stand without the castle gates of Canossa, exposed to the inclemency of the weather, before the pontiff consented to remove the ban of excommunication.

After this event, H.'s courage and resentment speedily revived; and having found adherents among the Lombards, he began a conflict against the papal power, chiefly in regard to the right of investiture, in which he was generally successful. Gregory again excommunicated H., who, as usual, retaliated by electing a new pope, Clement III. Hastening over the Alps, he laid siege to Rome. Gregory took refuge in the castle of St Angelo, and H. caused himself to be crowned emperor by the anti-pope; but finding that Hermann of Luxemburg had, during his absence, been elected king of Germany, he hastily left Rome to regain his lost power. For the third time H. crossed the Alps in 1090, and he had already succeeded in raising the fortunes of his friend, Clement III., taken Mantua, and gained many victories over the Guelphic princes and their favourite pope, Urban II., when he suddenly learned that his son Conrad had joined his enemies, and been crowned king at Monza. H.'s despair on hearing of these acts of rebellion nearly unsettled his reason, and having retired to one of his Lombard castles, he remained for several years in seclusion; but at length rousing himself from his lethargy, he returned in 1096 to Germany, where the princes and people now vied with one another to shew him their sympathy and good-will. By his own request, his second son, Henry, was elected king of the Germans, and his successor in the empire. This prince, however, having been induced to rise against his father by Pope Pascal II., took him prisoner, and forcibly compelled him to abdicate. The emperor escaped from his prison, and found friends and safety at Liege, where he died, August 7, 1106, while preparing another army to continue the struggle. See, for the lives of Henry III. and IV., Adamus Bremensis, *Historia Ecclesiastica;* Sismondi, *Italian Republics;* and *Europe during the Middle Ages;*

Schmidt, *Histoire des Allemands;* Söltl, *H. IV. Kaiser und König der Deutschen.*

HENRY, surnamed The Navigator, a famous Portuguese prince, the fourth son of John I., king of Portugal, was born at Oporto in 1394, and first distinguished himself at the conquest of Ceuta in 1415. After the death of his father, he took up his residence at the town of Sagres, in Algarve, not far from Cape St Vincent; and while prosecuting the war against the Moors of Africa, his sailors reached parts of the ocean which the navigation of the time had long supposed to be inaccessible. The grand ambition of H. was the discovery of unknown regions of the world. At Sagres he erected an observatory, to which he attached a school for the instruction of youthful scions of the nobility in the sciences necessary to navigation. Subsequently, he despatched some of his pupils on voyages of discovery, which resulted at last in the discovery of the Madeira Islands in 1418. H.'s thoughts were now directed towards the auriferous coasts of Guinea, of which he had heard from the Moors; and in 1433, one of his mariners sailed round Cape Nun, until then regarded as the furthest point of the earth, and took possession of the coasts as far south as Cape Bojador. Next year, H. sent out a larger ship, which reached a point 120 miles beyond Cape Bojador; and at last, in 1440, Cape Blanco was reached. Up to this period, H. had borne all the expense of these voyages himself; henceforth, self-supporting societies were formed under his patronage and guidance, and what had formerly been the affair of a single individual, now became the passion of a whole nation. But H. did not slack personally in his efforts. In 1446, his captain, Nuno Tristan, doubled Cape Verd in Senegambia, and in 1448, Gonzalez Vallo discovered three of the Azores. H. died in 1463, after he had the satisfaction of learning that his mariners had reached as far south as Sierra Leone. See Wappäus, *Untersuchungen über die Geogr. Entdeckungen der Portugiesen unter H., dem Seefahrer* (Gött. 1842). See also Barros and Candido Lusitano, whose *Vida do Infante don Henrico* was translated into French by the Abbé Cournand (Paris, 2 vols. 1781).

HENRY, surnamed The Lion, Duke of Saxony, is the most notable German prince of the 12th century. He was the son of Henry the Proud, and was born in 1129. When only ten years of age, he lost his father by poison, and for the next seven years, his mother, Gertrude, and his grandmother, Richenza, ruled his paternal dominions, while his uncle, Welf (Guelf), administered the hereditary fiefs of Bavaria. In 1146, Henry himself took the reins of government, and at the diet of Frankfurt, in the following year, he demanded of the Emperor Conrad the restoration of the whole duchy of Bavaria, which had been wrested from his father. This was refused, and Henry at once, in concert with his uncle, had recourse to arms; but his efforts were crushed by the energetic measures of Conrad. After the death of this emperor, however, Bavaria was given up to him by his cousin, the Emperor Frederick I. His possessions now extended from the North Sea and the Baltic to the shores of the Adriatic. Eastphalia and Westphalia, with Engern, and the old duchy of Saxony from the Rhine to the Elbe, acknowledged his authority. The greater part of Bavaria belonged to him as a hereditary fief, while his Italian vassals in the Guelfic dominions beyond the Alps took the oath of allegiance to him in 1157. In 1166, under the direction of Hartwig, Archbishop of Bremen, a league, comprising the bishops of Magdeburg, Halberstadt, and Hildesheim, and the markgrafs of Thuringia and Brandenburg, was formed against him; but the capture of Bremen, and the storming of Oldenburg by H., paralysed its designs. About this time he separated from his first wife, and married Matilda, daughter of Henry II. of England, soon after which event he undertook an expedition to Palestine. During his absence, his enemies were not idle, and even the Emperor Frederick displayed a decided want of good faith, conduct which H., some time after his return, shewed he had not forgotten, by quitting the imperial army during an Italian campaign, and thereby causing Frederick to lose the battle of Legnano, and forcing him to conclude a disadvantageous treaty. The emperor was indignant, and at the diet of Spires, in 1178, spoke strongly against the duke. The numerous enemies of the latter again combined against him; he was summoned to appear at three different diets, and refusing, was put under the ban of the empire. By 1182 his fortunes were at so low an ebb, that he was forced to ask mercy of the emperor at Erfurt; but all that he could get was permission to retain his hereditary territories of Brunswick and Luneburg, and even this was on the condition of his going into exile for three years. H., in consequence, betook himself with his family to England, but returned to Brunswick in 1184, where he lived quietly. On the departure of Frederick for Palestine in 1188, H. was again necessitated to withdraw to England, but returned in 1189, and after a year's fighting, a peace was concluded between him and his enemies, by which a portion of his former territories was restored to him. He died at Brunswick in 1195. H. was a brave and generous prince, of indefatigable activity, but obstinate and passionate. What raised him above the princes of his time was his efforts to advance the commerce, industry, and comfort of his people, and to foster literature and science. Compare Böttiger's *Heinrich der Löwe Herzog der Sachsen und Baiern* (Hannov. 1819).

HENRY, Matthew, an eminent Nonconformist divine, the second son of Philip Henry, one of the 2000 ministers who left the Church of England on the passing of the 'Act of Uniformity,' was born at Broad Oak Farmhouse, in Flintshire, October 18, 1662. Having qualified himself for the ministry, he began to preach in June 1686, and in 1687 was settled as pastor of a congregation of dissenters at Chester, where he continued for 25 years. In May 1712, he removed to a charge at Hackney, near London, having refused two previous invitations from the same congregation. He died of apoplexy, June 22, 1714, while on his return from a visit to his old friends at Chester. He was twice married, and had a large family by his second wife. His principal work is an *Exposition of the Old and New Testament*, in 5 vols. folio, 1710, which was commenced in November 1704, and has been often reprinted. He lived to finish only the Acts of the Apostles. The remainder was completed by various ministers, whose names are given in some of the editions. His first publication, entitled *A Discourse concerning the Nature of Schism*, 34 pages duodecimo, appeared anonymously in 1689. He was also the author of a biographical sketch of his father, 1696; *A Scripture Catechism*, 1702, 8vo; *Communicant's Companion*, 1704, 8vo; *Discourses against Vice and Immorality*, 1705; *A Method of Prayer*, 1710, 8vo; *Family Hymns;* numerous sermons; and some religious tracts. His miscellaneous works were republished at London in 1830, 8vo.

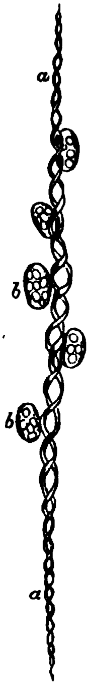
HENRY, Patrick, an eminent American orator, was born in Hanover county, Virginia, in 1736. His father was a native of Scotland, and a nephew of Robertson, the celebrated historian. In early life, H. was passionately addicted to angling and hunting, and seemed too indolent to apply himself to any regular occupation. He managed, however, to pick up a good deal of general information, and he seemed to possess by intuition a profound knowledge of human nature in all its various phases. Having failed successively in 'store-keeping' and in farming, he at length was induced to try the profession of law. For a few years this seemed to promise no better success than his former occupations had done, but having been employed in 1755 to plead the cause of the people against an unpopular tax, his peculiar talent seemed suddenly to develop itself; his eloquence, untaught except by the inspiration of native genius, thrilled the audience, and held it in rapt attention more than two hours. From that moment to the present day he has been universally regarded as the greatest of American orators. He was a zealous patriot in the war of the revolution, and was one of the most prominent and influential members of the Virginia legislature, when that state was deliberating whether or not to join Massachusetts in forcibly resisting the arbitrary policy of the home-government. H. was a delegate to the first general Congress, which met at Philadelphia in September 1774, and his voice was the first to break the silence of that assembly. His eloquence on that occasion is said to have astonished all his hearers. In 1776, he was elected governor of Virginia, and was afterwards twice re-elected. In 1795, Washington appointed him secretary of state. He died in 1799.

HENRY, Robert, D.D., a Scotch historian and divine, was born at St Ninians, in Stirlingshire, February 18, 1718. He studied at the university of Edinburgh; and from 1768 till his death in 1790, was one of the ministers of the Established Church in that city. His *History of Great Britain on a New Plan*—the first volume of which was published in 1771, and the sixth in 1793, after his death—is a respectable performance, and the 'new plan' on which it professes to be written—viz., that of embracing the social aspects of successive periods, and thus tracing the progress of civilisation in Great Britain—was unquestionably an improvement on anything that had been done before; but the work has no pretensions to critical acumen or even strict accuracy, and consequently is now of little value.

HENRY, William, F.R.S., an eminent chemist, was born in 1774 in Manchester, and died in 1836 at Pendlebury near that city. After studying medicine in the Manchester Infirmary, under the guidance of Drs Percival and Ferriar, H. attended the lectures of Black, Gregory, &c., in Edinburgh, in the session 1795—1796. After an interval of several years, in which he was chiefly engaged in superintending a chemical business which had been established by his father, he returned to Edinburgh in 1805, and received the degree of Doctor of Medicine from that university in 1807. From that time till shortly before his death, he devoted himself to the allied subjects of chemistry and medicine. He was the author of nine papers in the *Philosophical Transactions* (chiefly on the chemistry of the gases); and his *Elements of Experimental Chemistry*, in two volumes, which was published in 1799, reached an eleventh edition in 1829, an almost unparalleled success for a purely scientific work. H., like Dr Wollaston, made the results of science, obtained by the most original and difficult researches, the foundation of a splendid fortune, and few persons have contributed more effectually by the application of their discoveries to the promotion of the arts and manufactures. The Memoirs of the Manchester Society are chiefly indebted to him and to Dalton for their high scientific character.

HE'PAR (Gr. *hepar*, the liver) is the name given by the older chemists to various compounds of sulphur, from their brown, liver-like colour; of these, *Hepar sulphuris*, which is in reality a mixture of tersulphide of potassium and some oxysalts of potash, is the best known.—Hepatic, belonging to the liver; as, *hepatic* artery, vein, duct, &c.—Hepatica. This term has been given by writers on *materia medica* to medicines which affect the liver and its appendages. The hepatica may be employed (1) to modify the secretion of bile; (2) to remove pain of the liver or gall-bladder, or pain and spasm of the gall-ducts; or (3) to relieve enlargements and other affections of the liver.

HEPA'TICÆ, or **LIVERWORTS**, a natural order of cryptogamous plants, included among mosses by the older botanists. They have generally a leafy stem; more rarely they are expanded into a leaf-like form. The reproductive organs are of two kinds, *antheridia* and *pistillidia*, as in mosses; the spore-cases (capsules, matured pistillidia) have no operculum; open when ripe by 4—8 valves, more rarely by teeth; and generally contain, along with the spores, spiral filaments called *elaters*. Each elater consists of two spiral fibres, which, whilst the spore-case is unbroken, remain coiled up together within an oval cell; but when, by the breaking of the mature spore-case, the outer pressure is removed, their elasticity bursts their cells, and as they suddenly extend themselves, they aid in the dispersion of the spores. The H. are found in situations generally similar to those of mosses; and are widely distributed over the globe; but the greater number belong to warm climates, where they often grow on the bark, and even on the leaves of trees. Some botanists divide H. into three orders, *Jangermanniaceæ*, *Marchantiaceæ*, and *Ricciaceæ*.



Elater and Spores of Marchantia:
a, elater; *b*, spores.

HEPATI'TIS (Gr. *hepar*, the liver), inflammation of the liver. Hepatitis is a rare disease in temperate latitudes, and in tropical climates is often so acute and so rapidly fatal as to admit but little of medical treatment. It is indicated by pain in the right side and shoulder, tenderness on pressure in the right hypochondrium (see Abdomen), with enlargement of the liver as detected by the hand and by percussion, often vomiting, always fever, with more or less loss of appetite and a foul tongue. Not unfrequently there is Jaundice (q. v.). The disease sometimes ends in abscesses, which may require to be opened externally. The treatment is complicated, and cannot be ventured upon without professional assistance. The other diseases of the liver will be treated of under Liver, Diseases of.

HEPHÆ'STUS. See Vulcan.

HE'PTAGON, a plane figure of *seven* sides and *seven* angles; when the sides and angles are equal, the figure is a *regular heptagon*. Geometers have hitherto failed to discover a method of inscribing the heptagon in, or of circumscribing it about a circle, and the problem is believed by many to be, like 'the trisection of an angle,' impossible of solution by the ancient geometry.

HE'PTARCHY, The, is the name given to seven kingdoms said to have been established by the Saxons in England. See Anglo-Saxons. The common idea is, that these seven kingdoms were contemporaneous; but all that can be safely asserted is, that England, in the time of the Saxons, was peopled by various tribes, of which the leading occupation was war; and that sometimes one was conquered, sometimes another. At no time was there a counterpoise of power among seven of them, so that they could be said to have a separate, much less an independent existence. Still, seven names do survive (some authorities adding an eighth). The king of the one that had the fortune to be most powerful for the time being, was styled Bretwalda or ruler of Britain, but in most instances the power of this supposed ruler beyond the limits of his own territory must have been very small. Under Egbert, Wessex rose to be supreme, and virtually swallowed up the others. The following is a brief account of the seven kingdoms commonly said to have formed the Heptarchy:

1. Kent, after the battle of Creccanford, in which 4000 Britons were slain, was abandoned by the Britons, and became the kingdom of their conquerors, a band of Jutes, who had come in 446 A.D. to serve Vortigern, king of the Picts, as mercenaries, under the leadership of Hengist and Horsa, who were little other than pirates. Hengist became king of Kent, and his son Eric or Aesc succeeded him, and from him his descendants, the kings of Kent, were called Aescingas. In 796, Kent was conquered by Cenwulf, king of Mercia; and about 823 both were conquered by Egbert, king of Wessex, who appointed his son Ethelwulf king of Kent, which hereafter, though separate in name, was really subordinate to Wessex.

2. Sussex, partially conquered about 477, and wholly, before 491, by Ella the Saxon, who was the first bretwalda of Britain. Sussex submitted to Egbert of Wessex in 828, and his son Athelstane governed it under him.

3. Wessex, though fluctuating in extent, as all the kingdoms did, included Surrey, Hants, the Isle of Wight, Berks, Wilts, Dorset, Somerset, Devon, and part of Cornwall. It was founded about 494 by Cerdic and Cynric his son, 'Ealdormen' or leaders of the 'old Saxons.' King Egbert, who returned from a flight to Gaul in 800, and ruled from that year till his death in 836, was, as a conqueror, the most successful of all these Saxon kings. When he died, his dominions were divided between his sons, Ethelwulf and Athelstane, the former taking Wessex Proper, and the latter Kent, Essex, Sussex, and Surrey. Another Athelstane, who succeeded in 925 to Mercia and Wessex, conquered Exeter, and assumed Northumbria, exacted tribute from the Welsh, and some formal submission from the Britons of the west, as well as the Danes and Scots. He appears occasionally to have held witenagemôtes or Saxon parliaments of subordinate chiefs (*subreguli*), and at one of these, Constantine, king of Scotland, appeared as a *subregulus*. But Athelstane and his successors, as well as his predecessor, Alfred the Great, belong to the history of England, as indeed do all the Saxon states and kings after Egbert.

4. Essex, which comprised also Middlesex, if ever independent, was so about 530 A.D.; but early in the 7th c. it became subject to Mercia, and fell with it to Wessex in 823. This state and Sussex and Wessex were founded by the old Saxons; the remaining three by the Angles who came from Holstein, and gave their name to England.

5. Northumbria consisted of Bernicia and Deira, which were at first separate and independent states. The former comprised Northumberland and all Scotland south of the Forth, and was founded by Ida about 560. The latter comprised Cumberland, Durham, York, and Lancaster, and was founded by Ella the Angle about the same date. These two were united about 655, and as Northumbria, they submitted to Egbert in 829.

6. East Anglia, comprising Norfolk, Suffolk, and Cambridge, was founded about 571 by Uffa, and from him its kings were named Uffingas. In 883, it was conquered by the Danes, and was only restored to Saxon rule by Athelstane in 925.

7. Mercia included the counties in the centre of the kingdom, and is said to have been founded by Crida or Creoda in 585. Three-quarters of a century later, it was conquered for a time by Northumbria, but it recovered its independence, and retained it until Egbert subdued it. Canute the Dane had it and Northumbria ceded to him in 1016, just before Edmund Ironside's death allowed him to become king of England, and the Danes to obtain the ascendency over the Saxons, for which they had been striving, at intervals, for five generations. Compare Palgrave's *Rise and Progress of the English Commonwealth* (2 vols. Lond. 1832).

HERA. See Juno.

HERACLEI'A, an ancient city of Magna Græcia, situated on the right bank of the Aciris (the modern Agri), about three miles above the mouth of that river in the Gulf of Tarentum. It was founded about 432 B.C., and although under the Romans it became a prosperous, important, and refined city, it never acquired any historical prominence. When it fell into decay, is not known, but at the present day little more remains to mark its site than heaps of rubbish. In the neighbourhood, besides a large number of coins, ranking among the very finest relics of antiquity, there have been discovered certain bronze tables, known as the *Tabulæ Heracleenses*, containing a copy of the *Lex Julia Municipalis* (45 B. C.), and forming one of the principal authorities for a knowledge of the municipal law of ancient Italy. This inscription has been published by Muratori, Savigny, and others.

HERACLEI'DÆ. This term means, in its widest sense, all 'the descendants of Heracles' (Hercules), of whatever time, and in whatever district of Greece, but is specially applied to those adventurers who, founding their claims on their supposed descent from the great hero (to whom Zeus had promised a portion of the land), joined the Dorians in the conquest of the Peloponnesus. There were five different expeditions, the last and greatest occurring eighty years after the Trojan war. The leaders of this last were Temenus, Cresphontes, and Aristodemus, sons of Aristomachus. They defeated Tisamenus, son of Orestes, and grandson of Agamemnon, and thus gained possession of Argos, Sparta, and Mycenæ. The other parts of the country quickly submitted to them, and they then proceeded to divide the spoil. Argos fell to Temenus; Lacedæmon to Procles and Eurystheus, the sons of Aristodemus; and Messenia to Cresphontes. This story of the return of the Heraclidæ touches on the historical period, and though there is much of fable and tradition, yet there seems to be also a large substratum of truth in the records.—See Müller's *Dorians*, Thirlwall's and Grote's *Greece*.

HERACLEI'TUS, a Greek philosopher, was born at Ephesus, in Asia Minor, and flourished about 500

B. C. He is said to have travelled much, and to have been very sorrowfully impressed with the weaknesses of his fellow-creatures, whence, according to old traditions, he obtained the nickname of the 'weeping philosopher,' in contrast to Democritus, 'the laughing philosopher.' He died at the age of 60. The result of H.'s researches and meditations was a work on the nature of things, said to have been entitled *Peri Physeōs* (On Nature). Such fragments of it as remain were collected and elucidated by Schleiermacher in Wolf and Buttmann's ***Museum der Alterthumswissenschaften*** (vol. i. part 3, Berlin, 1805). From these, it appears that he considered fire to be the first principle of all phenomena, and the original substance out of which they have all been evolved. H. was neither a very original nor a very coherent thinker, and his speculations deserve little attention.

HERA'CLIUS, a Byzantine emperor (610—641), of splendid but fitful genius, was descended from a line of brave ancestors, and was born in Cappadocia about 575 A. D. His father, also named Heraclius, was exarch or governor-general of Africa. Regarding H.'s youth we know almost nothing; but when upwards of thirty, he took part in a conspiracy (which proved successful) against the emperor Phocas, whose horrible cruelties had made him universally detested. In 610, H., at the head of a fleet, appeared at Constantinople: the citizens rose in rebellion, Phocas was beheaded, and H. saluted emperor in his stead. His fellow-conspirators were richly rewarded. The condition of the Byzantine empire at this time was deplorable. Factions within and the barbarians without had almost reduced it to ruin, so that years elapsed before H. could put forth any vigorous efforts for its reorganisation. His most powerful enemies in the north were the Avari, who, in 619, plundered the country to the very gates of Constantinople, nearly captured H. himself, and are said to have carried with them to their homes beyond the Danube 250,000 prisoners. The whole western empire had by this time been seized by the Slaves, Lombards, Visigoths, and other tribes; but by far the most alarming conquests were those made in the East by the Persian king, Chosroës II. In 615, Sarbar, the Persian general, stormed and plundered Jerusalem. The same fate befell Alexandria in the following year, after which all Egypt yielded to the victorious Sarbar, who penetrated as far as Abyssinia. By stopping the export of corn from Egypt to Constantinople, he likewise caused a severe famine in the latter city. In the same year (616), the Persians besieged and captured Chalcedon, opposite Constantinople. H. at first tried to negotiate with his enemies, but flushed with their triumphs, they refused, and even put his ambassadors to death. Probably, the emperor, who was now laying his plans for taking a magnificent revenge on the Persians, was not greatly displeased at their refusal. Having, after a whole year of laborious discipline, organised an army composed of Greeks and barbarians, he, in 622, shipped his troops at the Bosporus, and sailed for Cilicia. Having landed, he encamped in the plain of Issus, completely routed a Persian army despatched against him, and forced his way through the passes of the Taurus and Anti-Taurus, into the province of Pontus, where his soldiers wintered. In 624, he crossed Armenia, conquered several of the Perso-Caucasian countries, and reached the Caspian Sea. Here he formed an alliance with the khan of the Khazars, who ruled over the sterile regions north of the Caucasus, as far as the river Ural. By the assistance of these and other barbarians, he attacked Media, and carried his arms as far south as Ispahan. Before going into winter-quarters, he again utterly defeated the main body of the Persians, commanded by Chosroës himself. In 625, H. descended from the Caucasus into Mesopotamia, and thence proceeded into Cilicia, where a sanguinary engagement took place between him and Sarbar; the Persians were routed with immense slaughter, and Sarbar fled to Persia. During the next two years (626—628), the glory of H. culminated. He carried the war into the heart of the Persian empire, and in December 627, cut to pieces the forces of Rhazates, the Persian general, near the junction of the Little Zab and the Tigris. An immense booty fell into the hands of the victors. A few days after, H. took Artemita or Dastagerd, the favourite residence of Chosroës, and here the Arabic historians exhaust hyperbole in attempting to state the enormous treasure which the Byzantine emperor captured. Chosroës fled into the interior of Persia, and was soon afterwards seized, imprisoned, and starved to death by orders of his son and successor Siroes, who was glad to conclude a peace with H., by which the Persians gave up all their former conquests. The fame of H. now spread over the whole world, and ambassadors came to him from the remotest kingdoms of the East and West; but a new and terrible enemy suddenly arose in the South. The Arabs, filled with the ardour of a new and fierce faith, had just set out on their career of sanguinary proselytism. The war begun during the life of the Prophet himself, was continued by his successors, Abubekr and Omar. H. no longer commanded the Byzantine forces himself, but wasted his days in his palace at Constantinople, partly in sensual pleasures, and partly in wretched theological disputations. His mighty energies were quite relaxed; and before the close of his life, Syria, Palestine, Mesopotamia, and Egypt were in the hands of the califs. H. died in 641.

HE'RALD (derivation uncertain), an officer whose duty consists in the regulation of armorial bearings, the marshalling of processions, and the superintendence of public ceremonies. In the middle ages, heralds were highly honoured, and enjoyed important privileges; their functions also included the bearing of messages, whether of courtesy or defiance, between royal or knightly personages; the superintending and registering of trials by battle, tournaments, jousts, and all chivalric exercises; the computation of the slain after battle; and the recording of the valiant acts of the falling or surviving combatants. The office of herald is probably as old as the origin of coat-armour. The principal heraldic officers are designed kings-of-arms or kings-at-arms, and the novitiates or learners are styled pursuivants. Heralds were originally created with much ceremony; they are now appointed by the Earl Marshal in England, and by the Lyon King-of-Arms in Scotland. There are now in England three kings-of-arms, named by their offices Garter, Clarencieux, and Norroy; six heralds—Somerset, Chester, Windsor, Richmond, Lancaster, and York; and four pursuivants, Rouge Dragon, Portcullis, Blue Mantle, and Rouge Croix. There have been at different periods other heralds, whose titles are now laid aside; heralds extraordinary have also sometimes been created, as Edmonson, by the title of Mowbray, in 1764. In Scotland, the principal heraldic officer is Lyon King-of-arms; and there were till lately six heralds—Snowdoun, Albany, Ross, Rothesay, Marchmont, and Ilay; and six pursuivants—Unicorn, Carrick, Kintyre, Ormond, Dingwall, and Bute. By 30 Vict. c. 17, the permanent number of heralds and pursuivants in Scotland is reduced to three of each. Ireland has one king-of-arms, Ulster; two heralds, Cork and Dublin; and two pursuivants, of whom the senior bears the title of Athlone, and the other is called the pursuivant of St Patrick.

The official costume of a herald consists of an embroidered satin tabard or surcoat of the royal arms, and a collar of SS. See King-at-Arms, Pursuivant, Heralds' College.

HE'RALDRY is properly the knowledge of the whole multifarious duties devolving on a herald (see Herald); in the more restricted sense, in which we shall here consider it, it is the science of armorial bearings. After occupying for ages the attention of the learned, and forming an important branch of a princely education, the study of heraldry fell, in later times, into neglect and disrepute, and was abandoned to coach-painters and undertakers, a degradation owing in part to the endless tissue of follies and mystifications that had been interwoven with it. Modern criticism has rescued heraldry from the pedantries and follies of the heralds, and imparted to it a new interest, as a valuable aid to historical investigations.

Though we have instances in remote times of nations and individuals distinguishing themselves by particular emblems or ensigns, nothing that can properly be called armorial bearings existed before the middle of the 12th century. The shields of the French knights in the first crusade presented a plain face of polished metal, nor is there any evidence of heraldic devices having been in use in the second crusade in 1147. But the Anglo-Norman poet Wace, who flourished in the latter part of the 12th c., mentions devices or cognizances as being in use among the Normans, 'that no Norman might perish by the hand of another, nor one Frenchman kill another;' and Wace is curiously corroborated by the Bayeux tapestry of the 12th c., where there are figures of animals on the shields of the invaders, while the Saxon shields have only borders or crosses. The rude devices on these shields have nothing approaching to an armorial form or disposition, yet it is probable that systematic heraldry sprang out of them, but it is difficult to say when they assumed that hereditary character which is essential to the idea of armorial bearings. Some sort of armorial insignia were depicted on the shields used in the third crusade, which took place in 1189; and in the same half century originated the fleurs-de-lis of France and the lions of England. The transmission of arms from father to son seems to have been fully recognised in the 13th c., and in the practice then introduced of embroidering the family insignia on the surcoat worn over the hauberk or coat of mail, originated the expression *coat of arms*. Arms were similarly embroidered on the jupon, cyclas, and tabard, which succeeded the surcoat, a practice which survived till the time of Henry VIII., when the tabard came to be entirely disused except by heralds, who still continue to wear on their tabards the royal arms.

It was by slow degrees that the usage of arms grew up into the systematised form which it assumes in the works of the established writers on heraldry. The principal existing data for tracing its progress are English rolls of arms yet extant of the times of Henry III., Edward I., and Edward III. The earliest formal treatises date no further back than the end of the 14th c., before which time the whole historical part of the subject had been obscured by a tissue of gratuitous fictions, which has misled most subsequent writers up to a very recent period. The professors of the science represent the heraldry of the 10th and 11th centuries as equally sharply defined with that of the 15th and 16th. The arms of William the Conqueror and his sons are described with all their differences; arms are ascribed to the Saxon kings of England, to Charlemagne, and even to half-mythical persons and heroes of classical times. It is rather surprising to find this fictitious heraldry understood and systematised early in the 14th century. The arms traditionally considered to be those of Edward the Confessor were sculptured in Westminster Abbey in the reign of Edward II.

In the infancy of heraldry, every knight assumed what arms he pleased, without consulting sovereign or king-at-arms. Animals, plants, imaginary monsters, things artificial, and objects familiar to pilgrims, were all fixed on; and whenever it was possible, the object chosen was one whose name bore sufficient resemblance in sound to suggest the name or title of the bearer of it. There is reason to believe that early arms were generally *armes parlantes*, though the allusion has in many cases ceased to be intelligible from the old name of the object being forgotten. The charge fixed on was used with great latitude, singly or repeated, or in any way which the bearer chose, or the form of his shield suggested. But as coats of arms became more numerous, confusion often arose from different knights adopting the same symbol; and this confusion was increased by a practice which crept in of sovereigns or feudal chiefs allowing their arms, or part of them, to be borne as a mark of honour by their favourite followers in battle. Hence different coats of arms came in many instances so closely to resemble each other, that it was imperative, for distinction's sake, that the fancy of the bearer should be restrained, and regulations laid down regarding the number and position of the charges, and the attitudes of the animals represented. This necessity led, in the course of time, to the systematising of heraldry, a process which the rolls alluded to shew us was going on gradually throughout the 13th and 14th centuries. By the time that heraldry was consolidated into a science, its true origin had been lost sight of, and the credulity and fertility of imagination of the heralds led them to invest the most common charges with mystical meanings, and to trace their original adoption to the desire of commemorating the adventures or achievements of the founders of the families who bore them. The legends ascribing an origin of this sort to the early armorial bearings have, in nearly all instances where it has been possible to investigate them, turned out to be fabrications. It was only when heraldry began to assume the dignity of a science, that augmentations of a commemorative character were granted, one of the earliest known instances being the heart added to the coat of Douglas, in commemoration of the good Sir James's pilgrimage with the heart of King Robert. After the science became thoroughly systematised, augmentations and new coats were often granted with a reference to the supposed symbolical meanings of the charges.

In England, the assumption of arms by private persons was first restrained by a proclamation of Henry V., which prohibited every one who had not borne arms at Agincourt to assume them, except in virtue of inheritance or a grant from the crown. To enforce the observance of this rule, heralds' visitations or processions through the counties were instituted, and continued from time to time till the reign of William and Mary. See Visitations, Heralds'.

Jurisdiction in questions of arms is executed by the Heralds' College in England, the Lyon Court in Scotland, and the College of Arms in Ireland. No one within the United Kingdom is entitled to bear arms without a hereditary claim by descent, or a grant from the competent authority; and the wrongful assumption of arms is an act for which the assumer may be subjected to penalties. See Heralds' College, and Lyon Court. The use of arms, whether rightfully or wrongfully, subjects the bearer of them to an annual tax. It is illegal to use without authority not only a coat of arms, but even a crest. Any figure or device placed on a heraldic wreath (see WREATH) is considered a crest in questions with the Heralds' College or Lyon Court, as well as in questions with the Commissioners of Inland Revenue. It shews how deeply the passion for outward distinction is implanted in human nature, when we find people in countries such as the United States, where all differences of rank are theoretically repudiated, assuming heraldic devices, each man at his own hand.

Besides individuals, communities and states are entitled to the use of arms, and heralds have classified arms, in respect of the right to bear them, under the following ten heads: 1. Arms of dominion; the arms borne by sovereigns as annexed to their territories. 2. Arms of pretension, which sovereigns have borne, who, though not in possession, claim a right to the territories to which the arms belong. Thus, England bore the arms of France from the time of Edward III. till 1801. 3. Arms of community; the arms of bishops' sees, abbeys, universities, towns, and corporations. 4. Arms of assumption; arms which one has a right to assume with the approbation of the sovereign. Thus, it is said, the arms of a prisoner at war may be borne by his captor, and transmitted by him to his heirs. 5. Arms of patronage; added by governors of provinces, lords of the manor, patrons of benefices, &c., to their family arms, as a token of superiority, right, or jurisdiction. 6. Arms of succession, borne quartered with the family arms by those who inherit fiefs or manors, either by will, entail, or donation. Thus, the Dukes of Athole, as having been lords of the Isle of Man, quarter the arms of that island, and the Duke of Argyle quarters the arms of the lordship of Lorn. 7. Arms of alliance, taken up by the issue of heiresses, to shew their maternal descent. 8. Arms of adoption, borne by a stranger in blood, to fulfil the will of a testator. The last of a family may adopt a stranger to bear his name and arms and possess his estate. Arms of adoption can only be borne with permission of a sovereign or king-at-arms. 9. Arms of concession; augmentations granted by a sovereign of part of his royal arms, as a mark of distinction, a usage which, we already observed, obtained in the earliest days of heraldry; and hence the prevalence among armorial bearings of the lion, the fleur-de-lis, and the eagle, the bearings of the sovereigns of England and Scotland, of France, and of Germany. 10. Paternal or hereditary arms, transmitted by the first possessor to his descendants.

A coat of arms is composed of charges depicted on an escutcheon representing the old knightly shield. The word escutcheon is derived from the French *écusson*, which signified a shield with armorial bearings, in contradistinction from *écu*, a shield generally. The shields in use in England and France in the 11th and 12th centuries were in shape not unlike a boy's kite, a form which seems to have been borrowed from the Sicilians; but when they became the recipients of armorial bearings, they were gradually flattened and shortened. From the time of Henry III., the escutcheon has been most frequently represented on seals as of something approaching to a triangular form, with the point downwards, the chief exceptions being that the shield of a lady is lozenge-shaped, and of a knight-banneret square. To facilitate description, the surface or field of the escutcheon has been divided into nine points (fig. 1), technically distinguished by the following names: A, the dexter chief point; B, the middle chief; C, the sinister chief; D, the honour or collar point; E, the fess point; F, the nombril or navel point; G, the dexter base point; H, the middle base; and I, the sinister base point. It will be observed that the dexter and sinister sides of the shield are so called from their position in relation not to the eye of the spectator, but of the supposed bearer of the shield.

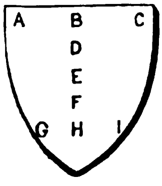


Fig. 1.

Coats of arms are distinguished from one another, not only by the charges or objects borne on them, but by the colour of these charges, and of the field on which they are placed. The field may be of one colour, or of more than one, divided by a partition line or lines varying in form. The first thing, then, to be mentioned in blazoning a shield—that is, describing it in technical language—is the colour, or, as it is heraldically called, *tincture* of the field. Tinctures are either of metal, colour strictly so called, or fur. The metals used in heraldry are two —gold, termed *or*, and silver, *argent*—represented in painting by yellow and white. The colours are five —red, blue, black, green, and purple, known as *gules*, *azure*, *sable*, *vert*, and *purpure*. Metals and colours are indicated in uncoloured heraldic engravings by points and hatched lines, an invention ascribed to Father Silvestro di Petrasancta, an Italian herald of the 17th century. *Or* (fig. 2) is represented by points; for *argent*, the field is left plain. *Gules* is denoted by perpendicular, and *azure*, by horizontal lines; *sable*, by lines perpendicular and horizontal crossing each other; *vert*, by diagonal lines from dexter chief to sinister base; *purpure*, by diagonal lines from sinister chief to dexter base. The *furs* were originally but two, *ermine* and *vair*. The former is represented by black spots resembling those of the fur of the animal called the ermine, on a white ground. *Vair*, said to have been taken from the fur of a squirrel, bluish-gray on the back, and white on the belly, is expressed by blue and white shields, or bells in horizontal rows, the bases of the white resting on the bases of the blue. If the vair is of any other colours than white and blue, they must be specified. Various modifications of these furs were afterwards introduced, among others, *ermines*, or ermine with the field sable and the spots argent; *erminites*, with a red hair on each side of the black spot; *pean*, with the field sable, and the spots or; *counter-vair*, or vair with the bells of one tincture placed base to base; and *potent counter-potent*, vair with crutch-shaped figures instead of bells.

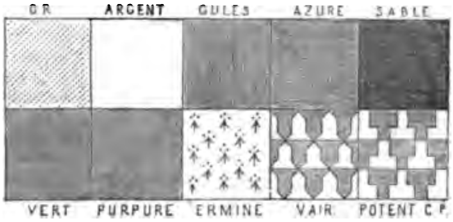
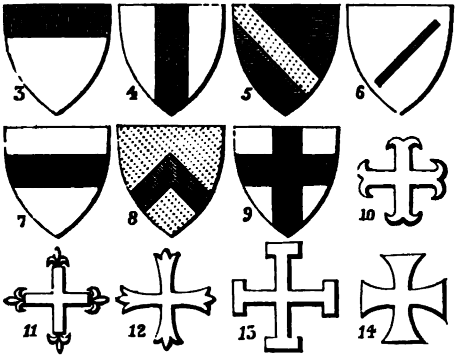


Fig. 2.

It is an established rule of heraldry that metal should not be placed on metal, nor colour on colour; a rule more rigidly adhered to in English than in foreign heraldry. We have one remarkable transgression of it in the arms of the kingdom of Jerusalem founded by the Crusaders, which are argent, a cross potent between four crosses or. A recognised exception exists wherever a charge lies over a field partly of metal and partly of colour, or where an animal is (see *infra*) attired, armed, unguled, crowned, or chained with a tincture different from that of his body. Marks of cadency, chiefs, cantons, and bordures are also occasionally exempted from the general rule, being, according to some heralds, not laid on the shield, but cousu or sewed to it.

Everything contained in the field of an escutcheon is called a *charge*. Charges are divided by heralds into the three classes of honourable ordinaries, subordinaries, and common charges. Under the name of ordinaries or *honourable ordinaries* are included certain old and very frequent bearings, whose true peculiarity seems to be that, instead of being taken from extraneous objects, they are representations of the wooden or metal strengthenings of the ancient shields. They are ten in number: 1. The *Chief* (fig. 3), the upper part of the shield separated from the rest by a horizontal line, and comprising, according to the requirements of heralds, one-third of it, though this proportion is seldom rigidly adhered to.



Figs. 3—14.

Its diminutive is the fillet, supposed to take up one-fourth the space of a chief, in whose lowest part it stands.

2. The *Pale* (fig. 4), a band or stripe from top to bottom, said, like the chief, to occupy one-third of the shield. It has two diminutives, the *Pallet*, one-half in breadth of the pale, and the *Endorse*, one-half of the pallet.

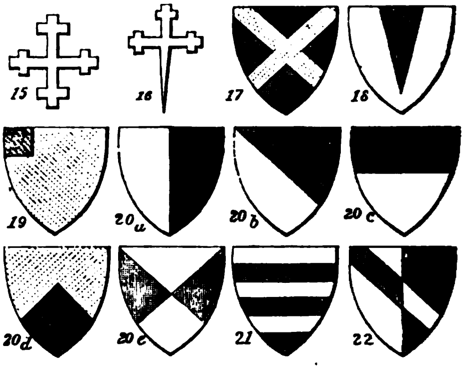
3. The *Bend* (fig. 5), a similar band crossing the shield diagonally from dexter chief to sinister base. Its diminutives are the *Bendlet* or *Garter*, one-half of its breadth; the *Cost* or *Cotise*, one-half of the bendlet; and the *Riband*, one-half of the cotise. The bend is sometimes borne between two cotises, in which case it is said to be *Cotised*, a term sometimes applied with doubtful propriety to the other ordinaries when accompanied with their diminutives.

4. The *Bend Sinister*, a diagonal band from sinister chief to dexter base. Its diminutives are the *Scarpe*, one-half of the bend sinister; and the *Baton* (fig. 6), one-half of the scarpe. The baton stops short of the extremity of the field at both ends, and has been considered a mark of illegitimacy. See Bastard Bar.

5. The *Fess* (fig. 7), a horizontal band in the middle of the shield, said, like the ordinaries already enumerated, to occupy one-third of it. Its principal diminutive is the *Bar*, containing the fifth part of the field; and there are also the *Closet*, one-half of the bar, and the *Barrulet*, one-half of the closet, the latter seldom borne singly.

6. The *Chevron* (fig. 8), composed of two stripes descending from the centre of the shield in diagonal directions like the rafters of a roof. Its diminutives are the *Chevronel*, of half, and the *Couple-close*, one-fourth its width, the latter borne, as its name implies, in pairs, and generally accompanying the chevron—on each side of it.

7. The *Cross* (fig. 9), uniting the pale and fess, an ordinary which was originally like the rest, composed of the clamps necessary to the strength of the shield, but had also the deeper meaning of the symbol of the Christian faith. Besides its plain form, the cross was varied in numerous ways, most of these varieties being, however, rather common charges than ordinaries. Of the 39 lesser crosses mentioned by Guillim, and 109 by Edmonson, a few of the most frequently occurring are the following: the *Cross moline* (fig. 10), with the ends turned round both ways; the *Cross fleury* (fig. 11), of which each limb terminates in a fleur-de-lis; the *Cross patonce* (fig. 12), each limb of which has three points; the *Cross potent* (fig. 13), crutch-shaped at the ends; the *Cross pattée* (fig. 14), small in the centre, but widening towards the ends; and the *Cross crosslet* (fig. 15), crossed at the ends. The latter is the most frequent of all, and borne oftener in numbers than singly. Any of these crosses is said to be fitchée, when the lower limb terminates in a sharp point, as in fig. 16. There is also the *Cross Maltese*, whose limbs have each two points, and converge to a point in the centre of the cross; though not frequent as a heraldic charge, it derives an importance from being the badge of the Knights of Malta and of many other orders.



Figs. 15—22.

8. The *Saltire*, or St Andrew's Cross (fig. 17), formed by a junction of the bend dexter and bend sinister.

9. The *Pile* (fig. 18), a wedge with the point downwards. A single uncharged pile should, at its upper part, occupy one-third the breadth of the shield, but if charged, it may be double that width.

10. The *Quarter*, consisting of the upper right-hand fourth part of the shield cut off by a horizontal and a perpendicular line. Its diminutive is the *Canton* (fig. 19).

Armorial figures may be depicted on any of these ordinaries, but not on their diminutives, with the exception of the canton.

We observed that the field of an escutcheon may be of two different tinctures, divided by a partition-line, which line may vary in direction. When divided by a partition-line in the direction of one of the ordinaries, the shield is said to be *Party per* that ordinary; thus we may have (figs. 20) a shield party per pale, bend, fess, chevron, or saltire. An escutcheon divided as by a cross is said to be quartered. A shield divided into any number of parts by lines in the direction of a pale, bend, or bar, is said to be *Paly*, *Bendy*, *Barry*, the number of pieces being specified, as in the example fig. 21, barry of six, argent and gules. When the field is of a metal and colour separated by any of the lines of partition, and the charge placed on it is said to be *Counter-changed:* this means that the part of the charge which is on the metal is of the colour, and *vice versâ*, as in fig. 22, the arms borne by Chaucer the poet, per pale argent and gules, a bend counter-changed.

The partition-line which bounds the field, or the boundary-line of an ordinary, is not always even. Fig. 23 represents the commonest forms of irregular partition-lines in use, viz., the *engrailed, invected, wavy, nebulé, embattled, indented*, and *dancetté*. An ordinary engrailed has the points of the engrailed line turned outwards, and an ordinary invected, inwards. Dancetté differs from the indented by the partition-line being marked with only three indentations.

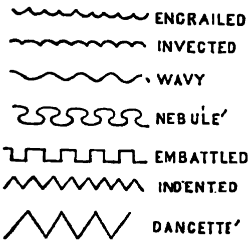


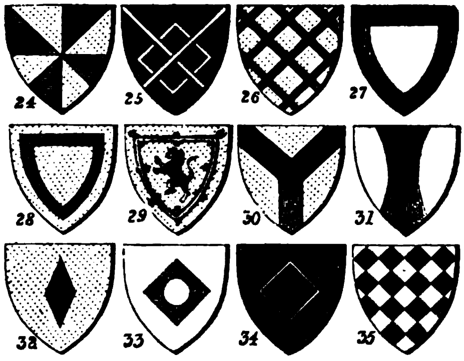
Fig. 23.

The *Subordinaries*, or subordinate ordinaries, are, generally, enumerated as the following, though there is no very broad line of demarcation between them and the common charges.

1. The *Gyron.*—When a shield is at once quartered and party per saltire, as in fig. 24, the division is called *Gyronny of eight* (from *gyrus*, a circle), and one of the triangles, or at least the triangle in dexter chief, is a gyron. Gyronny of six, ten, or twelve also occasionally occur, so called according to the number of the triangles.

2. The *Fret* (fig. 25) is a cognizance derived from the banding or ornamenting of the shield, and a shield covered with this lattice-work decoration (fig. 26) is said to be *Fretty.*

3. The *Bordure*, or border (fig. 27), is a stripe encircling the shield. It is much used to distinguish different branches of a family, and is often charged with small devices, on which account it has sometimes been reckoned an honourable ordinary.



Figs. 24—35.

4. The *Orle* (fig. 28) differs from a bordure in not touching the extremity of the shield.

5. The *Tressure*, regarded as a diminutive of the orle, is generally borne double, and flory counter-flory, as in the arms of Scotland, or, a lion rampant within a tressure flory counterflory gules (fig. 29).

6. The *Pall* (fig. 30), the archiepiscopal ornament of that name, sent from Rome to metropolitans, and resembling in form the letter Y.

7. The *Flanches* (fig. 31), the dexter and sinister sides of the shield cut off by a curved line. Flanches are always borne in pairs, and sometimes charged.

8. The *Lozenge*, a figure of four equal sides, with the upper and lower angles acute, and the others obtuse.

9. The *Fusil* (fig. 32), longer and more acute than the lozenge.

10. The *Rustre* (fig. 33), a lozenge pierced round in the centre.

11. The *Mascle* (fig. 34), a lozenge perforated, and shewing a narrow border. Mascles were probably originally links of chain-armour.

A field is said to be *Lozengy* (fig. 35), *Fusilly* or *Mascally*, when divided by diagonal lines in the direction of these subordinaries. A field divided by horizontal and perpendicular lines into squares of different tinctures, is said to be *Checky;* in the case of a *Fess checky* there are three such rows of squares.

Among subordinaries are sometimes reckoned certain circular charges called *Roundels* or *Roundlets*, distinguished in English heraldry by different names according to their tinctures. When of or, they are called *Bezants;* of argent, *Plates;* of gules, *Torteaux;* of azure, *Hurts;* of purpure, *Golpes;* and of sable, *Ogresses* or *Pellets.*

We now come to the third class of figures occurring in armorial bearings. We have seen that the ordinaries and subordinaries are for the most part purely heraldic figures, connected in their origin with the shield itself; the *common charges*, on the other hand, are representations more or less conventional of familiar objects, which have no necessary relation to the shield; but are in some way emblematic as concerns family or individual history and character. The knights, in the early days of heraldry, ransacked the animal, the vegetable, and the mineral kingdom, as well as the range of things natural and artificial, for cognizances which would be distinctive, and at the same time suggestive, of the name or title of the bearer of them. We can only enumerate a few of the charges of most frequent occurrence.

Of beasts, the *lion* requires special mention. The king of beasts is one of the most frequent of heraldic devices, and is made to assume a great variety of attitudes, for which see LION. Lions and other beasts of prey are said to be *armed* or *langued* of any tincture when their teeth and claws, or their tongue, is of that tincture. With some change of colour or position, the royal beast came to be used by all who could claim kindred, however remote, with royalty, and lions were further multiplied by augmentations granted by the sovereign to favourite followers. The heraldic *leopard*, which has been the subject of much controversy, was originally but another designation for the lion passant-gardant. Bears, boars, bulls, stags, are favourite heraldic beasts. A stag walking is said to be *trippant;* he is *at gaze* when a lion would be statant-gardant; he is *attired* of any tincture when his horns are of that tincture. The animals that possess horns and hoofs are said to be *armed* and *unguled* in respect of them. The heads and limbs of animals are often borne as charges, and they may be either *couped*, cut off in a straight line, or *erased*, cut off with a jagged edge.

Of birds, we have first the *eagle.* The sovereign of birds, and symbol of imperial Jove, was, next to the lion, the most favourite cognizance of royal personages, and was adopted by the German emperors, who claimed to be successors of the Cæsars of Rome. The imperial eagle had at first but one head; the monstrosity of a second head seems to have arisen from a dimidiation of two eagles, to represent the eastern and western empire (see MARSHALLING OF ARMS). The eagle of heraldry is most generally *displayed*, i. e., its wings are expanded; sometimes it is *preying*, or standing devouring its prey. The *alerion*, the cognizance of the duchy of Lorraine, and the family of Montmorency, was originally but a synonym for the eagle assumed (M. Planché suggests) as an anagram for the word Loraine, but modern heralds have degraded it into a nondescript creature without beak or claws. The *martlet* was originally a martin, a species of swallow, which has also in course of time been deprived by heralds of its legs and beak. The pelican, the swan, the cock, the falcon, the raven, the parrot or popinjay, and the peacock, are all of tolerably frequent occurrence. The *pelican* has generally her wings *indorsed*, or placed back to back, and is depicted pecking her breast. When in her nest feeding her young, she is called a pelican *in her piety*. A *peacock* borne affronté with his tail expanded, is said to be *in his pride*. Birds of prey are *armed* of the colour of which their beak and talons are represented. Such as have no talons are *beaked* and *membered*. The *cock* is said to be *armed*, *crested*, and *jelloped*, the latter term referring to his comb and gills. Birds having the power of flight are, in respect to their attitude, *close*, *rising*, or *volant*.

Fishes and reptiles occur as charges: the former are said to be *naiant*, if drawn in a horizontal, and *hauriant*, if drawn in a perpendicular position; and the *dolphin*, in reality straight, is conventionally borne *embowed* or bent. The *escallop shell* is of frequent occurrence, and said to be the badge of a pilgrim. Sometimes the conventional heraldic form of an animal differs from its true form, as in the case of the *antelope* of heraldry (fig. 36), which has the head of a stag, a unicorn's tail, a tusk issuing from the tip of the nose, a row of tufts down the back of the neck, and similar tufts on the tail, chest, and thighs. Of 'animals phantasticall' we have among others the gryphon, wyvern, dragon, unicorn, basilisk, harpy. We have the human body in whole or part, a naked man, a savage or wild man of the woods, also arms, legs, hearts, Moors' heads, Saracens' heads, and that strange heraldic freak, the three legs conjoined, carried in the escutcheon of the island of Man.

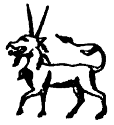


Fig. 36.

Of plants, we have *roses*, *trefoils*, *cinquefoils*, *leaves*, *garbs* (i. e., sheaves of corn), *trees*, often *eradicated* or *fructuated* of some other colour, and above all, the celebrated *fleur-de-lis*, used as a badge by Louis VII. of France before heraldry had an existence. When a plant, animal, or other charge is blazoned *proper*, what is meant is that it is of its natural colour.

The heavenly bodies, the sun, moon, and stars, are also pressed into the service of heraldry, as are things inanimate and artificial without number, particularly such as were familiar to the warriors and pilgrims of the twelfth and thirteenth centuries. Helmets, buckles, shields, hatches, horseshoes, swords, arrows, battering-rams, pilgrims' staves, mullets (or spur-rowels), and water-bougets, or bags, in which in crusading times water was carried long distances across the desert, also the clarion or war-trump, generally and erroneously called a *rest*. Even the letters of the alphabet have been used as charges.

Charges may be placed either simply on the field or on one of the ordinaries; in some instances, one of the ordinaries is placed over a charge, in which case the charge is said to be *debruised* by the ordinary. Three charges of one kind are placed two above and one below, unless blazoned *in fess* or *in pale*. In the fourteenth and fifteenth centuries, the simplicity of early heraldry began to be departed from by accumulating a variety of charges on one shield, and in later times we have sometimes a charge receiving another charge like an ordinary. The growing complexity of shields arose from augmentations granted to distinguish the younger branches of a family, or charges assumed from the maternal coat by the descendants of an heiress. In the end of the last, and beginning of the present century, a practice prevailed for a time of introducing into armorial bearings matter-of-fact landscapes, representations of sea-fights, and of medals and decorations worn by the bearer, setting all heraldic conventionalities at defiance, and dealing in details not discernible on the minutest inspection. Such charges are frequent in the arms of the heroes of the old war; as, for example, in the augmentation granted to Sir Alexander Campbell, Bart., in addition to his paternal arms—viz., 'a chief argent charged with a rock proper, subscribed *Gibraltar*, between two medals; that on the dexter representing the silver medal presented to Sir A. Campbell by the supreme government of India, for his services at the storming of Seringapatam, in 1799; that on the sinister representing the gold medal presented to him for his services in the battle of Talavera.' The grants proceeding from the present kings of arms are more conformable to the usages of heraldry, and do not stand in need of such lengthened explanations to make them intelligible.

The arms of the different members of a family have been distinguished from one another, sometimes by the use of a bordure or other difference; and sometimes, especially by English heralds, by the use of certain figures called *marks of cadency*, the *label*, *crescent*, *mullet*, *martlet*, *annulet*, *fleur-de-lis*, to designate the eldest, second, third, fourth, fifth, or sixth son and his descendants—an invention originating about the time of Henry VII., but which cannot consistently be carried through all the ramifications of a family for a succession of generations. See CADENCY.

Blazonry is an essential part of the science of arms. To blazon a coat is so to describe it that any one with an ordinary knowledge of heraldry will be able to depict it correctly.. In the language of blazonry, all tautology must be avoided. The tincture of the field is first mentioned; the ordinary, if any, follows, unless it be a chief; then the charges between which the ordinary is placed. The charges on the ordinary follow, and lastly we have a canton or chief, and marks of cadency. The rules of blazonry are given in the article BLAZONING OF ARMS.

Besides the heraldic devices depicted on the shield, there are the following borne external to it—the helmet, the mantling, the wreath, the crest, the motto and scroll, the supporters, and the coronet.

The *helmet*, originally a piece of defensive armour, became in the course of time one of the usual accompaniments of the shield; and placed over the arms, it came by its form to mark the rank of the wearer. For these distinctions, which are of comparatively recent date, and applicable only to British heraldry, see HELMET.

The *mantling* is an embellishment of scroll-work flowing down on both sides of the shield, and originating in the *cointoise*, or scarf, wrapped round the body in the days of coat-armour.

From the centre of the helmet, within a *wreath* of two pieces of silk of the two first colours of the armorial bearings, issues the *crest*, originally a special mark of honour worn only by heroes of great valour, or advanced to a high military command; now an inseparable adjunct of the coat of arms in English, though not in continental heraldry, and often assumed or changed arbitrarily without proper authority.

The *scroll*, placed over the crest or below the shield contains a *motto*, bearing in many cases an allusion to the family name or arms.

Supporters are figures or animals standing on each side of the escutcheon, and seeming to support it. They were in their origin purely ornamental devices, which only gradually acquired a heraldic character. In England, the right to use supporters is confined to the royal family, peers, peeresses, and peers by courtesy, Knights of the Garter, Knights Grand Cross of the Bath, and a very few families whose ancestors bore supporters before their general use was restricted. In Scotland, supporters are also used by the baronets of Nova Scotia and the chiefs of various families.

The crown of the sovereign, the mitre of the bishop, and the coronet of the nobility, are adjuncts appended to the shield of those whose dignity and office entitle them to that distinction. For a description of the crown of Great Britain and the coronets of the royal family, see article Crown. Under the articles Duke, Marquis, Earl, Viscount, and Baron, the coronets appropriated to the different ranks of the nobility are described.

The subject of *marshalling arms*, or arranging various coats in one escutcheon, is explained in a separate article. Here it may suffice to lay down a few general rules. A husband is entitled to *impale* the arms of his wife, i. e., to place them on the same shield side by side with his own. When the wife is an heiress, the husband bears her arms in an *escutcheon of pretence*, or small escutcheon in the centre of his own shield, and the descendants of the heiress may quarter her arms with their paternal coat. A sovereign also quarters the arms of his several states, and feudal arms are sometimes quartered by subjects. An elective king, it is said, may place his hereditary arms on an escutcheon of pretence over the insignia of his dominions.

For information on the details of heraldry, reference is made to the standard works of Guillim, Edmonson, and Nisbet; and for a more discriminating view of the subject, to such recent treatises as Montague's *Heraldry*, and Planché's *Pursuivant of Arms*.

HERALDS' COLLEGE, or COLLEGE OF ARMS, a collegiate body, founded by Richard III. in 1483, consisting of the heraldic officers of England, who were assigned a habitation in the parish of All-hallows-the-Less, in London. Various charters confirmed the privileges of the College of Arms, and it was reincorporated by Philip and Mary, who bestowed on it Derby House, on whose site in Doctors' Commons the present college was built by Sir Christopher Wren.

The presidency of the college is vested in the earl marshal, an office now hereditary in the family of Howard Duke of Norfolk; he nominates the three kings of arms, six heralds, and four pursuivants, who are the members of the collegiate chapter. Persons having a hereditary claim to arms, which has been disused for one or more generations, are empowered by the Heralds' College to resume them, on proof and registration of pedigree. A person who has no hereditary claim, and wishes a grant of arms, must memorialise the earl marshal, and shew that he is in a condition to 'sustain the rank of gentry.' An important department of the Heralds' College is the recording of pedigrees. Any pedigree shewing the existing state or descent of a family, may, if accompanied with sufficient evidence, be entered on the books of the college. The members of the college have salaries, but derive their principal income from fees charged for assistance in tracing pedigrees and titles, and for the granting and registration of arms. In Scotland, the corresponding functions belong to the Lyon Court (q. v.).

HERA'T, capital of the most westerly of the three divisions of Afghanistan, stands on the river Heri, at the height of 2500 feet above the sea. Lat. 34° 50′ N., long. 62° 30′ E.; distance from Cabul, 390 miles west. Situated near the boundaries at once of Afghanistan, Persia, and Independent Tartary, H. is one of the principal marts of Central Asia, carrying on at the same time extensive manufactures of its own in wool and leather. The vicinity, naturally fertile, has been artificially rendered much more so by means of irrigation. But the city claims notice mainly on political and military grounds. Long the royal seat of the descendants of Timur, and often a bone of contention between the warlike tribes all round, it is fortified by a ditch and wall, and is commanded on its north side by a strong citadel. In more modern times, the place has acquired a kind of European importance, being, towards Persia, the key of Afghanistan, which, again, in turn affords the only approach by land to Western India. In this connection, H. has been viewed as an outpost of England's eastern empire against Russian intrigue and encroachment. Hence, it has been alike the subject of treaties and the occasion of wars between Great Britain, as the mistress of Hindustan, and Persia, as virtually a vassal of Russia. This feature of the history of the city was more specially developed in connection with the last conflict between Persia and England. In November 1856, the Shah, regarded by the British government as the vassal and agent of the Czar, captured H., while actually conducting negotiations for an amicable adjustment at Constantinople; but he was within a few months, constrained to relinquish his prey and renounce his claims by a British expedition directed against the opposite extremity of his empire. According to different estimates, referring, however, to different epochs, the population has varied from 20,000 to 70,000.

HERAULT, a maritime department in the south of France, bounded on the south-east by the Gulf of Lyon, is oval in form, and is 84 miles in greatest length from east to west. Area, 2436 square miles; pop. (1872) 429,878. It is occupied in the north and north-west by the Lower Cevennes, from which several branches of moderate elevation run toward the south, gradually subsiding as they approach the sea. The principal rivers are the Herault (from which the department derives its name), the Orb, and the Lez, which, rising in the Cevennes, pursue a generally southward course to the Mediterranean. The coast-line is about 66 miles in length; and along the shore, from Agde to the Vidourle, are numerous *étangs*, or marshy lakes, united by the Canal-des-Etangs, and communicating with the sea. In the neighbourhood of the *étangs*, the climate is unhealthy, especially in summer, when agues and fevers prevail; but elsewhere throughout the department it is unusually fine. About a fourth of the entire area consists of arable land, and about a sixth is under vineyards. The department of H. stands, for quantity at least, at the head of the wine-growing departments of France, 46,552,000 gallons being the average annual produce. From the shore-lakes and the sea, immense quantities of fish are obtained. Woollen, silk, and cotton fabrics, in great variety, are largely manufactured. Coal and copper mines, as well as quarries yielding variously veined marbles, building-stone, granite, &c., are worked. This department supplies a great quantity of the salt used in France. It is divided into four arrondissements. Montpellier is the capital.

HERBA'RIUM, the name usually given to a collection of dried plants, intended for the future study and examination of botanists. For collecting plants, a box of tinned iron, called a *vasculum*, is generally used, which preserves most plants from withering for at least some hours. Plants intended for the herbarium should be collected on a dry day; plants which when gathered have moisture on their leaves, should, when brought home, be placed in a vessel of water, and there allowed to dry. Plants with thick succulent stems or leaves are immersed for a few seconds in hot water to kill them. The specimens are then laid between layers of blotting-paper, or of a thick bibulous kind of paper called botanical drying-paper, not spread out with anxious minuteness, nor so placed as to distort their parts. The number of sheets of paper in each layer is accommodated to the nature of the plants, and pressure is applied by means of weights, screws, or straps, the whole being enclosed in boards, and the layers of paper, when very numerous, having also boards occasionally interposed. Care must be taken that too much pressure be not applied at first, lest the parts of the plants be unfitted for future examination. For a short time, the paper is changed every day, or every second day, dry paper being supplied. Specimens have the best appearance which are quickly dried. Some plants which, in spite of all care, lose their natural colours in the ordinary method of drying, and become black, as orchids, may be beautifully dried by enclosing the layers of paper in a network wire-frame, and hanging the package before a fire, where it is turned round like meat roasting. Specimens are thus dried in a few hours, which otherwise would have required eight or ten days.—When the specimens are fully dried, they are laid within sheets of writing-paper, or they are gummed or glued to sheets of paper, the name of the species, with the locality, date of collection, and any other interesting particulars, being marked beside each. As much as possible of each plant is preserved in the herbarium, but the flower and leaf must always be exhibited. Some parts of plants, as succulent roots, fruits, &c., are otherwise preserved. The herbarium is arranged according to a botanical system. Care must be taken to preserve it from the ravages of moths and beetles by frequent inspection, by the aid of camphor, and by the occasional application of a little corrosive sublimate. There are herbaria in existence which are now some centuries old, and which are still consulted for the identification of species. The herbarium enables us to compare plants which flower at different seasons, and those of different countries. The herbaria formed by travellers have been of great importance to the progress of botany.

HERBART, JOHANN FRIEDRICH, a German philosopher, was born at Oldenburg, May 4, 1776. He was educated at Jena. At a very early age, he was familiar with religious and metaphysical doctrines and discussions, and at twelve years had read the systems of Wolff and Kant. He became the pupil of Fichte, and received his philosophy with enthusiasm; but after more reflection, he found himself obliged to reject much of his system, and to form one of his own. In 1805, he was appointed extraordinary professor at Göttingen; in 1809, he obtained the chair of philosophy at Königsberg, where he remained until 1833, when he returned to Göttingen, and enjoyed the dignities of titular professor and aulic councillor until his death, August 14, 1841. The school of philosophy he promulgated has (or had) its centres at Göttingen and Leipsic. His collected works were published, in 12 volumes, at Leipsic in 1850—1852.

The philosophical system of H. is neither very profound nor very original, but it has, what in the eyes of many is no small merit, the quality of extreme obscurity. The total result of his metaphysical investigations may be thus briefly expressed: that the variety and change of the given phenomenal world are not to be explained by the hypothesis of a single reality, but of a plurality of such (*eine Vielheit des Realen* or *Monaden*). H. has made a fruitful application of his metaphysical doctrines to psychology, through the help especially of his great mathematical knowledge, and has endeavoured to shew the untenableness of the ordinary views regarding the soul, but his own speculations on the subject are anything but intelligible.

HERBELOT, BARTHÉLEMY D', a celebrated orientalist, was born in Paris, December 4, 1625, and finally became professor of Syriac in the College of France. He died at Paris, December 8, 1695. His celebrated work, the *Bibliothèque Orientale*, was published after his death by Galland (Paris, 1697), and afterwards with a supplement (Maestricht, 1776—1781); but the best edition is that published at the Hague (1777—1782, 4 vols.). It is unfortunate that H. was unable to give the finishing touch to a work which had cost him so much labour and research, and which, in spite of the errors, repetitions, contradictions, and omissions which one meets with, still bears a deservedly high character. In it we find an abridgment of the immense Turkish literary biography of Haji Khalefah, and numerous extracts from a multitude of Arabic, Turkish, and Persian authors, who have written on history, geography, religion, and the manners and customs of oriental nations, especially those who profess Islam; and the enormous labour the author must have undergone may be imagined when we consider that at least 150 of these works were in MS.

HERBERT. This name, which stands forth prominently upon the records of British history, has been ennobled at various times, in so many of its branches, by so many ancient and renewed creations, that it has become a matter of difficulty to ascertain with certainty which is the parent stem; though Sir Bernard Burke is inclined to give the representation of the House to the Right Honourable H. A. H., M.P., of Muckross, co. Kerry. It is certain that the Herberts came over to England in the train of William the Conqueror, for H., Count of Vermandois, who afterwards filled the post of chamberlain under William II., is mentioned in the Roll of Battle Abbey, and received from his sovereign a grant of lands in Hampshire. His wife Emma, daughter of Stephen, Count of Blois, was a granddaughter of the Conqueror, and his son H. (called in history H. of Winchester) was chamberlain and treasurer to King Henry I. Seven or eight generations later, we find the Herberts diverging into several distinct branches, including the lines of the Earls of Powis (now extinct in the male line), of the Lords H. of Cherbury (also extinct), the Herberts of Muckross (ancestors of the gentleman mentioned above), and also several untitled branches which have flourished upon their ancestral lands in England, Wales, and Ireland. In the reign of Henry V., Sir William H., of Raglan Castle, co. Monmouth, received the honour of knighthood in reward of his valour in the French wars. His eldest son, a stanch adherent of the House of York, was created Earl of Pembroke * by Edward IV. in 1469, but fell into the hands of the Lancastrians after the battle of Danes Moor, and was beheaded the following day, when the title became extinct. It was, however, revived in 1551, in the person of his (illegitimate) grandson, William H., K.G., one of the most influential noblemen of his age, and one who took an active part in public affairs, both as a statesman and as a soldier. It is recorded by Sir B. Burke, that 'he rode on February 17, 1552—1553, to his mansion of Baynard's Castle, with 300 horse in his retinue, 100 of them being gentlemen in plain blue cloth, with chains of gold, and badges of a dragon on their sleeves.' He was buried in Old St Paul's, and his funeral was conducted on such a scale of magnificence that, according to Stowe, the mourning given away on that occasion cost £2000—a very large sum in those days. By his wife, who was a sister of Catharine Parr (the last queen of Henry VIII.), he had a son Henry, second earl, K.G., to whose countess, Mary, daughter of Sir Henry Sydney, K.G., Sir Philip Sydney dedicated his *Arcadia*. She is celebrated by Ben Jonson in the well-known lines—

---

* The earldom of Pembroke was originally conferred on Richard de Clare, the celebrated Strongbow, who aided Henry II. in the conquest of Ireland.

Underneath this marble hearse
Lies the subject of all verse—
Sydney's sister, Pembroke's mother.

The fourth earl, some time Lord Chamberlain to Charles I., and Chancellor of the university of Oxford, was the founder of Jesus College in that seat of learning. The eighth earl held several high offices under Queen Anne, including that of Lord High Admiral. From him the present Earl of Pembroke (George Robert Charles H., born in 1850) is directly descended. The late Lord Herbert (q. v.) of Lea—better known as Mr Sidney Herbert—was the younger brother of the late, and father of the present earl. The Earls of Carnarvon, more than one of whom have gained celebrity in the field of literature, descend from the eighth Earl of Pembroke mentioned above. The present Earls of Powis are descended from the same stock maternally, the only child and heiress of the last Earl of Powis of a previous creation having married the eldest son of the illustrious Robert Clive, the founder of our Indian Empire, in whose favour that title was renewed in 1804.

HERBERT, Edward, Baron H. of Cherbury, who is commonly reckoned the first of the English deistical writers, was born of a noble family in the year 1581, at Montgomery Castle, in North Wales. In his Autobiography, he has described his early love for inquiry and his scrupulous truthfulness. He was sent to Oxford in his twelfth year, and before he had quite quitted his studies, he married an heiress. On the occasion of the coronation of James I., he was made a knight, and invested with various offices. Although his marriage was happy enough, there appears to have been little warmth of affection between him and his wife, who was considerably older than himself. He left home, accordingly, for travel in France in 1608, and from this time resided very much abroad. In Paris, he lived on terms of intimacy with the Constable Montmorency, Jean Casaubon, and other distinguished men. After a brief return to his native country, he set out again in 1610 for the Low Countries, where he joined the arms of the brave Maurice of Orange. For this prince he contracted a great affection, and again offered him his services in 1614. After a campaign, he travelled through Germany and Italy on horseback, and went as far as Venice, Florence, and Rome. On his return, he got into trouble from an attempt which he made to raise a troop of Protestant soldiers in Languedoc for the Duke of Savoy. Shortly after, he returned to England, and proposed to devote himself to study and philosophical inquiry; but high and important diplomatic duties awaited him. He was made a member of the Privy Council, and sent to France as extraordinary ambassador. His aim was to promote the alliance between France and England, and he was so far successful that he was appointed ordinary ambassador, and continued to reside at Paris. He tried, but without much success, the difficult task of negotiation between Louis XIII. and his Protestant subjects. He was elevated first to be a peer of Ireland, and then in 1630, five years after the accession of Charles I., to be a peer of England, with the title of Baron H. of Cherbury. When the civil war broke out, he appears to have acted with hesitation, at first siding with the parliament, and then joining the king. His hereditary seat, Montgomery Castle, was attacked and burned. He died in London in the year 1648.

The character of H., as depicted in his Autobiography, is in the main that of a gallant adventurer, equally fired with the love of arms and of arts, at once a soldier and a scholar. He is the gay man of the world, always truthful, honourable, and high-spirited; yet he has thoughts above those of the world; he ponders deeply the great questions of truth and religion, and has left us the result of his speculations in his two treatises, *De Veritate* and *De Religione Gentilium*. The reader will find an admirable analysis of the first and most important of these treatises in Hallam's Literary History. They are only interesting to the philosophical student, or to the inquirer into the history of religious opinion in England. H.'s position at the fountain-head of English deism gives them a peculiar significance. He is far, however, from being *sceptical*, in the modern sense of the term. His speculations are those of a philosophical dogmatist rather than of a critical inquirer. His arguments are abstract and deductive, and not analytical or negative. He offers solutions, rather than starts difficulties or obtrudes negations; and in this respect H. is rightly reckoned the first of English deists, the writings of all of whom partake more or less of the same character; although it is not easy to trace any links of direct connection between him and the outburst of deistical literature in the end of the 17th and beginning of the 18th century.

HERBERT, George, an English poet, and fifth brother of Lord Herbert of Cherbury (q. v.), was born in Montgomery Castle, Wales, on the 3d April 1593. He was educated at Westminster, and was sent to Trinity College, Cambridge, about 1608. In 1615, he was elected fellow; and in 1619, he was promoted to the office of public orator. At the university, he made the acquaintance of Lord Bacon; and in the hope of preferment, he was induced to spend a considerable portion of his time about the court. On the death of James I., he studied divinity, and finally took holy orders. He was made prebendary of Leighton Bromswold in 1626. He married in 1630; and in the same year, received the rectory of Bemerton. Two years after, at the early age of 39, he died of the effects of a quotidian ague. His principal poetical production, printed in 1633, a year after his death, is entitled *The Temple, or Sacred Poems and Private Ejaculations*, and, although disfigured by fantastic conceits, contains several passages of the purest pious verse which the language possesses. He wrote a prose work, *The Country Parson*, which lays down rules for the guidance of a clergyman's life, and which may be considered a pendant to *The Temple*. His life was written by Izaak Walton, and to that quaint and loving pen, even more than to his own *Temple* Songs, he owes his immortality.

HERBERT, Lord, of Lea (Sidney Herbert), minister and statesman, son of the eleventh Earl of Pembroke by his second wife, was born at Richmond in 1810. Educated at Harrow and at Oriel College, Oxford, he devoted himself to public life, and entered the House of Commons in 1832 as member for South Wilts, which he represented until his elevation to the peerage in 1861. He began his political career as a Conservative, and was Secretary to the Admiralty in Sir R. Peel's administration from 1841 to 1845, when he became Secretary-at-war. As a member of this administration, it fell to him to oppose Mr Cobden's motion for a select committee to inquire into the effect of the corn-laws on farmers, and afterwards, to argue in support of free trade in corn. He went out of office with his party in 1846. In 1852 he was again Secretary-at-war, under the Aberdeen ministry, and, in consequence, the 'horrible and heart-rending sufferings' of the army before Sebastopol were laid in a great degree at his door. He was for a few weeks Colonial Secretary in the first administration of Lord Palmerston in 1855, and Secretary-at-war in his second administration in 1859. Great improvements in the sanitary condition and education of the army, the amalgamation of the Indian with the royal army, and the organisation of the volunteer force, signalised his army administration. He largely reformed the War-office, and was devoting himself with equal zeal and intelligence to his ministerial duties, when, owing to failing health, he resigned his seat in the House of Commons, and in 1861 was called to the Upper House, under the title of Baron Herbert of Lea. But release from labour came too late, for he died August 2, 1861. He was heir-presumptive to the twelfth Earl of Pembroke. He had great aptitude for business, winning and genial manners, great readiness and fluency in debate, and a boundless philanthropy. He was a liberal patron of the arts; and his Lombardian church at Wilton, near his splendid abbey-seat in Wiltshire, will remain a lasting monument of his taste and munificence. He married, in 1846, the daughter of Major-general A'Court, niece of the first Lord Heytesbury; and his eldest son, born in 1850, is now Earl of Pembroke and Montgomery.

HERBS, or HERBA'CEOUS PLANTS, in Botany, are those in which no persistent woody stem is formed above ground. In some, the stem is woody, but still annual. There is, however, in many a permanent woody *rhizome* or root-stock.—In books of gardening, plants used only for flavouring are sometimes distinguished as *sweet herbs*, as mint, basil, &c.; whilst those valued for their nutritive qualities are known as *pot herbs.*

HERCULA'NEUM, an ancient city of Italy, was situated at the north-western base of Mount Vesuvius, about five miles east of Naples. Considerable obscurity envelops its early history; it is supposed, however, to have been of Phœnician origin, and to have been occupied afterwards by Pelasgians and Oscans. It subsequently was conquered, with all the rest of Campania, by the Samnites, and later it fell into the hands of the Romans. In 63 A.D., the city was seriously injured by a violent earthquake; and in 79 it was buried, along with Pompeii and Stabiæ, by the memorable eruption of Vesuvius (q. v.) which took place in that year. It now lies at a depth of from 70 to 120 feet below the surface, and is filled up and covered with volcanic tufa, composed of sand and ashes, and consolidated to some extent by water, which is often thrown up in great quantities during volcanic eruptions. Above it, on the modern surface, are the two large villages Portici and Resina. In the latter, in 1706, on the occasion of deepening a well, fragments of mosaics were first brought up; but little was done in the way of systematic excavation till 1738, when explorations were commenced under royal authority. It was then discovered that the building near the bottom of the well, from which the first relics were obtained, was the theatre. This building was forthwith explored and cleared, and several statues, both in bronze and marble, were extracted from it. Excavations were carried on but to a limited extent, not only in consequence of the hardness of the tufa, but from the fear of undermining the dwellings on the surface. Hence visitors can see only a very small portion of this entombed city. The chief edifice shewn is the theatre, which had been very large, and was built but a short time before the fatal eruption. It has 18 rows of stone seats, and could accommodate 8000 persons. A basilica, two small temples, and a villa, have also been discovered; and from these buildings, many beautiful statues and remarkable paintings have been obtained. Among the art-relics of H., which far exceed in value and interest those found at Pompeii, may be mentioned the statues of Æschines, Agrippina, the Sleeping Faun, the Six Actresses, Mercury, the group of the Satyr and the Goat, the busts of Plato, Scipio, Africanus, Augustus, Seneca, Demosthenes, &c. These treasures, together with such vases and domestic implements as have been found, have been conveyed to the Museum at Naples. Latterly, the portion of H. towards the sea, which had been covered only by loose ashes, has been laid open, and ancient buildings are now seen there to advantage as at Pompeii. See *Something of Italy*, by W. Chambers, 1862.

Gate at Herculaneum.

HE'RCULES (Gr. *Herakles*), called likewise *Alcides*, after his grandfather Alcæus, was the son of Zeus and Alcmene, and the most celebrated hero of the Greek legends, the ideal of human perfection, as conceived in the heroic ages; i. e., the greatest physical strength, connected with every high quality of mind and character which these ages recognised. He had a bitter enemy in Hera, who, knowing that the child who should be born that day was fated to rule over all the descendants of Perseus, contrived to prolong the travail of Alcmene, who was the daughter of Alcæus, son of Perseus, and hasten that of the wife of Sthenelus, another son of Perseus, who, after a pregnancy of seven months, gave birth to a son, named Eurystheus. Eurystheus thus, by decree of Fate, became chief of the Perseidæ. Pindar and other subsequent writers relate, that, while yet in his cradle, H. shewed his divine origin by strangling two serpents sent by Hera to destroy him. By Amphitryon's care, he was instructed in all arts by the first masters. Amphitryon now sent him into the country, where he tended the flocks till he was 18 years of age. During this period, as the Sophist Prodikos relates in his poem, H., meeting the goddesses of Pleasure and Virtue at the crossways, chose the latter to be the constant companion of his life.

His first exploit was the slaying of a lion, which haunted Mount Cithæron, and ravaged the dominions of King Thespios. H. was kindly received by the king, and at length succeeded in destroying the lion. On his return to his native city of Thebes, he not only freed it from the disgrace of having to pay tribute to the Orchomenians, but compelled them to pay double the tribute which they had formerly received. In return for this service, Creon, king of Thebes, gave him his daughter Megara in marriage. At this time, Eurystheus summoned H. to appear before him, and ordered him to perform the labours which, by priority of birth, he was empowered to impose upon him. H., unwilling to obey, went to Delphi to consult the oracle, and was told that he must perform ten labours imposed by Eurystheus, after which he should attain to immortality. This reply plunged H. into the deepest melancholy, which Hera increased to madness, so that he killed his own children by Megara. When he recovered his senses, he returned, submitted to Eurystheus, and addressed himself to the performance of the labours imposed upon him.—The first labour was to destroy the lion which haunted the forests of Nemea and Cleonæ, and could not be wounded by the arrows of a mortal. H. boldly attacked him with his club, but in vain; and he was finally obliged to strangle him with his hands. From this time, he wore the lion's skin as armour.—The second was to destroy the Lernæan hydra, which he accomplished with the assistance of his friend Iolaus; but because H. obtained assistance in this labour, Eurystheus refused to count it.—His third was to catch the hind of Diana, famous for its swiftness, its golden horns, and brazen feet.—The fourth was to bring alive to Eurystheus a wild boar, which ravaged the neighbourhood of Erymanthus.—The fifth was to cleanse the stables of Augeas, king of Elis, where 3000 oxen had been confined for many years, which he accomplished in one day, by turning the rivers Alpheus and Peneus through the stables. But as H. had gone to Augeas, and offered to perform this service on payment of a tenth of the cattle, and concealed the fact, that he had been commanded to perform it by Eurystheus, the latter, hearing of this, judged that it must not be counted as one of the labours.—His sixth was to destroy the carnivorous birds, with brazen wings, beaks, and claws, which ravaged the country near the lake Stymphalis, in Arcadia.—The seventh was to bring alive to Peloponnesus a bull, remarkable for his beauty and strength, which Poseidon, at the prayer of Minos, had given to Minos, king of Crete, in order that he might sacrifice it, which Minos afterwards refusing to do, Poseidon made the bull mad, and it laid waste the island. H. brought the bull on his shoulders to Eurystheus, who set it at liberty. It appears again as the Marathonian bull in the story of Theseus.—The eighth labour was to obtain the mares of Diomedes, king of the Bistones in Thrace, which fed upon human flesh.—The ninth was to bring the girdle of Hippolyta, queen of the Amazons.—The tenth labour was to kill the monster Geryon, and bring his herds to Argos. These were all the labours which were originally imposed on H., but as Eurystheus declared the second and fifth unlawfully performed, H. was ordered to perform two more.—The eleventh was to obtain the golden apples from the garden of the Hesperides. Atlas, who knew where to find the apples, brought them to H., who meanwhile supported the vault of heaven; but according to others, H. went himself and stole the apples, after slaying the dragon who guarded them.—The last and most dangerous labour was to bring from the infernal regions the three-headed dog Cerberus. Pluto promised him Cerberus on condition that he should not employ arms, but only force. When H. had brought the monster to Eurystheus, the latter, pale with fright, commanded him to be removed. H. set him at liberty, whereupon Cerberus immediately sank into the earth. H. was now free from his state of servitude.

To these well-known 'twelve labours,' must be added many other achievements, such as his battles with the centaurs and with the giants; his participation in the expedition of the Argonauts; the liberation of Prometheus and Theseus, &c. After accomplishing all these exploits, H., while in a state of mental aberration, murdered his faithful friend, Iphitus; he was afterwards purified from the murder; but was compelled to sell himself for three years into slavery. When his period of slavery had expired, he returned to Peloponnesus, and some time afterwards became a suitor for the hand of Dejanira, the daughter of Œneus, king of Calydon, whom he married, after having overcome his rival Achelous. With her he now repaired to Trachinia. Having arrived at the river Evenus, he encountered the centaur Nessus. H. passed through on foot; but Nessus, under pretence of carrying Dejanira over, attempted to offer her violence; whereupon H. slew him with an arrow dipped in the poison of the Lernæan hydra. Nessus, before expiring, instructed Dejanira how to prepare a love-potion for Hercules. The hero now made war against Eurytos (king of Oechalia, who had defrauded him), slew him and his sons, and carried off his daughter Iole. Thence he went to Kenæon in Eubœa, and erected an altar to Zeus Kenæos. In order to celebrate the rite with due solemnity, he sent Lichas to Trachis for a white garment. Dejanira, being jealous of Iole, anointed the robe with the philter she had received from Nessus. H. put it on, and immediately the poison penetrated his bones. Maddened by the terrible pain, he seized Lichas by the feet, and flung him into the sea. He tore off the dress, but it stuck to his flesh, which was thus torn from his bones. In this condition, H. was conveyed by sea to Trachinia; and Dejanira being informed of what had occurred, destroyed herself. H. himself repaired to Mount Œta, where he erected a funeral-pile, and ascending it, commanded that it should be set on fire. The burning pile was suddenly surrounded by a dark cloud, in which, amid thunder and lightning, H. was carried up to heaven. There he became reconciled to Hera, and married Hebe.

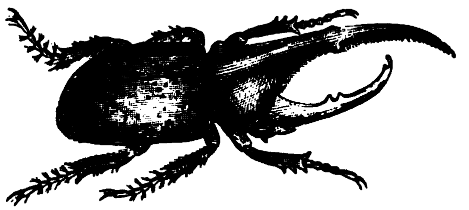
According to most mythologists, there were several heroes of the name of Hercules. Among these are an Indian, an Egyptian, a Tyrian or Phœnician, and a Theban Hercules. The last is the most celebrated, and to him the actions of the others have possibly been attributed. Others, who would explain the story of H. symbolically, pretend that it conceals an astronomical idea; while others discover in this myth the history of the early development of Greece. On the astronomical hypothesis, the twelve labours of H. are simply the course of the sun through the twelve signs of the zodiac, which the plastic poetry of the Greeks has converted into a legend. According to Max Müller, H. was the Sun-god, and the legend of his death symbolises the sunset: 'In his last journey, H. proceeds from east to west. He proceeds from the Kenæon promontory to Trachis, and then to Mount Œta, where his pile is raised. The coat which Dejanira sends to the solar hero is an expression frequently used in other mythologies, it is . . . . the clouds which rise from the waters, and surround the sun like a dark raiment. H. tries to tear it off, i. e., his fierce splendour breaks through the thickening gloom, but fiery mists embrace him, and are mingled with the parting rays of the sun, and the dying hero is seen through the scattered clouds of the sky tearing his own body to pieces, till at last it is consumed in a general conflagration.' Comparative Mythology, in the *Oxford Essays*, 1856.

Festivals were celebrated in honour of H., at which his exploits were sung. In this manner arose the *Heracleia*, long poems celebrating the life and actions of Hercules. H. is represented in plastic art as the ideal of a hero. Strength is the characteristic idea, which has been developed by the sculptors Myron and Lysippus in a form not to be surpassed. A complete series of representations of the twelve labours may be seen in the vases of Volce. The conflict with the giants very frequently occurs on vases of the oldest style; the one on the casket of Cypselos is particularly worthy of notice. H.'s figure is generally youthful.

Head of Hercules.
(British Museum.)

HERCULES, Pillars of, the name given by the ancients to the two rocks forming the entrance to the Mediterranean at the Strait of Gibraltar. Their erection was ascribed by the Greeks to Hercules, on the occasion of his journey to the kingdom of Geryon. According to one version of the story, they had once been united, but Hercules tore them asunder, to admit the flow of the ocean into the Mediterranean; another version represents him as causing them to unite temporarily, in order to form a bridge. The pillars are not mentioned in Homer, though he speaks of Ulysses' passage out of the Mediterranean into the ocean and back, shewing an apparent knowledge of the existence of the strait. The first author who mentions them is Pindar, who places them at Gades (Cadiz), and his opinion had many followers in later times. The most general opinion, however, identified them with Calpe (now Gibraltar) and Abyla (now Ceuta).

HERCULES BEETLE (*Scarabæus Hercules*, or *Dynastes Hercules*), a coleopterous insect of the family *Lamellicornes* and tribe *Scarabæides*, remarkable not only for its great size—it being five inches long—but for the singular appearance of the male; an enormous horn projecting from the head, and being opposed by a similar but smaller projection of the thorax, the whole resembling a pair of great but somewhat unequal pincers, of which the body of the insect is the handle. It is a native of Brazil.



Hercules Beetle (*Dynastes Hercules*).

HERCY'NIAN FOREST (Lat. *Hercynia silva;* Gr. *Herkynia hylē*, or *Herkynion oros*), the general designation of the entire wooded mountain-range of Middle Germany, from the Rhine to the Carpathian Mountains. Different ancient writers, however, apply the name sometimes to one part, sometimes to another of the range. Aristotle makes the Ister (or Danube) take its rise in it. Cæsar, who estimates it at nine days' journey in breadth, and sixty in length, comprehends under this name the whole of the mountain-ranges in Germany north of the Danube; while some identify it with the Bohemian Forest, and others with the Thuringian Forest. Modern geographers apply the term, for the most part, in a very arbitrary manner.

HERD GRASS. See Bent Grass.

HERDER, Johann Gottfried von, an illustrious German thinker, was born at Morungen, in East Prussia, in 1744, and studied philosophy at Königsberg under Kant, for whom he conceived an enthusiastic admiration, although subsequently he became one of his most resolute opponents. Here, also, he made the acquaintance of Hamann (q. v.), who first introduced him to the Oriental languages and literatures, and made him appreciate the poetic beauty of the primitive civilisations. In 1764, he was appointed assistant professor and preacher at the Cathedral School of Riga, where his sermons were greatly admired. Here he published his first works, *Fragmente über die neuere Deutsche Literatur* (Fragments on the Recent German Literature, 1767), in which, with bold and fiery vehemence, he attacked the wretched puerilities and errors of the national literature of the day, and the *Kritische Wälder* (lit., Critical Forests, 1769), once, but no longer, of great theological importance. These two works contain the germs of all that is essentially peculiar and characteristic in H.'s thinking. It was during a temporary residence at Strasburg that Goethe made his acquaintance. The latter was five years younger than H., and, as yet, nameless in literature; while H., by his *Fragments*, was kindling with new fire the soul of Germany. Goethe almost worshipped him; he tells us (in his Autobiography) that the very handwriting of H. exercised 'a magical influence' (*eine magische Gewalt*) over him. In 1775, on the recommendation of Goethe, he was invited to Weimar by the Grand Duke, and appointed court-preacher and consistorial councillor. Here he resided until his death, which took place 18th December 1803. H.'s writings are very numerous, amounting in all to 60 vols. (Stuttg. 1827—1830). They may be divided into three classes: 1. Those relating to religion and theology; 2. Those relating to literature and art; 3. Those relating to philosophy and history. As a theologian, his most important work is his *Geist der Hebr. Poesie* (Spirit of Hebrew Poetry, Dess. 1782; later edition, Leip. 1825; translated into English by Dr James Marsh, 2 vols. Burlington, 1833). As a philosopher, he has left behind him a fund of valuable observations on nature and mankind. His philosophical master-piece is his unfinished *Ideen zur Philosophie der Geschichte der Menschheit* (Ideas towards a Philosophy of the History of Mankind, 4 vols. Riga, 1784—1791; 4th edition, with Luden's Introduction, 2 vols. Leip. 1841; translated into English by T. Churchhill under the title, *Outlines of a Philosophy of the History of Man*). In this work, all the rays of his genius converge. His aim is to represent the entire history of the race as a series of events pointing to a higher destiny than has yet been revealed. His love and reverence for humanity are intense, pure, passionate. An ideal humanity, it might almost be said, is his divinity, in whose service he labours with restless zeal. That enthusiasm, however, which made H. so effective as a mover of men's minds, had its fatal compensation in a deficiency of artistic excellence. His writings have not that fine perfection of style and method which will enable them to float down the stream of time unmolested. Among his other works may be mentioned his *Gedichte Volkslieder*, and the *Cid*, the last of which is considered by the Spaniards themselves to be truly Spanish in its spirit. See H.'s *Lebenbild*, executed by his son (Erlang. 6 parts, 1846—1847).

HEREDITAMENT, in English Law, a comprehensive word, including everything that goes to the heir-at-law. It is often divided into corporeal and incorporeal. Thus, a house or land held in freehold is a corporeal hereditament; while tithes, advowsons, &c., are incorporeal, being merely rights in connection with corporeal things. The word includes some things personal as well as real, as when a chattel right is carved out of an estate of inheritance.

HEREDITARINESS. The influence exerted by parents on the qualities of their offspring is universally admitted, but the relative amount of influence which each parent exerts is still to some extent an open question.

The general structure of the body, the height, the degree of development of the bones and muscles, the tendency to obesity or leanness, &c., seem to depend as frequently on one parent as on the other, in the case of man; but in many animals, as the dog, horse, &c., the father most frequently determines the general form and the size of the body.

The colour and complexion of the offspring follow no definite rule. Sometimes the colours of the two parents appear undiluted in the offspring, as in the case of a piebald colt, resulting from the union of a bay stallion and a white mare, while in other cases an intermediate tint appears in the young. In the offspring resulting from the union of individuals of the dark and white human races, we have this intermediate tint developed; but it is believed that the colour of the father usually predominates over that of the mother.

A very curious department of this subject is the transmission to the offspring of special marks or deformities exhibited by one of the parents or more remote ancestors, and not common to the species. Nævus (or mother's marks), moles, harelip, growths of hair in unusual places, an unusual number of fingers or toes, and special malformations of the heart and of other organs, have been frequently traced to hereditary influence. It is deserving of remark, that these peculiarities have a tendency to shew themselves in alternate generations, or even at greater intervals. Burdach, Blumenbach, and other eminent physiologists, have held the doctrine, that parents (whether dogs or men) who have suffered accidental or intentional mutilation of certain parts (as, for example, the tail, fingers, &c.), often produce offspring which inherit these injuries; for instance, the dogs with cropped tails often produce pups with cropped tails. If the facts are true (which possibly may be doubtful), the results are probably due to an impression on the mother's mind rather than to an hereditary tendency. The immemorial practice of the Chinese in stunting the feet of their women, has not produced a natural variety with that peculiarity.

Morell, in his *Introduction to Mental Philosophy*, observes that there are latent powers or tendencies which have been inherited, and which often remain unknown until brought out by peculiar circumstances. He gives the familiar example of the pointer. The habit of pointing at game is originally an acquired one; but so strongly does this habit become seated in the race, that the very first time the young pointer is taken into the field, he will stand and mark it, thus developing a purely hereditary instinct. 'Exactly in the same way,' he adds, 'we find in man peculiarities of mind, temper, thought, habit, volition, &c., appearing and reappearing in families and races. Lord Brougham found some of his grandfather's writing exactly resembling his own [which is very peculiar], though the grandfather had died before he was born, and his father's was quite different.' It is alleged that the children of skilled artisans are, as a rule, more apt at petty manipulations than the children of ordinary labourers, and that hence the population of certain towns—Birmingham, for example—has a great advantage over that of other towns in point of manufacturing industry.

It is well known that longevity or the reverse, a tendency to great fruitfulness or to sterility, peculiarities in the degree of delicacy in the external senses, and a special tendency to certain diseases—as gout, pulmonary consumption, cancer, &c.—are frequently transmitted in hereditary descent from one or other parent to the offspring. The predisposition to any special disease may be transmitted by either parent; but where both parents have been affected, the offspring are especially liable to suffer from it. Deformities and diseases, also, engendered by circumstances to which the exposure is lifelong, or affecting successive generations, are more certainly and conspicuously hereditary.

Hereditary Tendency to Mental Disease.—As the mental constitution in general is eminently propagable, the hereditary tendency in mental disease is more familiar and better demonstrated than in other forms of morbid action. One observer attributes six-sevenths of the cases of insanity to this cause. In France, and among the affluent classes, one case in every three; among the peasants, one in every ten, is found to occur in families predisposed to alienation. In Italy, the proportion is nearly the same. When stating that derangement is traced to transmitted taint, expression is given to the complex proposition, that individuals who have inherited an unhealthy cerebral organisation, or bodily qualities, such as anæmia, incompatible with sound mental action, fall victims more frequently and inevitably to insanity than those physically and mentally robust would do. Experience shews that as particular forms of physical degeneration, such as rickets, consumption, in like manner particular species of alienation, are propagated in families; that the suicidal impulse appears in one, while the uncontrollable and insatiable desire for stimulants, is the heritage of a third. There are certain laws by which this proclivity seems to operate. Not merely are there more females than males actually insane, but there are more hereditarily disposed to be insane. In connection with this it must be observed that women are more exposed by constitution to the exciting causes of insanity than males, and that as infants they more readily acquire the mental tone of the mother. But, moreover, the madness of the mother is more frequently transmitted than that of the father. French authorities record that of 467 cases of mental affections, 279 were traceable to the mother: an English physician similarly records 76 out of 133. Where the taint exists on the side of the mother, a greater number of children, and a greater number of daughters, are born of unsound mind. But this disposition to disease of the nervous matter is manifested in the same family in various forms—in one member suffering under epilepsy, another under mania, another under eccentricity or delusions. Even the last are exhibited in successive generations. Oxford, who fired at the Queen, his father, and grandfather, all believed themselves to be St Paul.—Holland, *Medical Notes*, &c.; Lucas, *L'Hérédité Naturelle*.

HEREDITARY PRIVILEGES AND POSSESSIONS. The question of the admissibility of hereditary rights and privileges has been much agitated with regard to three points, especially in more recent times. The first is hereditary monarchy. The 'divine' right of kings is now little urged, being felt to be incompatible with modern notions of the political relations of society; and the defence of the hereditary transmission of the supreme power of the state is rather rested on the ground of political expediency and necessity. The animosities and disturbances of public affairs that attend the ever-recurring election of a head of the state are avoided, it is argued, by making power hereditary in a particular family, and by a determinate law of succession; while the dangers and disadvantages which might arise from an authority depending upon the chance of birth, are capable of being neutralised by institutions which prevent the monarch from doing harm, even if there were not every reason to hope that self-interest will lead him to use the power which is the birth-right of his family, for the permanent honour and advantage of that family, and, therefore, of the community with which it is indissolubly bound up.

Another and perhaps more difficult aspect of the question is with regard to hereditary classes, dignities, and offices in the state over and above the hereditary monarch. One thing is now universally agreed upon, that the transmission in individual families of dignities, rights, and offices, involving essential parts of government, such as the supreme dispensation of justice, and other attributes of sovereignty, is inconsistent with the very idea of a state. The splitting up of Germany into a maze of petty sovereignties arising out of fiefs of the empire become hereditary, is a signal instance of the dangers of this principle. A hereditary nobility with such rights is no longer considered defensible. It is another question whether, as a political institution, a class with certain hereditary privileges may not be advantageous or even necessary as an element of stability, and as affording a source of trained statesmanship. Society has a longer life than the individuals that compose it, and should have further-stretching views—'looking before and after;' and it is chiefly in the great historical families of a nation, that such extended views grow up and are cherished—families whose traditions form part of the national history, and which naturally identify their future with the national prosperity and dignity. Besides their traditions and well-developed national instincts, the individual members of such families enjoy other advantages as political and social leaders. Their usually good education, and their well-secured possessions which, in addition to a high sense of honour, raise them above having recourse to petty shifts and jobs, make them valuable as examples and as administrators in a commonwealth which aims at dignity and stability. Carried to an extreme length, as was the case in France prior to the great revolution, the hereditary privileges of the nobility became a source of social discontent and disorder; but limited as in the United Kingdom, hereditary privileges and dignities are found to be no way incompatible with the utmost social expansion, and are in reality so popular as to be admittedly a happy feature in the structure of society. It is further to be observed, that as great families with privileges and titles are from time to time dying out, while others, through distinguished public services, are raised to the rank of nobility, that degree of infusion of new blood is kept up which gives vigour to the system, and at least prevents the British aristocracy from degenerating into an effete or antiquated caste.—As regards the economic view of hereditary right to private property, see J. S. Mill's *Political Economy*.

HEREDITARY RIGHT, strictly speaking, means the right of succession as an heir-at-law. The foundation of this right is nothing but convenience, the principle being, that if a man does not by will appoint his own heir, the law will do it for him; and the law, in doing this, proceeds according to certain degrees of relationship. It is therefore a mistake to suppose that there is anything in mere hereditary right which is divine, or superior to that which results from the radical right of ownership. It is a secondary and substitutional right, the principal and primary right being that by which the owner of land is entitled to say who shall at his death enjoy that land.

HE'REFORD, a city, parliamentary and municipal borough, and capital of the county of the same name, is situated in the fertile and highly cultivated valley of the Wye, 134 miles west-north-west of London. The principal building is the cathedral, a noble edifice, which, after having been substantially restored, was reopened in 1863. St James's church, built in 1868, is an ornament to the city. A very interesting old map of the world, said to date from the 13th c., and other geographical works, are deposited in the chapter-house and library. Besides many other public buildings, H. contains numerous benevolent and educational institutions, among the latter of which are several important free schools. Among its manufactures, which, however, are inconsiderable, gloves, hats, and flannel are the chief. Of its 5 annual fairs, that held in October is perhaps the largest in the county for cattle and cheese. H. returns 2 members to parliament. Pop. (1871) 18,347.

HE'REFORDSHIRE, an inland county in the west of England, is bounded on the W. by South Wales, and on the E. by the counties of Worcester and Gloucester. Area, 534,823 acres. Pop. (1871) 125,370. The surface of the county is hilly, with occasional valleys opening into wide-spread plains. Among the chief hill-ranges, are the Black Mountains on the western, and the Malvern Hills on the eastern border of the county. The whole of H. is in the basin of the Severn, and the general direction of the streams is south-east toward that river. The Wye, with its affluents the Lugg, the Arrow, and the Teme, are the principal rivers. The climate of H. varies with the elevation and the exposure, but, as attested by the general longevity of the inhabitants, is on the whole exceedingly healthy. The soil is for the most part a deep, heavy, red loam, which produces good crops of grain, chiefly wheat, and is highly favourable to the growth of trees. Oaks and apple-trees abound, orchards are numerous, and cider is made in great quantity. Sheep and cattle of excellent breeds are extensively reared, and in the north-west of the county a useful breed of horses is produced. Agriculture is the chief employment of the inhabitants.

H., or at least the greater part of it, formed a portion of the territory of the ancient Silures, and was conquered by the Romans in about 73 A. D. During the so-called Heptarchy, it was included in Mercia. From its position on the Welsh border—a portion of the county being included in the debatable land called the 'Marches'—H. was long the scene of frequent contests.

HERE'NCIA, a town of Spain, in the province of Ciudad Real, and about 40 miles north-east of the city of that name. It carries on manufactures of soap, has a large weekly market and a population of 6400.

HE'RESY (Gr. *Hairesis*) primitively means a *choice* or *election*, and in its application to religious belief is used to designate as well the act of choosing for one's self, and maintaining opinions contrary to the authorised teaching of the religious community to which one's obedience is due, as the heterodox opinions thus adopted and the party which may have adopted them. In the Acts of the Apostles (see Acts v. 17; xv. 5; xxiv. 5; xxviii. 22), the word seems to be used of a sect or party, abstracting from the consideration of its character whether good or bad; but in the Epistles and in the early Christian writers it is almost invariably used in a bad sense, which is the sense uniformly accepted in all subsequent theological literature. The notion of heresy, as understood by theological writers, involves two ideas: first, the deliberate and voluntary rejection of some doctrine proposed by the supreme authority established in any church as necessary to be believed; and secondly, a contumacious persistence in such rejection, with the knowledge that the belief of the doctrine is required of all the members of that particular religious community. Roman Catholic writers, regarding the authority of their own church as supreme and final, apply the name of heresy to any formal denial of a doctrine proposed by the Roman Catholic Church as necessary to be believed. Protestant writers seldom use the word, except in relation to what each sect regards as the essentials of Christian faith. Beyond this point, indeed, the idea of heresy has no proper place in the dogmatical system of the Protestant sects, especially in reference to other communions than their own. In the Roman Catholic Church, the supreme authority may be either the decree of a general council approved by the pope, or a dogmatical decree of the pope himself, expressly or tacitly received by the bishops of the various churches; and in general the crime of heresy is incurred in any church by the rejection of a doctrine which in that church is held to constitute an essential and integral portion of the Christian faith. Apostasy is the complete abandonment of the whole Christian doctrine, and the renunciation of the Christian profession. If the intellectual error be accompanied by full deliberation, and by full knowledge of the motives of belief, the heresy is called *formal;* should it arise from ignorance or imperfect knowledge, it is styled *material;* and the heresy is held to be imputable, or the contrary, according as this ignorance is vincible or invincible.

Even in the apostolic times, heresies had arisen in the church, and before the council of Nice, the catalogue of sects had already swelled to considerable dimensions. Without attempting any enumeration of these heresies, it may be said in general that the sects of the early centuries are all reducible to two classes: (1) Those which attempted to associate the Christian doctrines with Judaism; (2) Those which ingrafted Christianity upon the Gentile religions or the Gentile philosophies. And this latter class naturally subdivides itself into (1) The sects which were tinged with the errors of the oriental philosophy; and (2) Those which drew their errors from the Grecian schools. Of all these we find traces, more or less distinctly marked, in the sects of the later ages.

From the very date of the establishment of Christianity in the Roman empire, heresy appears to have been regarded as a crime cognizable by the civil law; and Constantine enacted several severe laws for its repression, which were continued and extended by his successors, and were collected into a single title, *De Hæreticis*, in the Justinian code. The penalties of heresy ordained by these enactments are very severe, extending to corporal punishment, and even to death; and they all proceed on the distinct assumption that a crime against religion is a crime against the state. These enactments of the Roman law were embodied in the various codes of the European kingdoms; and in considering the history of the middle ages, it is necessary to recollect that the principle above referred to, as to the social bearing of the crime of heresy and of other crimes against religion, pervades the whole system of medieval jurisprudence. It is further to be remembered, that the principles of many of the medieval sects were anti-social and communistical, as well as opposed to the doctrines of the church; and that their leaders, in many instances, by adopting violent and revolutionary means for the propagation of their doctrines, drew upon themselves the punishment of anarchy and rebellion, as well as of heterodoxy in religion. Still, with even these allowances, Catholic historians themselves admit that the medieval procedures against heresy were in many instances excessive, as were, indeed, also the processes and penalties of the criminal code.

In English Law (2 Hen. IV. c. 15), heresy consisted in holding opinions contrary to Catholic faith and the determination of Holy Church; and by common law the offender was to be tried in the provincial synod by the archbishop and his council; and, after conviction, was to be given up to the king to be dealt with at his pleasure, the king being competent to issue a writ *de hæretico comburendo;* but the statute above referred to empowered the diocesan to take cognizance of heresy, and on conviction, to hand over the criminal directly, and without waiting for the king's writ, to the sheriff-major or other competent officer. This statute continued practically in force, with certain modifications, till the 29 Charles II. c. 9, since which time heresy is left entirely to the cognizance of the ecclesiastical courts; but, as there is no statute defining in what heresy consists, and as, moreover, much of the jurisdiction of the ecclesiastical courts has been withdrawn by the various toleration acts; and, above all, as the effect of various recent decisions has been to widen almost indefinitely the construction of the doctrinal formularies of the English Church, it may now be said that the jurisdiction of these courts in matters of heresy is practically limited to preventing ministers of the Established Church from preaching in opposition to the doctrine and the articles of the establishment from which they derive their emoluments, and that, even in determining what is to be considered contrary to the articles, a large toleration has been juridically established. See the recent trial of Dr Rowland Williams, and the judgment given by Dr Lushington in the Court of Arches. For the history and literature of heretical sects, see the various ecclesiastical historians, as also Stockmann's *Lexicon Hæresium* (Leip. 1719); De Cæsari's *Hæresiologia* (Rome, 1736); Fritz's *Ketzerlexicon* (Würzburg, 1834); Arnold's *Ketzerhistorie* (Frankfurt, 1699); Walch's *Geschichte der Ketzereien* (Leip. 1762); and Hilger's *Darstellung der Hæresieen* (Bonn, 1837).

HE'RFORD, a town of Prussia, in the province of Westphalia, is situated close to the frontier of Lippe-Detmold, on the Werre, 17 miles south-west of Minden. Yarn-spinning, linen-weaving, and carpet manufactures are carried on. Pop. (1871) 10,968.

HERIOT, George, founder of a magnificent hospital at Edinburgh, the son of a goldsmith in that city, a descendant of the Heriots of Trabroun, East Lothian, was born in June 1563. Admitted, in May 1588, a member of the Edinburgh Incorporation of Goldsmiths, he was, in 1597, appointed goldsmith to Anne of Denmark, consort of James VI. of Scotland, and soon after to the king. On the accession of the latter, in 1603, to the English throne, he went to London, where, as court-jeweller and banker, he amassed considerable riches. He died February 12, 1624, without issue, and bequeathed the greater part of his wealth to the town-council and ministers of Edinburgh, to found and endow an hospital in that city for the maintenance and education of the sons of poor deceased or decayed burgesses. The noble structure of Heriot's Hospital, from a design, it is believed, by Inigo Jones, was completed, in 1649, at a cost of £30,000 sterling. After the battle of Dunbar, in 1650, Cromwell made it a military hospital; but in 1658 it was restored to the governors by General Monk; and in 1659, 30 boys were admitted. 180 boys are now maintained and educated in it, 60 of whom are non-resident. In 1766 the annual revenue was £1966. In 1837 it amounted to £11,235, leaving, in that year, a surplus of £3099. The yearly revenue is now about £18,000. Most of the ground on which the New Town of Edinburgh is built belongs to the hospital. The revenues greatly exceeding the expenditure, in 1837 an act of parliament was procured for the erection of schools in Edinburgh for the education of poor children, free of all expense. Of these 'Heriot Schools,' there are sixteen—viz., eleven juvenile and five infant schools—attended by upwards of 4000 boys and girls; other three infant schools are to be added. The children who are eligible to these schools are, first, children of decayed burgesses and freemen; and, second, children whose parents are in poor circumstances, and who reside within the royalty of Edinburgh; but of late, admission has also been given to the children of parents residing beyond that limit. There is a system of bursaries connected with the Hospital, both for the boys who are educated in it, and for others who are elected according to the discretion of the governors—'house bursars,' £30 a year; and 'out bursars,' about £20; the former established in 1810, the latter in 1825.

HERIOT, in English Law, is a kind of fine due in copyhold estates to the lord of the manor on the death of the copyholder, and consists of the best beast, jewel, or chattel that belonged to the deceased. The lord can enforce this right by action, or seize it *brevi manu*. Such a right is practically unknown in freehold estates in England. In Scotland, all land is held on much the same forms as copyholds; and much more vexatious things of a similar kind to heriots, under the name of reliefs, become due from a vassal's heir to the superior on the vassal's death. In both countries, the practice is equally barbarous.

HE'RISTAL, or HE'RSTAL, a considerable village of Belgium, in the province of Liege, extends along the left bank of the Maas for about three miles, immediately below the city of Liege, of which it may almost be considered a suburb. Population about 7000, principally workmen, who find employment in the coal-mines, the iron and steel works, which are here carried on. Some ruins still exist of the castle of Heristal, the birthplace of Pepin le Gros (father of Charles Martel, and great-grandfather of Charlemagne), and from which he had his title of Pepin d'Heristal.

HE'RITABLE and MOVABLE, a Scotch law-phrase denoting the distinctions of things which go to the heir and to the executors respectively. The distinction corresponds to a certain extent to the phrase 'Heir and Executor' (q. v.) in England.

HERITABLE BOND, in Scotch Law, is a bond for a sum of money, and joined with it a conveyance of land in security thereof. The usual deed is now a bond and disposition in security, corresponding to the English mortgage (q. v.).

HERITABLE JURISDICTIONS, a remarkable class of jurisdictions held hereditarily from the crown in Scotland, abolished (1748) by 20 Geo. II. c. 43. These jurisdictions amounted to upwards of a hundred in number, and consisted of sheriffships, stewartries, constabularies, but principally of regalities and bailieries, with some offices of distinction. One of the more important was the office of Lord Justice-general, and the lordship of Argyle and the Isles, both belonging to the family of Argyle. In virtue of their hereditary rights, the possessors of these jurisdictions exercised an arbitrary power over vassals and others within the limits of their domain, and could punish them by fines, scourging, imprisonment, and even in some cases put them to death, without interference of the common law. As repugnant to social policy, and more particularly with the view of extinguishing the authority of Highland chiefs over their clans, these heritable jurisdictions were abolished; the possessors receiving payment for the assumed value of their rights. Argyle, alone, received £21,000 as an indemnity, and altogether there was paid by government £152,037, 12*s.* 2*d.* The abolition of these odious jurisdictions being followed by the appointment of sheriffs on a proper footing, this great legislative act marks an important era in the history of Scotland.

HERITABLE SECURITIES, the name given in the law of Scotland to what are called mortgages and charges on land in England. These were formerly distinguished into wadset, infeftment of annual rent, heritable bond, bond and disposition in security, and absolute disposition with back-bond, and also reserved burdens on land. All heritable securities are founded on the theory, that they constitute a pledge of the land to the creditor until the debt is paid, or rather the debt is a burden on the land, so that whatever becomes of the land, into whatever number of hands it is conveyed and transferred, the debt still inheres in it, and must be first paid out of the proceeds, unless it is redeemed. In Scotland, the principal heritable security is now called the bond and disposition in security, which consists of an obligation to pay the debt, and a disposition *pro tempore* to the creditor, by way of security till the debt is paid. The bond must be registered in the Register of Sasines, to complete the title, and it is assignable to a third party. A power is always given to the creditor to sell the estate, if the principal or interest is not paid, in which case, the creditor must account for the surplus after paying himself his debt.

HE'RITOR, in the Law of Scotland, is the owner of land in a parish liable to public burdens. The heritors, collectively, have vested in them the fee of the church and churchyard; they elect the parish schoolmaster, repair the parish church, &c.

HERMÆ. See Hermes.

HERMANDAD, The (Sp. 'Brotherhood'), an association of the principal cities of Castile and Aragon, bound together by a solemn league and covenant for the defence of their liberties in seasons of trouble. These confederacies were sanctioned by the sovereigns, as agents for suppressing the increasing power of the nobles, and for maintaining public security through the land with no cost to the government. In Aragon, the first Hermandad was established in the middle of the 13th c., and in Castile about 30 years later; while in 1295, 35 cities of Castile and Leon formed a joint confederacy, and entered into a compact, by which they pledged themselves to take summary vengeance on every noble who had either robbed or injured a member of their association, and refused to make just atonement for the wrong; or upon any one who should attempt, even by the order of the king, to levy an unjust tax. During the long period of anarchy in which the Christian rulers of Spain were impotent to maintain order in their own dominions, the *Santa Hermandad*, or Holy Brotherhood, had presented the only check against the unbounded licence of the nobles; and Isabella of Castile, seeing the beneficial effects which an extension of the institution was capable of producing, obtained the sanction of the Cortes for its thorough re-organisation and extension over the whole kingdom in 1496. The crimes reserved for its jurisdiction were all acts of violence and theft committed on the high-roads or in the open country, and the penalties attached to each misdemeanour were specified with the greatest precision in the codes of laws, which were enacted at different times in the yearly assemblies of the deputies of the confederate cities. An annual contribution was, moreover, assessed on every hundred householders or *vecinos*, for the equipment and maintenance of the horsemen and *quadrilleros* or officials of the brotherhood, whose duty it was to arrest offenders, and enforce the sentence of the law. Although the Hermandad was regarded with much disfavour by the aristocracy, it continued for many years to exercise its functions, until the country was cleared of banditti, and the ministers of justice enabled to discharge their duties without hindrance from lawless disturbers of the peace. In 1498, the objects of the Hermandad having been obtained, and public order established on a firm basis, the brotherhood was disorganised, and reduced to an ordinary police, such as it has existed, with various modifications of form, to the present century. The laws enacted at different times in the juntas or assemblies of the Hermandad were compiled, in 1485, into a code, known as the *Quaderno de las Leyes nuevas de la Hermandad*, which was first printed at Burgos in 1527.—See Mariana, *History of Spain;* Pulgar, *Reyes Catolicos;* Prescott, *History of Ferdinand and Isabella.*

HERMANN, Johann Gottfried Jakob, a German philologist of great genius and learning, was born at Leipsic, 28th November 1772; studied there and at Jena, and was made, in 1798, extraordinary professor of philosophy. In 1803, he was called to Kiel as ordinary professor of eloquence, becoming in addition professor of poetry in 1809, and in this position he remained till his death, 31st December 1848. Distinguished by liberal-mindedness and love of truth, by eloquence and extensive culture, H. continued till his latest days to attract a large circle of students to his class-room, which sent forth some of the most celebrated teachers in the schools and universities of Germany. The first department which he began to cultivate on original principles was the science of metre, of which he attempted to develop a philosophical theory from the categories of Kant; and on this subject he wrote, besides his *Handbuch d. Metrik* (1798), several Latin treatises, among which his *Epitome Doctrinæ Metricæ* (1818) reached a third edition in 1852. Of wider importance, however, was the new method which he introduced into the treatment of Greek grammar, which has had its influence on the grammar of Latin, and even of modern languages, especially of the German. The principles of this method are not only explicitly developed in his *De Emendendâ Ratione Græcæ Grammaticæ* (1801), but are practically illustrated in his numerous editions of the ancient classics. H.'s power of dealing with chronological, topographical, and personal questions, is shewn in his *Opuscula* (7 vols., Leip. 1827—1830), which also contain some poems breathing the spirit of Roman poetry. Consult Jahn's *Gottfried H. eine Gedächtnissrede* (Leip. 1849).

HERMANN, or HERMAN, a name that first appears in Germany in the 6th c. after Christ, but is now become common. It has been erroneously transferred to that prince or chief of the Cherusci, called by Roman writers Arminius, and by the Greeks Armenios. This personage was the son of Sigimer, and was born 16 B.C. The period in which the youth of H. was cast was fraught with the greatest peril to Germany. To secure the frontiers of the empire against the attacks of the Germanic tribes, the Romans had been forced to advance into the more turbulent districts, and to build a series of forts to overawe the inhabitants. In this manner, not only had most of the Celtic tribes from the Alps to the Danube been subdued, but in the years from 9 B.C. to 4 A.D., Drusus and Tiberius had penetrated into the north-west of Germany as far as the Elbe, laid out a number of military roads, erected fortresses in the country, and reduced the different tribes to such dependence upon Rome, as virtually amounted to complete subjugation. With so much prudence and caution had Tiberius proceeded, that the Germans continued to all appearance on the best terms with the Romans, gradually adopted Roman habits, and frequently and readily took service in the Roman armies. Thus H. and his brother Flavius had enrolled themselves under the Roman standards, and as leaders of Cheruscan auxiliaries, had not only obtained Roman citizenship and the rank of knighthood in the country of the Danube, but had likewise acquired a knowledge of the Latin language, and a deep insight into the arts of war and policy as practised by the Romans. Enriched with these experiences, when H. after the expiration of some years, returned home, he found the state of affairs considerably changed for the worse, through the unskilful despotism of the Roman viceroy, Quintilius Varus. H. now conceived the plan of delivering his country from its oppressors. All the tribes and leaders as far as the Elbe were secretly summoned; Varus was lulled into security, and induced to despatch portions of his army to different points, and with the remaining portion, which was just on the point of leaving the country of the Cherusci for the Rhine, to quit the highway. He was thus lured into the impassable districts of the *Teutoburg Forest* (either in the upper valley of the Lippe, or the adjoining Prussian territory); an engagement took place, which lasted for three days. The result was the annihilation of the whole Roman army (9 A. D.). When intelligence of this defeat reached Rome, it excited the greatest consternation and anxiety. The Germans, however, who had only their own liberation in view, prosecuted their victory no further; and for a few years both parties, so to speak, hung fire. When Germanicus (q. v.), however (14 A.D.), assumed the command on the Lower Rhine, he resolved to crush the barbarians. In two successive campaigns, 14 A.D. and 16 A.D., he reduced H. to great straits; but he being recalled to Rome by the Emperor Tiberius, 17 A.D., the results of his victorious activity were lost. From this time no Roman army ever ventured to penetrate from the Rhine into the interior of Germany, and this circumstance, which decided the future fate of Germany, must be ascribed chiefly to Hermann. Nevertheless, no sooner was the foreign enemy expelled, than the internal feuds broke out with more violence than ever. In the course of these, H. was slain by his own relatives, in the 37th year of his age and twelfth of his leadership. Tacitus says of him: 'He was, without doubt, the deliverer of Germany; and unlike other kings and generals, he attacked the Roman people, not at the commencement, but in the fulness of their power; in battles, he was not always successful, but he was invincible in war. He still lives in the songs of the barbarians, though unknown to the annals of the Greeks, who admire only what belongs to themselves; by the Romans, he is not estimated according to his merits, because in our admiration for the past, we neglect the present.'—Compare Wietersheim, *Der Feldzug des Germanicus an der Weser 16 n. Chr.* (Leip. 1850); Massmann, *Arminius, Cheruscorum Dux ac Decus, Liberator Germaniæ* (Lungo, 1839).

HE'RMANNSTADT (Lat. *Cibinium*, Hung. *Nagy-Szeben*), an important town of Austria, capital of the crown-land of Transylvania, is beautifully situated on the Cibin, or Zibin, an affluent of the Aluta, about 70 miles west-north-west of the town of Cronstadt. H. is the seat of the Austrian governor of Transylvania, and of a Greek non-united bishop, and is the head-quarters of the 12th corps of the imperial army. Pleasing promenades surround the town, and the district in which it is placed is fertile as well as beautiful. Tanning, wax-bleaching, and the manufacture of cloth (linen and woollen), combs, paper, and gunpowder, chiefly employ the inhabitants. The local trade is considerable. Pop. (1869) 18,998, one-half of whom are Protestants.

H., originally a village, is called, on the ancient seal of the town, *Villa Hermanni*. The *Hermann* from whom the town has its name was a citizen of Nürnberg, and is said to have led hither a colony in the 12th century.

HERMA'PHRODITE, in Botany, the term employed to designate those flowers which contain both the male and female organs of reproduction (stamens and pistils), and are therefore by themselves capable of producing perfect seed. Flowers containing only male or female organs are called *unisexual* or *Diclinous* (q. v.), and when produced on the same plant, *Monœcious* (q. v.); when on different plants, *Diœcious* (q. v.). Hermaphrodite flowers are also called *monoclinous* (Gr. *monos*, one, and *klinē*, a couch) and *perfect* flowers.

HERMA'PHRODITISM is the term employed by naturalists to designate the state or condition of those organisms, whether animal or vegetable, in which the sexual characteristics of the male and female are united in the same individual. The name is derived from the fable of the union into one of the bodies of Hermaphroditus, son of Hermes and Aphrodite, and the nymph Salmacis. See Ovid's *Metamorphoses*, lib. iv. v. 347.

There are two kinds of hermaphroditism, the true and the spurious; in the former, there is an actual co-existence, in the same individual, of male and female reproductive organs; while in the latter, there is only an appearance, from arrest or excess of development, of a union of the distinctive organs of both sexes. True hermaphroditism is the normal type of sexual structure in most plants. See HERMAPHRODITE, in Botany. It likewise occurs normally in many of the lower invertebrata, and as a monstrosity in the higher invertebrata, and even occasionally in certain vertebrata.

The recent investigations of Balbiani shew that certain Infusoria (as, for instance, the common green Paramœcium), at all events occasionally present the phenomena of hermaphroditism. In some of the polyps (as, for example, the Hydra and some of the Actiniæ), the sexes are united in the same individual; the same is the case with some of the Acalephæ (namely, the Ctenophora), with certain orders of Helminthes or parasitic worms (the Cestodes and Trematodes), with certain Annelides (the Hirudinei and Lumbricini, of which the leech and the earthworm are typical examples), with many acephalous molluscs, with the Pteropods and with most of the Gasteropods; while in the highest order of molluscs, the Cephalopods, the sexes are always distinct. Among the crustaceans, the Cirrhipeds are for the most part hermaphrodites; but in the other and higher orders, if hermaphroditism exists, it is only as an abnormal occurrence, and gives rise to a monstrosity. (For example, the common lobster has been observed with male organs on one side of its body, and female organs on the other.) True but not normal hermaphroditism is also occasionally met with in insects. In fourteen cases given by Ochsenheimer, the right side was male, and the left female; and in nine cases it was the reverse. Professor Owen remarks that in insects hermaphrodites are occasionally found, where the characters of one sex, instead of extending over one-half, are limited to particular parts of the body which agree in the main with the other sex. Thus, in an individual of *Gastrophaga quercus*, the body, the antennæ, and the left wings were those of the female, while the right wings were those of the male.

True (but of course abnormal) hermaphroditism is far rarer amongst the vertebrata than in insects or crustaceans. Various instances, however, are on record of fishes presenting a lateral hermaphroditic structure, or a roe on one side and a milt on the other; and references to various cases that have been reported may be found in Sir James Y. Simpson's learned and elaborate article, 'Hermaphroditism,' in *The Cyclopædia of Anatomy and Physiology*. The same article may be referred to for cases of similar hermaphroditism in birds and mammals, including the human subject, namely, cases in which there were female structures on one side, and male structures (more or less perfect) on the other.

Returning from these cases of abnormal true hermaphroditism to those of normal true hermaphroditism, the question naturally suggests itself—Can these true animal hermaphrodites, possessing male and female organs, fertilise themselves? As far as is known, none of the terrestrial hermaphrodites, such as land-molluscs (the common snail, for example) and earth-worms, are self-impregnating. They all pair, and in this respect offer a strong contrast with hermaphrodite plants. But of aquatic animals, there are many self-fertilising hermaphrodites. For further details on the subject of hermaphroditism generally, the reader is referred to Steenstrup's *Untersuchungen über das Vorkommen des Hermaphroditismus in der Natur* (1846).

Spurious hermaphroditism is a subject of too purely a professional character to be noticed at all fully in these pages. Those who take an interest in this subject may be referred for further information to Sir James Y. Simpson's article, and to a case recorded a number of years ago in *The Lancet* by Dr Girdwood.

HE'RMAS, the name of one of those who were members of the Roman Church at the time at which St Paul wrote his Epistle to the Romans, and, as may be inferred from the apostle's addressing a special greeting to him, a person of some eminence among his fellow-Christians. He was, though resident at Rome, most probably, judging from his name, of Greek origin. H., however, has obtained even more consideration from the circumstance of his being the reputed author of the well-known early treatise, called *The Shepherd*, which is commonly classed among the writings of the apostolic Fathers. It is ascribed to the H. of St Paul, more or less positively, by Origen, Eusebius, and St Jerome. But there is a second H., who lived about the middle of the 2d c., a brother of Pius I., Bishop of Rome, to whom the work is attributed by other writers, and it would seem with greater intrinsic probability. The work contains many allusions which appear to be directed specially against the Montanistic errors—a fact quite irreconcilable with the supposition of its having been written in the apostolic age. *The Shepherd*, whichever H. may have been its author, seems to have been originally written in Greek. However, until recently, it was known only by a Latin version, with the exception of some Greek fragments collected from the quotations of the work by the Greek Fathers. But in the year 1856, a Greek text, said to have been found at Mount Athos, by the since too notorious M. Simonides, was published at Leipsic, the genuineness of which is more than doubtful; and an Ethiopic version was printed in 1860, by M. Antoine d'Abbadie, the well-known Abyssinian traveller and scholar. *The Shepherd* is a mystical work, divided into three parts—the first containing four 'Visions;' the second, twelve 'Precepts;' and the third, ten 'Similitudes.' It has been described as the *Pilgrim's Progress* of the early church; and although it contains but little of positive dogmatic teaching, is a most interesting monument of the Christian life of that period.

HERMENEU'TICS (Gr. *Hermeneutes*, an interpreter), the science of interpretation, especially as applied to the Holy Scriptures. It forms a branch of the same general study with Exegesis (q. v.), and indeed is often confounded with that science; but the distinction between the two branches is very marked, and is perhaps sufficiently indicated by the etymology of the names themselves. To hermeneutics properly belongs the 'interpretation' of the text—that is, the *discovery* of its true meaning; the province of exegesis is the 'exposition' of the meaning so discovered, and the practical office of making it intelligible to others in its various bearings, scientific, literal, doctrinal, and moral. Hence, although, as will be seen by reference to the article EXEGESIS, the laws of interpretation have many things in common with those of exposition, it may be laid down that to the especial province of hermeneutics belongs all that regards the text and interpretation of the Holy Scripture; the signification of words, the force and significance of idioms, the modification of the sense by the context, and the other details of philological and grammatical inquiry; the consideration of the character of the writer or the persons whom he addressed; of the circumstances in which he wrote, and the object to which his work was directed; the comparison of parallel passages; and other similar considerations. All these inquiries, although seemingly purely literary, are modified by the views entertained as to the text of Holy Scripture, and especially on the question of its inspiration, and the nature and degree of such inspiration.

So far, there is but little difference between Roman Catholic hermeneutists and the more strict school of Protestant critics. It is at this point that the fundamental distinction between Catholics on the one side, and Protestants of every shade on the other, may be said to begin. With the latter, the sense of the Scripture once truly ascertained from the Scripture itself interpreted by the rules explained above, is regarded as final, and is accepted by the interpreter as the revelation intended by God. With the former, the individual judgment which is formed upon these rules, and which, as to the actual meaning of the particular passage, may possibly coincide with that of the Protestant, is still controlled, and, it may be, overruled by the authoritative interpretation of the church, as conveyed in the decrees of councils, or the dogmatical definitions of pontiffs accepted by the universal church. From this circumstance, it is often inferred that in the Roman Catholic Church the science of hermeneutics is a nullity, and that no freedom of interpretation is practically permitted. The Roman Catholic critic, however, maintains that he exercises, and is free to exercise, on the text of Scripture the same liberty of interpretation which the Protestant may claim; and that it is quite possible that he may arrive at precisely the same conclusions with the Protestant as to the meaning of *the scriptural text considered in itself alone*. But he differs from the Protestant in believing that the Scripture does not contain the whole of God's revelation, and, therefore, that, as one passage of Scripture is modified by another, so the scriptural revelation itself may be modified by other revelations of God conveyed to us through other mediums; as, for example, that of tradition. See TRADITION. As regards the literature of Hermeneutics, most of the writers named in the article EXEGESIS have dealt with both branches of the science. They are for the most part Protestant. The most remarkable modern Catholic hermeneutical writers are, Hermann Goldhagen (Mainz, 1765); Seemüller's *Hermeneutica Sacra* (1779); Mayr's *Institutio Juaup. Sacri* (1789); Jahn's *Enchiridion Hermen.* (Vienna, 1812); Arigler's *Hermeneutica Generalis* (Vienna, 1813); Unterkircher's *Hermeneutica Biblica* (1831); Ranolder, *Herm. Bibl. Principia Rationalia* (Fünf Kirchen, 1838); Schnittler, *Grundlinien der Hermeneutik* (Ratisbon, 1844); Glaire's *Hermeneutica Sacra* (1840).

HE'RMES, the name of a divinity more familiarly known as Mercury, the god of speech, eloquence, the sciences, traffic, theft, and herds. Under his name are comprised several mythological personages, who personified the external expression of thought, whether human or divine. The principal of these are Teti, Thoth, Theuth, or Taut, the Egyptian H., the Greek god properly so called, the Phœnician Taaut, the Carthaginian Sumes, the Etruscan Turms, the Chaldæan Duvanai, and the Latin Mercurius. The oldest of these was undoubtedly the Egyptian, whose worship appears as early as the 11th dynasty. Thoth was generally represented with the head of an ibis (*heb*), which was his living emblem, and expressed his name in hieroglyphs. These, according to the legends, he had invented and revealed to the monarch Thamus. Many religious books were believed to have been written by him, and all literary compositions were dedicated to him. He was scribe or clerk of the gods, and in the future state justified the good against their accusers, as he formerly had Osiris in the trial of that god and Typhon. In the contest between Osiris and Typhon, when Horus had torn off the diadem of his mother Isis, Thoth is reported to have replaced it with the head of a cow. Locally, he was lord of Sesenu, Hermopolis, the modern Eshmunin, but his worship was universal. He was a self-created, self-existent god, although some legends of later date make him the son of Chnumis, or of the Nile. In his celestial character he was identified with the moon, *Aah*, and was supposed to preside over that luminary, and the souls which made it their habitation. He inscribed also the names of monarchs on the *asht* or Persea, the tree of life of the Egyptian paradise.

In the Phœnician mythology, Taaut or H. seems derived from the Egyptian, and he was the son of Misor or Egypt, inventor of writing and the sciences; while another form of his name, Sumes, is that of the Punic H. of Carthage. It is, however, clear that the name Taaut is derived from the Egyptian Tet, 'word' or 'speech.' The tradition of H. has passed to the Arabs, who recognise two Hermes, one who lived 1000 years after Adam, called by the Chaldees Ouriai or Duvanai, the great master; another, surnamed Thani, doctor of the world, and liberator of men from error, a prophet and philosopher; and Trismegist, the thrice-great, who lived at Calovaz, in Chaldæa.

But the most important of all was the Greek Hermes. The various traditions which make him the son of the Egyptian Nilus, whose name was never pronounced, or the sacred Thoth, are clearly Egyptian; that which derives his origin from Ouranos, and Hemera, is probably the Phœnician myth. But the principal H. in whom the actions of the others centered, was the son of Zeus and Maia, born on Mount Cyllene, in Arcadia, and originally a Pelasgian divinity who presided over cattle and commerce. His birth is placed subsequent to that of Apollo. Four hours after, according to the hymn, he left his cradle, and having found a tortoise, invented the *chelys*, or lyre, using its shell as a sounding-board, and making the strings out of the entrails of a sheep. At nightfall he stole fifty of the sacred herd of Apollo from Pieria, drove them to the banks of the Alpheius, slaughtered and dressed two of them. To escape detection, he had bound his feet with branches of the myrtle and tamarisk. Apollo, missing his cattle, dragged H. before Zeus, at Olympus, who condemned him to restore them; but Apollo, enchanted by the sound of the newly invented lyre, offered H. his cattle in exchange, gave him his whip or goad, taught him how to tend cattle, and presented him with the caduceus. In the *Iliad* and *Odyssey* are no traces of his thievish propensities, which were introduced by the later poets. In the Gigantomachia he liberated Zeus from Typhon, and restored him his limbs. H. was messenger, herald, and ambassador of the gods; he bound Prometheus to Caucasus; killed Argus with the hundred eyes; liberated the wandering Io, &c. In the events of the Trojan war, he conducted the goddesses to the fatal judgment of Paris, brought Priam to Achilles, and was patron of Ulysses, to whom he gave the herb molys, to liberate him from Circe. Many heroical and other personages were descended from him. As god of the sciences, he invented the alphabet from the flight of cranes, astronomy, and numbers, weights and measures, music, the lyre, and syrinx, gymnastics, tactics, and the cultivation of the olive. Many festivals were celebrated to him in Northern Greece and the islands, as at Phenea, Cyllene, and Athens; and some of these Hermæa resembled the Saturnalia, slaves being served on these occasions by their masters. His worship, in fact, extended all over the Peloponnesus, the islands of the Ægean, Asia Minor, and even Hesperia or Magna Græcia. Amongst animals, the tortoise, pig, lamb, and goat, and the young of beasts, were sacred to him; the ibis and the gull (*larus*) amongst birds; and the palm-tree, black-thorn, cinque-foil, and purslane amongst plants. H. had a local worship in Samothrace, where he appeared as one of the Cabiri, under the name of Casmilos, the son of Hephaistos or Vulcan, and Cabira. In the Eleusinian mysteries, he was represented by the hieroceryx.

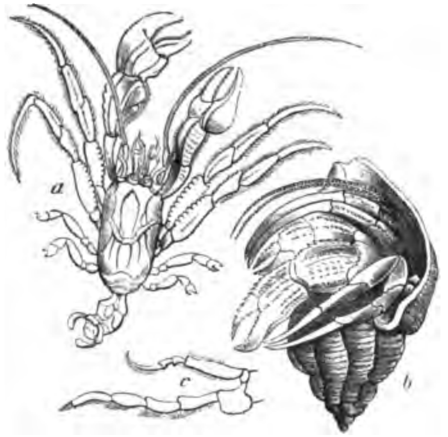
The idea of H. seems to have been developed from two origins—the ancient Pelasgic or Arcadian god of shepherds, subsequently considered the patron of barter, of commerce, without any trace of intellectual qualities; and the Phœnician or Egyptian H., introduced by commerce into Greece, with all the attributes attributed by the Orientals to their deity. In art, a similar development is seen from the old squared trunks or pillars, called Hermæ and Hermidia, retained till a later period, but by degrees ornamented with a bearded head, to which sometimes are added phallic symbols, the destruction of which at Athens before the sailing of the Sicilian expedition led to a fearful tumult, and the fall of Alcibiades (q. v.). In later, but still archaic art, he is represented bearded, wearing the broad-brimmed petasus, and holding the twisted caduceus. At the time of Phidias, he was represented unbearded, with curly hair, a crafty and charming expression, and the form of an athlete. Instead of the petasus, wings are sometimes arranged in his hair; his boots are winged, and his caduceus has two snakes attached to it. His form is naked, but often has a *chlamys*, or cloak, doubled upon his shoulder, and his hand holds a purse of money; while the cock, referring to his invention of the gymnasium, or the hours of business; the tortoise, allusive of his discovery of the lyre; the palm-tree, emblem of his invention of letters; the goat, referring to his charge of herds, and paternity of Pan; and even the dog, allying him with Anubis, are placed at his side. The most remarkable type of the god was as carrying a ram upon his shoulders (*criophoros*). The caduceus was gilded at the top, painted blue in the middle, and black at the handle.

The Etruscans seem to have derived his worship directly from the Greeks, and represent him with the same attributes and type, but with the Etruscan name *Turms*, as the Camillus of the gods. His worship passed into Rome, under the name of Mercurius, or Mercury, by which he is more familiarly known, supposed to be derived from *mercari*, to traffic. There was something mystic in his cult, for the *feciales* did not know his nature, and he originally had the laurel instead of the caduceus, and the name of his mother Maia had been given to the month Maius, or May, on the 15th day of which his festival was held. As early as 259 A. U. C., he had a temple near the Circus Maximus, and his statue in that locality held a purse. At the Porta Capena, there was a well sacred to him, and the merchants sprinkled themselves and their goods with the holy-water, obtained by dipping a laurel branch into the well. Tradition made him the father of Evander by the nymph Carmenta, and of Larea by the goddess Lara; but the Romans adopted into their religious system the Greek traditions, although, at a later time, under the empire, the influx of foreign religions made them confound him with the Egyptian Anubis, and even represent him with a dog's or jackal's head, and depict him of a golden or black colour. His worship had even penetrated to Gaul, where he was adored under the name of Teutames.—Grüber, *Altklass. Wörterbuch Voce;* Gerhard, *Griechisch. Mythol.* (8vo Berl. 1854, i. 260); Hartung, *Rel. d. Römer* (8vo Frib. 1843); Birch, *Gall. Antiq.*, pp. 26, 27; Müller, *Arch. d. Kunst*, p. 560.

HERMETIC BOOKS. Amongst the Egyptians, all books or literary compositions appear to have been dedicated to Thoth, and notices of this nature are appended to several papyri. The earlier religious books, such as the Ritual, were supposed to have been written by the fingers or under the dictation of the god Thoth himself, and several chapters of this and other works are stated to have been found on monuments written by the god. Hence the word hermetic, taken in its most extended sense, meant inspired, as Thoth was the scribe of the gods. Various traditions prevailed as to the number and nature of these books. Clement of Alexandria mentions 42 hermetic books, which contained the sum of all knowledge, whether human or divine; while others, as Iamblichus, raise their number to 20,000; and Manetho gives the astronomical cipher of 36,525. The series of books mentioned by the great authors were: 1. Sacred hymns of Osiris; 2. On the Life of a King; 3—6. Astrological precepts and observations; 7—17. Cosmography, geography, and chorography of Egypt and the Nile; 18—27. Laws, and discipline of priests; 28—33. Medicine. Portions of these books have been undoubtedly found in the hieratic papyri. Under the name of hermetic books, several writings, principally in Greek, have been handed down, which pretend to be translated from the Egyptian, and similar books may have existed in the 2d century. But these books contain notions of the Neo-Platonic school of Porphyry and Iamblichus, and appear to be intended as philosophical works giving an explanation of the genesis of the Cosmos, the nature of God and man, in antagonism to the books of the Old and New Testament, from sources partly Egyptian, partly Persian and Rabbinical, and other traditions of the Alexandrian school. The name of hermetic writings was particularly affected by the alchemists and astrologers of the middle ages, as the *Tractatus Vere Aureus*, by Dominicus Gnostus, in 1610; the *Tabula Smaragdina*, or 'Emerald Table of Alchemy,' in 1541; and various others. The principal tenets of the hermetic books are, that the Creator made the Cosmos by his word out of fluid; that the soul is a union of light and life, and proceeded from the cosmic soul; that death and life are only changes, and that nothing is destructible; that the soul transmigrates; that passion or suffering is the result of motion.—Baumgarten-Cruzius, *de Librorum Hermeticorum Indole* (Jena, 1827); *Hermes Trismegistus*, a Scheible (12mo, Stuttg. 1855); *Hermes Trismegistus* (*Poemander*) a Parthey (8vo, Berol. 1854).

HERMIT (Gr. *eremites*, Lat. *eremita*, an inhabitant of the desert), one of the names given in the early ages, and still more in the later church, to a class of solitary ascetics, who, with a view to more complete freedom from the cares, temptations, and business of the world, withdrew from the ordinary intercourse of life, and took up their abode in natural caverns or rudely formed huts in deserts, forests, mountains, and other solitary places. In the first centuries, the names of Eremite and Anchorite (q. v.) were indiscriminately applied to these solitaries; but the word *eremita* having been adopted into Latin, it is more commonly used in the modern languages which are derived from the Latin; and the Germans use the name *Einsiedler*, which is of the same signification. The hermits of the middle ages, like the primitive anchorites, often lived in complete solitude; but a much more common, and, in its influence on the church, more important form of the institute, was that of a community of hermits, each possessing his separate hermitage, but all meeting at stated times for mass, prayer, religious instruction, and other common and public exercises. The various hermits of this class are regarded as constituting religious orders, and although never attaining to the popularity which distinguished the Franciscans, the Capuchins, the Dominicans, and other active orders, they form, nevertheless, a numerous and not uninfluential element in the spiritual life of the Roman Catholic Church. It is beyond the scope of this work to enumerate all the eremitical orders. The most remarkable are—the Hermits of St Augustine, who trace their origin to the holy father of that name, but are subdivided into several varieties, which had their rise in the 11th, 12th, and 13th centuries; the Camaldolese, founded by St Romuald in 1012; the Celestines, a branch of the Franciscans, established by Peter Murrone, afterwards Pope Celestine V.; the Hieronymites (q. v.), established first in Castile in the 14th c., and thence introduced into other parts of Spain and into Italy by Lope d'Olmeda in 1424; and the Paulites, so called from St Paul, the first hermit, but an institute of the 13th c., which had its origin in Hungary, and attained to a wider extension and a greater popularity than perhaps any other among the eremitical orders.—See Helyot, *Histoire des Ordres Religieux*; also Wetser, *Kirchen-Lexicon*, art. *Einsiedler*.

HERMIT CRAB, the common appellation of a large family (*Paguridæ*) of crustaceans, of the order *Decapoda*, and sub-order *Anomoura* (see CRAB), having the abdominal or tail segments much more largely developed than in true crabs, but undefended by hard plates, and not forming an organ for swimming, as in lobsters, prawns, and other *Macroura*. The soft and tender tail requires a protective covering, which the instinct of the hermit crabs leads them to find in some turbinated univalve shell of suitable size. The most common British species (*Pagurus Bernhardus*) is an interesting object to every visitor of the sea-shore, and may be found in abundance wherever little pools are left by the tide on a rocky or shelving coast. Shells of whelks, periwinkles, &c., may be seen moving about in the pools in a manner very different from that in which they were carried by their original molluscous owners, having now become the property and habitations of hermit crabs, by which, perhaps, the molluscs were eaten. On the slightest alarm, the H. C. retires into the shell, guarding the aperture of it with one claw, which is much larger than the other, the hard points of the feet also projecting a little. The whole structure of the animal is adapted to such a habitation. The part which in the lobster becomes a finlike expansion at the end of the tail, becomes in the H. C. an appendage for firmly holding by the shell; and so firmly does the



Hermit Crab (*Pagurus Bernhardus*):
a, animal out of the shell; *b*, in shell; *c*, a jaw-foot.

H. C. hold, that it may be pulled in pieces, but cannot be pulled out. Some species have suckers to render the hold more perfect. Increase of size, however, renders it necessary for hermit crabs to relinquish their old shells and seek new ones. Hermit crabs are very interesting inmates of the aquarium, but their locomotive habits and their voracity make them unsuitable for an aquarium otherwise very finely stocked. They feed on molluscs, and on all the animal garbage of the sea-shore.—Some of the hermit crabs of warmer climates are much larger than the British species; some of them (genus *Cœnobita*) inhabit land-shells, and some are found even at a distance from the sea.

HE'RMITAGE, the cell or hut of a single hermit, and sometimes the aggregate of the cells occupied by the members of a single community. Many of these, from the reputation of their inmates, or as being the scenes of certain popular miraculous legends, attained great celebrity, and became the nuclei of important ecclesiastical establishments, and, in some instances, large and populous cities.

HERMODA'CTYL (Gr. *Hermes*, Mercury, and *dactylos*, a finger) is the name of a medicine that had a high repute among the later Greek and the Arabian physicians, as a remedy for gout and rheumatism. It is mentioned by Alexander of Tralles, who flourished 560 A.D.; Paulus Ægineta, who lived a century later; Avicenna, Serapion, &c. By some of the old writers, it was termed *anima articulorum*, or *the soul of the joints*. Corms, probably of several species of colchicum, are still sold in Greece and in the East under the name of hermodactyls. While Sir H. Halford and others have advocated the view that hermodactyls are the corms of *Colchicum autumnale*, different botanists and pharmacologists have referred them to *C. illyricum*, *C. variegatum*, *C. bulbocodiodes*, &c. No modern experiments have been made to determine the activity of hermodactyl, and the subject is one rather of historical than of practical interest.

HE'RNIA, in its widest sense, signifies a protrusion, through an abnormal or accidental opening, of any organ from its natural cavity. Although hernia may occur in many parts of the body, the word, used by itself, is restricted to signify protrusion of the abdominal viscera.

The way in which hernia may arise will be readily understood, if we bear in mind that the abdominal viscera are subject to violent pressure from the diaphragm and other surrounding muscles. This pressure forces them outwards and downwards against the walls of the belly; and if at any point these walls are not sufficiently strong to resist this pressure, some portion of the viscera is driven through them, and a hernial tumour is formed. Certain parts of the abdominal walls, especially the inguinal and crural rings, and the umbilicus, being weaker than others, hernia most frequently occurs at these points. In some instances hernia is congenital, as from abnormal deficiency of the walls; in other cases, it may arise at any period of life as a result of violent bodily exertion. Sex, age, and occupation seem to have a marked influence in predisposing to hernia. Men are far more liable (in about the proportion of four to one) to this disease than women; though they are less so to those forms of the affection known as femoral and umbilical hernia. According to Malgaigne, in France, one man in thirteen, and one woman in fifty-two, are the subjects of hernia. In respect of age, he found that the liability is least about the age of thirteen (1 in 77), after which it progressively increases until the close of life, rising at 70—75 to 1 in 3.

A hernia is almost always composed of *a sac* and *its contents*. The sac is a portion of the Peritoneum (q. v.) corresponding to the aperture at which the hernia protrudes. It is pushed forward by the protruding viscera, and forms a pouch. The contents vary greatly, but generally consist of a portion of the small intestine (particularly of the ileum), forming the variety of hernia known as *enterocele*. Omentum is often found in hernial sacs, together with intestine. Besides the viscera, the sac always contains a certain quantity of fluid secreted by its interior. Hernia is divisible (1) into *reducible*, or returnable into the abdomen, *irreducible*, and *strangulated;* and (2) according to its situation, into *inguinal*, *crural*, &c.

The treatment of reducible hernia may be palliative or radical. The palliative treatment consists in the application of a Truss (q. v.) to retain the protrusion within the cavity of the abdomen. Each particular kind of hernia (femoral, crural, &c.) requires its special form of truss; and before applying it, the hernia must be reduced by placing the patient on his back, relaxing the muscles by bending the thigh upon the abdomen, and pressing the tumour back in the proper direction. The truss should then be put on, and should be worn during the whole of the day; and if the patient will submit to wear it (or a lighter one) during the night, so much the better. The means that have been contrived to effect a radical cure are too purely surgical for description in these pages. Below the age of puberty, and if the hernia is recent, a radical cure is sometimes effected by wearing the truss for two or three years.

In irreducible hernia the protruded viscera cannot be returned into the abdomen, but there is no impediment to the passage of their contents or to their circulation. In these cases, the patient is often liable to dragging pains in the abdomen, and to attacks of vomiting, in consequence of the movements of the stomach being checked by the omentum or intestines being fixed. There is also constant danger of this hernia passing into the strangulated form. The treatment may be either palliative or radical. The palliative treatment consists in the employment of a truss with a hollow pad that shall embrace the hernia, and prevent any additional protrusion. A radical cure may *sometimes* be obtained by keeping the patient in the recumbent position, and on very low diet, for two or three months; at the same time keeping the bowels open by laxatives and injections, and maintaining equable pressure over the tumour.

Hernia is said to be strangulated when a portion of intestine or omentum that is protruded is so tightly constricted that it not only cannot be returned into the abdomen, but has its circulation arrested. This form is highly dangerous, because, if relief is not speedily afforded, the strangulated part becomes gangrenous. The causes of strangulation are various, but this condition most commonly arises from a sudden violent effort, by which a fresh portion of intestine is driven into a pre-existing hernia, which it distends to such a degree as to produce this complication. The most prominent early symptoms are flatulence, colicky pains, &c. They are succeeded by vomiting first of the contents of the stomach, then of mucus and bile, and lastly of fæcal matters, owing to inverted peristaltic action. If relief is not obtained, the inflammation that commences in the sac extends to the peritoneum, and the ordinary signs of peritonitis appear. After a variable time, comes gangrene or mortification of the part, and the patient speedily sinks.

The surgeon first tries to return the intestine, as in the preceding cases. This manipulation, termed the taxis, may be assisted by the internal use of chloroform, inhaled till it produces complete relaxation of the muscle, by general bleeding to the verge of faintness, by the hot bath, &c. If this fails, he must have recourse to the knife to divide the constriction.

HE'RO, a priestess of Venus, celebrated for her love for Leander. At a festival of Venus and Adonis, held at Sestos on the Thracian coast, H. and Leander first saw each other, and were immediately inspired with a mutual passion. H.'s position as a priestess, and the will of her parents, opposed their union. Undaunted by these obstacles, Leander every night swam across the Hellespont to visit his beloved, who directed his course by holding a burning torch from the top of a tower on the sea-shore. After many interviews, Leander was drowned in a tempestuous night, and was cast on shore at the foot of the tower, where H. anxiously awaited him. At the sight of the body, she threw herself from the tower. A poem has come down to us under the name of Musæus, in which this story is sung; Schiller likewise has made it the subject of a beautiful ballad.

HERO, or HERON, commonly known as HERO OF ALEXANDRIA, was a pupil of Ctesibius, and flourished 284—221 B.C. He was a celebrated mathematician and natural philosopher, and displayed, especially in the latter subject, a most original and inventive genius. He constructed a great number of machines and automata—rather, however, as toys, than for the purpose of applying them to any useful purpose—among which are *Hero's Fountain* (q. v.); a *steam-engine* on the principle of Barker's mill (a vessel being caused to revolve by jets of steam issuing from lateral holes in the arms with which it is provided); a double forcing-pump used for a *Fire-engine* (q. v.), and various other similar applications of air and steam. It is but recently that the remarkable claims of H. to such discoveries have received any notice, for in the valuable work of M. Dutens, entitled *L'Origine des Découvertes attribuées aux Modernes*, the name of H. is not even mentioned. Among his works which have come down to us are *Pneumatika*, his most valuable work, in which the above-mentioned machines and many others are figured and described; *Belopoiëtika* (on the manufacture of darts), and *Cheiroballistras Kataskeuē* (also on warlike instruments); *Peri Automatopoiëtikōn* (on the construction of automata). All these works are merely fragments, and an acquaintance with them causes us to regard with the greater regret the loss of the rest. The best edition of his works is that published in the *Veterum Mathematicorum Opera* (Paris, 1693).

HE'ROD, the name of a family which rose to power in Judea during the period which immediately preceded the complete destruction of the Jewish nationality. The family was of Idumean descent; but, though alien in blood, was Jewish in religion, the Idumeans having been conquered and converted to Judaism by John Hyrcanus, 130 B.C. The most remarkable rulers of the name are four in number—Herod the Great, Herod Antipas, and Herod Agrippa I. and II. (for the two last, see AGRIPPA). 1. HEROD THE GREAT. He was the second son of Antipater, who was appointed procurator of Judea by Julius Cæsar 47 B.C. At the time of his father's elevation, H., though only 15 years of age, was made governor of Galilee, and afterwards of Cœle-Syria; and finally, he and his elder brother were made joint-tetrarchs of Judea; but he was soon displaced by Antigonus, the representative of the Asmonean dynasty, and forced to flee to Rome, where he obtained, through the patronage of Antony, a full recognition of his claims, together with the title of king of Judea, 40 B.C. Several years elapsed, however, before he succeeded in establishing himself in Jerusalem. On the fall of Antony, he managed to secure a continuance of favour from Augustus, from whom he not only obtained a confirmation of his title to the kingdom, but also a considerable accession of territory, 31 B.C. From this time till his death, his reign was undisturbed by foreign war; but it was stained with cruelties and atrocities of a character almost without parallel in history. Every member of the Asmonean family, and even those of his own blood, fell in succession a sacrifice to his jealous fears; and in the latter years of his life, the lightest shade of suspicion sufficed as the ground for his wholesale butcheries, which are related in detail by Josephus. Of these, the one with which we are best acquainted is the slaughter of the infants at Bethlehem. The one eminent quality by which H. was distinguished, was his love of magnificence in architecture, and the grandeur of the public works executed under his direction. Even by these, however, he alienated the Jews, who ascribed them all to his Gentile leanings, and to a covert design of subverting the national religion. H. married no fewer than ten wives, by whom he had fourteen children. He died of a loathsome disease at the age of 70, after a reign of 37 years. —2. HEROD ANTIPAS, son of H. the Great by his wife Malthace, a Samaritan, was originally designed by his father as his successor; but by the final arrangements of the will of H. the Great, Antipas was named tetrarch of Galilee and Perea. He divorced his first wife, the daughter of Aretas, king of Arabia Petræa, in order to marry Herodias, the wife of his half-brother Philip—an incestuous connection, against which John the Baptist remonstrated, and was in consequence put to death. It was during a visit of H. Antipas to Jerusalem for the purpose of celebrating the passover, that our Lord, as having been a resident of his tetrarchate, was sent before him by Pilate for examination. At a later time, he made a journey to Rome, in the hope of obtaining the title of king; but he not only failed in this design, but, through the intrigues of H. Agrippa, was banished to Lugdunum (Lyon), where he died in exile.

HERO'DOTUS, the oldest Greek historian, and for this reason usually styled the 'Father of History,' was born at Halicarnassus, in Caria, 484 B.C. He appears to have early formed the resolution of writing a historical work on an extensive scale, and with this view determined to visit and observe with his own eyes the most remote countries and nations. Although the dates and extent of his travels are involved in obscurity, and sometimes even in contradictions in the ancient narratives, we gather from his own statements that in his early youth he visited the islands and coasts of Asia Minor; that subsequently he devoted particular attention to Egypt, which was at that time little known; that he next visited Palestine and Phœnicia; and finally penetrated as far east as Babylon and Susa. We are also informed that he sailed through the Hellespont into the Black Sea, and visited all the countries situated on its shores. After his return, he appears to have resided for a time at Athens. He speaks of having seen the *Propylæa*—i. e., the entrances to the Acropolis, which were not finished till the outbreak of the Peloponnesian war (431 B.C.). He also interested himself warmly in the politics of his native city, was instrumental in delivering it from the tyranny of Lygdamis, a vassal of Persia; but being what we should call 'a moderate liberal,' he had the misfortune to offend the extreme or popular party, and in consequence withdrew to Thurii, in Italy, whither many of his fellow-citizens had previously proceeded. Here, in all probability, he wrote his immortal work in the decline of his life. Lucian, an indifferent authority on such a subject, states that about the year 456 B. C., he read the nine books before the Greeks assembled at the Olympic games, but this is contradicted by the numerous allusions in the History to incidents of later occurrence—for example, the revolt of the Medes against Darius Nothus (409—408 B. C.). The statement of Pliny, that it was composed in his old age at Thurii, is the most probable, and it best agrees with the unfinished programme of the work, and its abrupt termination, as if the author were prevented by death from finishing it as he intended. According to Suidas, he died and was buried at Thurii about 408 B. C.

The purpose of H. in his History is to describe the war between the Persians and the Greeks—the struggle for supremacy between Europe and Asia, between civilisation and barbarism, between freedom and despotism. H., wishing to indicate that the antipathy between the two was not the result of any accidental quarrel, but of a deep-rooted difference of character, traces it back to the mythical ages. This was the only way in which a man in his time could express what we mean when we speak of the differences of *race*. In the course of his History, he gives an account of the various countries which he had visited. Wherever he gives the results of his own observations and inquiries, he exhibits a wonderful accuracy and impartiality; and when he does not do this, he is generally careful to say so. He has been accused of credulity, and it is certain that he too readily accepted statements on the authority of others, but that he was personally a keen intelligent observer of what he saw is beyond all dispute. H. wrote in the Ionic dialect, but Attic, Doric, and epic forms occur in his work. The style is marked by an easy grace and lively vigour, and everywhere there is the presence of a reverent spirit, giving a certain air of moral dignity to the entire composition. The first edition (in Latin), by Laurentius Valla, appeared at Venice in 1474; the first in the original Greek at Venice in 1502. The chief modern editions are those of Schweighauser (6 vols. Strasb. and Paris, 1806), Gaisford (4 vols. Oxford, 1824), Bähr (Leip. 1830—1834), and Müller (Paris, 1844). The best school editions are those of Matthiæ (2 vols. Leip. 1825), Bekker (Berlin, 1833 and 1845); G. Long (Lond. 1830), and Negris (Edin. 1834). A variety of translations of the writings of H. have likewise been published, as well as of historical and geographical treatises calculated to facilitate the study of the celebrated historian.

HEROES were, in the Homeric period, the kings, princes, generals, leaders, all brave warriors, and men who excelled in strength, courage, wisdom, and experience. Many of these had, on account of such qualities, a fabled origin, half human, half divine, and were honoured, after their death, with a kind of adoration or inferior worship. These heroes and demigods were recognised as the special patrons or protectors of particular countries and cities, and to them were raised temples and altars. These examples of heroic character, held up constantly to the admiration and imitation of peoples, tended to strengthen their peculiar character, and to impress them with the greatness and glory of courage, contempt of danger, and nobility of purpose. Poetry exalted the heroic sentiment to sublimity; and poems which celebrated the deeds of heroes, are themselves termed heroic. The imaginary time when heroes and other semi-divine beings lived on earth was called the HEROIC AGE. See AGES.

HEROIC VERSE. See METRE, VERSE.

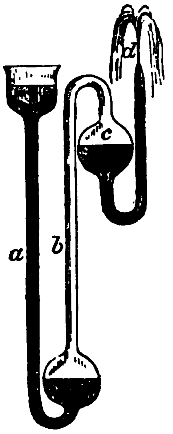
HERON (*Ardea*), a genus of birds, of the order *Grallatores*, tribe *Cultrirostres*, and family *Ardeidæ*. This family includes also Bitterns, Night Herons, Spoonbills, Boatbills, Storks, Adjutants, Ibises, &c. The bill is long, compressed, and sharp; the tail short; the legs and the toes long and slender; the wings long. In the herons—in which genus are included the species commonly designated EGRETS (q. v.), which differ only in unimportant particulars of plumage—the bill is slender, but strong, forming a compressed and lengthened cone; the plumage is beautiful, but seldom exhibits very gay colours; white, brown, black, and slate colour, finely blended, being generally predominant. The body is small in proportion to the length of the neck and limbs; the neck is long, and, except in flight, is usually held curved. In flight, the H. carries the neck, head, and long bill in a straight line before the body, and the long legs in like manner stretched out behind. Herons feed mostly on fish, frogs, and other aquatic animals; and may be seen, particularly very early in the morning and late in the evening, standing patiently motionless in some shallow water, at the margin of a lake or stream, or on the sea-shore, waiting till prey come within reach. In default of their more common food, however, herons sometimes prey on young birds, reptiles, and the smaller mammalia. They usually go forth singly in quest of prey, but are mostly gregarious in their nidification.—The COMMON H. (*A. cinerea*) is about three feet in length from the point of the bill to the end of the tail. It is of a delicate gray colour on the upper parts, except the quill-feathers, which are black, and the tail, which is deep slate colour. The Common H. generally builds its nest in a high tree, and many nests are sometimes to be seen in a single tree. Pennant tells us that he counted 80 in one oak in Lincolnshire. In very northern parts of the world, the H. is known only as a summer bird-of-passage, but it remains in Britain all the year. Its geographical range extends over most parts of Europe and Asia, and includes the north of Africa. The H. was formerly in great esteem for the table, although now disregarded; it was also the kind of game most of all pursued in falconry; and the English act,

Common Heron (*Ardea cinerea*).

19 Henry VII. c. 11, prohibited the killing or taking of herons, except by hawking, or with the long-bow. This act was not repealed till the game act of Geo. IV.—The Purple H. (*A. purpurea*) is a smaller and much rarer British species.—The Great White H., or Great Egret (*A. alba*), a mere accidental visitor of Britain and of the western parts of Europe, is more common in Turkey, Greece, &c., and in some parts of Asia. It is an extremely beautiful bird, with perfectly white plumage, much of it loose and flowing.—The Little Egret (*A. garzetta*) has also white flowing plumage. It is only about two feet in length.—America has many species of H., most numerous in its warmer regions. The most common species in the temperate parts of North America is the Green H. (*A. virescens*), the flesh of which is so much esteemed that it is often to be seen in the markets.

Heron and egret plumes, made of the long feathers, were in former times highly valued, being, in some countries, deemed an ornament fit for royal personages, or for the highest nobles.

HERO'PHILUS, one of the greatest physicians of antiquity, was born at Chalcedon, in Bithynia, and flourished in the 4th and 3d centuries, B.C. He settled at Alexandria, and distinguished himself in particular by his devotion to anatomy. In fact, he is said to have pursued this to such an extent as to have dissected criminals alive. Several names which he gave to different parts of the body are still in use, as the 'Torcular Herophili,' the 'Calamus scriptorius,' and the 'Duodenum.' H. placed the seat of the soul in the ventricles of the brain. Of his writings, only a few fragments remain, which have been collected and published in a dissertation entitled *De Herophili Celeberrimi Medici Vita, scriptis, atque in Medicina Meritis* (Gött. 1840).



Hero's Fountain.

HERO'S FOUNTAIN, a pneumatic apparatus, through which a jet of water is supported by condensed air. A simple mode of constructing it by means of glass tubes and a glass-blower's lamp is shewn in the annexed figure. The column of water in the tube *a*, compresses the air in *b*; this presses on the surface of the water in *c*, and causes it to gush out at *d*.

HERO'STRATUS, an Ephesian, who, from a desire of future fame, set fire to the magnificent temple of Diana, in 356 B.C. He expiated the deed by a painful death; and, by a decree of the Ionians, capital punishment was to be inflicted upon any one who should mention his name; a decree which produced an effect directly the reverse of what had been intended. The temple is said to have been set on fire on the night that Alexander the Great was born.

HE'RPES, a variety of disease of the skin, characterised by vesicles, sometimes as large as a split-pea, occurring in clusters on an inflamed base, and ending in desquamation, after a course of a few days or weeks. In herpes zoster, or zona, the largest and most marked variety of the disease, there is the additional peculiarity, that it extends in patches around one side of the body, usually passing sharply up to the middle line, but not beyond it either before or behind. Herpes phlyctænodes, zoster, labialis, præputialis, circinatus, are the varieties of this disease most commonly met with in practice. The treatment is by soothing and cooling applications; there is no danger; but the smarting during the eruptive period, and the itching afterwards, are often very distressing to the patient, and may be somewhat relieved by the application of cold cream, and other simple soothing external applications.

HERPETO'LOGY (Gr. *herpĕton*, a reptile, and *logos*, a discourse), that branch of natural history which treats of reptiles. The Batrachians or Amphibia having, till recently, been included by naturalists generally—as they still are by many—in the class of Reptiles, the science of herpetology may be regarded as including the study of them. This branch of natural history received a share of attention from the naturalists of antiquity and the earlier naturalists of modern times. The name most deserving of notice in connection with it before the time of Linnæus is that of Ray. In the end of the 18th c. and beginning of the 19th, H. received special attention from Lacépède, Brongniart, Latreille, and Daudin, all of whom, as well as Cuvier, contributed greatly to its progress. More recently, it has been much advanced by the labours of Schlegel, Fitzinger, J. E. Gray, Müller, Owen, &c. The work of Spix on the *Reptiles of Brazil* is one of the most important contributions to herpetology. Bell's *History of British Reptiles* (Lond. 1839) contains a very full account of all the British species, including the Batrachians. This branch of natural history derives great additional interest from the numerous fossil remains of reptiles of former geological periods, and from the great size and extraordinary characters of many of them.

HERRE'RA, Antonio, one of the most eminent historians of Spain, was born at Cuellar, in the year 1549, and died at Madrid, 1625. His principal work is the *Historia general de los Hechos de los Castellanos en las Islas y Tierra Firme del Mar Oceano* 1492—1554 (4 vols. Madrid, 1601—1615), which was afterwards published with continuations by Andr. Gonzalez de Barcia (4 vols. Madrid, 1728—1730). His *Descripcion de las Indias occidentales* (Madrid, 1601 and 1615) forms an introduction to the above work. His other works, which are no less valuable, are the *Historia del Mundo en el Reynado del Rey D. Felipe II.*, 1554—1598 (3 vols. Madrid, 1601—1612); *Commentarios de los Hechos de los Españoles, Franceses y Venecianos en Italia*, 1281—1559 (Madrid, 1624); and the *Historia de Portugal y Conquista de las Islas de los Açores* 1582 *y* 1583 (Madrid, 1591).

HERRÊRA, Fernando de, a Spanish poet, was born at Seville, in the beginning of the 16th century. When advanced in life, he took orders, and died in 1589. He was master of the Greek, Roman, and Italian literatures, and was a man of prodigious learning. As a poet, he ranked so high, in the opinion of his contemporaries, that they bestowed upon him the appellation of the *divine*. Among his poetical works still extant, many of his erotic poems are remarkable for tender feeling; while his odes frequently display a lofty enthusiasm, but the expression is cast in too classical a mould, and consequently wears a certain air of artificiality. His *Obras en Verso* were published by Pacheco (Seville, 1582), and subsequently under the title *Versos* (Seville, 1619). They were republished in the *Coleccion* of Ramon Fernandez (Madrid, 1786; new edit. 1808). His principal historical work is the *Relacion de la Guerra de Chipre* (Seville, 1572); and he also translated from the Latin of Stapleton a life of Sir Thomas More.

HERRÊRA, Francesco, El Viejo, i.e., the Elder, one of the most eminent Spanish painters of the school of Seville, was born in that city about the year 1576. He was the first to lay aside that timidity in the use of the brush which we observe in the works of the older Andalusian painters. His drawing was bold and spirited, for which reason he may justly be regarded as the founder of a new and more national school. His 'Last Judgment,' painted for the church of St Bernard at Seville, is a master-piece of drawing and colouring. The 'Holy Family,' and 'Outpouring of the Holy Spirit,' in the church of Sta. Ines, in Seville, are also much esteemed. The cupola of the church of Sta. Bonaventura displays his skill in fresco-painting. He likewise worked in bronze, a circumstance which may have led to the imputation cast upon him of coining false money. He died at Madrid in the year 1656. His easel-paintings and reed-drawings fetch very high prices. Some of his best works are in the Louvre at Paris.—His youngest son, FRANCESCO HERRĔRA, EL MOZO (the Younger), was born at Seville in 1622. He studied under his father, and afterwards went to Rome, where he became so celebrated for his fish-pieces, that he received the surname of *Il Spagnuolo degli Pesci.* After his father's death, he returned to Seville, and painted for the churches. He subsequently went to Madrid, where he painted the dome of the choir of Sta. Felipe and the chapel of Our Lady of Atocha, and died in 1685.—There have been several other artists of the same name, but of less note.

HERRING (*Clupea harengus*), a fish of the malacopterous family *Clupeidæ* (q. v.); the most important to mankind of all species of fish. The genus *Clupea* is distinguished from others of the same family chiefly by the fins and by the teeth, which are small and numerous, and are situated not only on the jaws, but in other parts of the mouth, as the *vomer* (middle line of the palate) and the tongue. The H., of which we think it unnecessary to give any description, is found in the seas of the northern parts of the world, but more abundantly in those of temperate than of arctic regions. The opinion, once entertained, that its proper home is within the Arctic Circle, and that its vast shoals issue thence at certain seasons, migrating southward, and spreading themselves along the British and other coasts, is now discarded as utterly without foundation; and the H. is believed to be an inhabitant of deep water, from which, at certain seasons, it approaches the shores, probably never migrating to any great distance. The young are abundant in the shallow water near the shores at seasons when the parent fish are absent. The H. seems always to deposit its spawn in comparatively shallow water, and is said to be very indifferent whether the spawning-ground be sandy, rocky, or covered with submarine vegetation. Certain localities, however, have the reputation of being favourite spawning-grounds. When the great annual shoals of herrings appear on the coasts, they generally swim near the surface of the water, and are followed by multitudes of larger fishes, as hakes, dog-fishes, &c., which prey on them; great numbers also fall a ready prey to gulls and other sea-birds, which congregate for the occasion. The food of the H. is believed to consist chiefly of minute crustaceans and *acalephæ;* but it feeds also on small fishes, not scrupling to devour even the young of its own species. Herrings are sometimes, though rarely, caught on the lines set for other fishes, and by persons angling from the shore; they are readily caught by means of a lure made of a white feather, which swims at the depth of some yards, the point of the fishing-rod being kept a yard or two below the surface of the water, the angler being in a boat which is in motion. The immense multitudes of herrings annually taken by the net cause no apparent diminution of their abundance, the destruction being compensated for by prodigious fecundity; more than 68,000 eggs have been counted in the roe of a single female. But herrings, without any apparent cause, often desert parts of the coast where for a time they have been remarkably abundant, not returning again in similar plenty till after the lapse of a number of years. Some instances of this kind, in the western parts of Scotland, were popularly ascribed to steam-boats, when these first began to ply. The magnitude of the shoals of herrings is often enormous, and they have sometimes even been driven ashore in far greater quantities than the inhabitants of the neighbourhood could find means of curing. An instance of this kind occurred, before the days of railways, at Crail in Fife. The water, as the tide came in, was so full of herrings, that half-a-dozen could be taken out at one dip of a basket. Finally, they were stranded and left by the retiring tide in such numbers, that when all the salt within reach was exhausted, the magistrates had to offer a shilling a cart for their removal as a nuisance.

There is evidence that the herring-fishery has been prosecuted in England since the beginning of the 8th c., and in Normandy since the 11th. Nor is it probable that in either case the date is that of its commencement. The prosperity of Holland is in a great measure owing to the herring-fishery, and the Dutch engaged in it with great eagerness, and carried it on even on the British coasts, at a time when it was comparatively neglected both by English and Scotch.

Another species of H. (*C. Leachii*) is occasionally found on the British coasts. It is rather smaller than the common H., and the body is much deeper in proportion to its length. It is of particularly delicate flavour.—The seas of other parts of the world produce a number of other species of the genus *Clupea*, as now restricted by ichthyologists. The other British *Clupeidæ* are now referred to other genera.

The fishes popularly called *Freshwater Herrings* are *Salmonidæ* of the genus *Coregonus* (q. v.), to which also belong the *Herring Salmons* of the North American lakes and rivers. All of them are esteemed for the table.

HERRING-FISHERY. The herring-fishery is carried on all the year round, there being both a winter and a summer fishery; but the largest quantities of fish are caught in the months of August and September, at which time the fishery becomes general on all parts of the British coasts.

The common mode of capturing herrings is by a set of large nets joined together, and known among fishermen as a 'drift.' These nets, held together by a back-rope, are let into the water in a straight line, and are kept perpendicular by a number of bladders or cork floats, balanced by a few slight weights of lead. Each single net is composed of fine twine worked into meshes of an inch square, and is 50 yards long and 33 feet in depth. These nets, which are now woven by machinery, were formerly made by the fishermen's families; but so many are used now, that it would be impossible to make them by hand, as each boat has a train that extends nearly a mile in length.

The herring-fishery in Scotland is regulated by acts of parliament, and watched over by the Commissioners for the British Fisheries. This Board will allow of no other method of taking the fish than by a drift-net. Another mode of fishing, known as 'trawling,' but which is in reality carried on by means of a 'seine'-net, prevails on some parts of the British coast; but in Scotland, trawling is illegal, and subjects those who practise it to heavy penalties.

The boats required in the herring-fishery in Scotland, although open or undecked, require to be of considerable size, in order to contain the large quantity of nets which are used, as well as to bring home the fish that may be taken; the fishermen also believe that the open boats are more convenient for the manipulation of the nets. Most of the boats used in Scotland are obtained from the port of Leith, which has long been celebrated for the build of its open fishing-boats. Each vessel is manned by a crew of five or six persons, one to guide the boat, and the others to manœuvre the sails, nets, &c. The boat usually belongs to one person, who hires his assistants, or, as in some cases, may be owned by two or three relatives, who form themselves into a crew, and share in the proceeds of the capture. The boats of a district usually gather to a particular centre, for the convenience of the curers. Some fishermen will proceed a hundred miles or more to a favourite port, and many of the curers have curing-stations at five or six different places. The boats proceed to sea so as to arrive at the place selected for casting the nets about sunset, when the sail is struck, and the nets are gently paid over the boat, which requires to be kept in motion during the process. The last portion of the nets is fixed to the boat by a long swing-rope, and when the whole train has been let into the sea, the fishermen go to rest; the boats and nets being allowed to drift with the tide. The herrings are caught by striking against the nets, in which they entangle themselves by the head. The herring-fishery partakes greatly of the nature of a lottery. A boat will sometimes obtain a large quantity of herrings, and as frequently take only a few; sometimes the nets are shot twice in a night, if no fish are got on the first trial.

The commerce carried on in herrings is peculiar. The fish when brought on shore are measured ungutted by the 'cran,' a vessel which contains 45 gallons, and handed over to the curer. A very large proportion of the herrings taken on the British coast are pickled or cured by means of salt; owing to the facilities for speedy transport afforded by railways, however, great quantities are also disposed of fresh. At Yarmouth, and some other parts of England, and also at some places in Scotland, the herrings are, after being slightly salted, made into what are called 'bloaters,' by means of smoking. A large portion of the total catch is likewise made into 'reds' by a more complete smoking, and both kinds are in great demand. Smoking-houses are now numerous in many parts of Scotland.

The chief buyers of the fresh fish are known as curers; they provide salt, barrels, and labour, for the curing and packing of the fish. The curer, who is usually a person of considerable capital, contracts with the owners of the boats for a certain quantity of fish, usually 200 crans, for which he pays at a rate which has been arranged for long before the commencement of the fishery. In addition to a specified price per cran, a sum of money is usually paid down by way of bounty, and various privileges, such as dye-stuffs and drying-ground for nets, a few gallons of whisky, &c., are agreed for as well. Some curers will have as many as 250 boats fishing for them on various parts of the coast. The herrings are cured (in Scotland) under the inspection of an officer, and each barrel, if cured according to the instructions laid down by the Fishery Board, is entitled, on the payment of a small fee, to be marked with the government brand, as a mark of its quality. A large number of women are employed to gut and pack the fish, which they do with astonishing dexterity. The excitement and bustle at a large fishing-port during the herring season are remarkable, large numbers of people being employed in the various industries incidental to the capture and cure of the herrings. Amsterdam is said to have been built on herring-bones; but the Dutch herring-fishery, once of great magnitude, has been exceeded by that of Scotland, which is the largest in the world, and from which cured herrings are exported to the continent of Europe and to Ireland, and other countries, in large quantities. The only official statistics of the herring-fishery in Great Britain relate to the fishery in Scotland and the Isle of Man; these are issued annually by the Commissioners of the British Fisheries. No account is kept of the quantity of herrings caught on the English coast, nor is there any authentic statistics of the number or value of the boats engaged in this branch of the fishery.

From the report of the Scottish Fishery Board for 1873, it appears that, in that year, there were 88,159 people employed in the various departments of the Scottish herring and other fisheries, and that the number of herring-boats in use at the various stations was 15,095, representing in value, together with nets and lines, £1,020,328. The total quantity of herrings cured was 939,233 barrels. The report of the Fishery Commissioners for Ireland does not afford information on these points, and the details of the English herring-fishery cannot be separated from those of other branches of the fishery business.

Herring-fisheries have always been the subject of legislative protection in the United Kingdom, being considered a valuable branch of public industry. In 1860, an act of parliament, 23 and 24 Vict. c. 92, passed to regulate the Scotch herring-fisheries. By that act, the Commissioners of the British White-herring Fishery may appoint a close season in some parts of the Scotch coast, there being a close season also fixed from January to May inclusive, as to the principal parts of the coast. The kind of fishing-boats and nets employed in the fishery is subjected to regulation. A penalty is incurred by selling fresh herrings during close time, 24 and 25 Vict. c. 72. The following are the more recent acts for the encouragement and regulation of the British White-herring Fishery, 48 Geo. III. c. 110, 51 Geo. III. c. 101, 52 Geo. III. c. 153, 54 Geo. III. c. 102, 55 Geo. III. c. 94, 1 Geo. IV. c. 103, 1 and 2 Geo. IV. c. 79, 5 Geo. IV. c. 64, 7 Geo. IV. c. 34, 1 Will. IV. c. 54, 6 and 7 Vict. c. 79, 10 and 11 Vict. c. 91, 14 and 15 Vict. c. 26, 23 and 24 Vict. c. 92, 24 and 25 Vict. c. 72. See FISHERIES.

HERRING SILVER, a composition in money, in lieu of supplying a religious house with a certain number of herrings.

HE'RRISON (Fr. *hérisson*), in Heraldry, the hedgehog, a charge allusively borne by families of the name of Harris.

HE'RRNHUT, a small town in the circle of Bautzen, kingdom of Saxony, about 50 miles east of Dresden. It is pleasantly situated on the southern slope of the Hutberg, from which it takes its name, and is noted throughout Germany for its fine and durable manufactures, particularly linen, japanned wares, and leather. H. is also remarkable for the regularity and simplicity of its architecture, and the inhabitants for their cleanliness, freedom from all ostentation, and quiet deportment. Pop. about 1100. H. was founded in 1722 by a colony of persecuted Moravians, some of whom were descended from the old Bohemian and Moravian Brethren. On coming into Saxony, they were sheltered and protected by the pious Count Zinzendorf, to whom H. belonged. From this place the United Brethren, better known as Moravians, have spread themselves over all parts of the world.

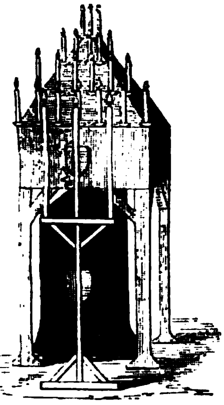
HERSCHEL, Sir William, born at Hanover, November 15, 1738, was the son of a musician, and was educated specially as a professional musician. In 1757 he went to England, where he became a teacher of music in the town of Leeds, from which he went to Halifax as organist, and subsequently (1766) in the same capacity to Bath. Here he would seem to have first turned his attention to astronomy. Wanting a telescope, and unable to afford a reflector, he made one for himself—a Newtonian, of five feet focal length, and with this applied himself to study the heavens. In 1781, he made his first discovery (*Philos. Trans.* 1780—1781), being a new planet, which at first he took for a comet. It was detected by an exhaustive process of surveying the heavens, which H. was the first to follow, taking the stars in regular series, and examining them all in their groups through the same instrument. The result of his discovery was his appointment to be private astronomer to George III., with a salary of £400 a year. He then went to live at Slough, near Windsor, where, assisted by his sister Caroline (q. v.), he continued his researches. H. married a Mrs Mary Pitt, and left one son, John (q. v.). Little is known of his private life. He was knighted by George III., and made a D.C.L. by the university of Oxford; he became rich partly through his wife's jointure, and partly through selling mirrors for reflecting telescopes. He died at Slough, 23d August 1822.

H. contributed 69 papers to the *Philos. Trans.* between the years 1780 and 1815; and to the 1st vol. of *Mem. of the Astron. Society*, he contributed a paper, 'On the Places of 145 New Double Stars.' He greatly added to our knowledge of the solar system: he discovered Uranus and its six satellites, and two satellites of Saturn. Besides this, he detected the rotation of Saturn's ring, the period of rotation of Saturn itself and that of Venus, the existence of the motions of binary stars, the first revelation of systems besides our own. He threw new light on the Milky Way and the constitution of nebulæ, and, in fact, was the first to give the human mind any conception of the immensity of the universe. His catalogue of double stars, nebulæ, &c., and tables of the comparative brightness of stars, and his researches in regard to light and heat, would of themselves entitle him to the first rank as an astronomer and natural philosopher. For a notice of H.'s telescope, see Telescopes. He erected one monster telescope, as it was then considered, of 40 feet length. It was begun 1785, and finished 1789, on the 28th August of which year he by means of it detected the sixth satellite of Saturn.

HERSCHEL, Caroline Lucretia, sister of the astronomer, Sir William Herschel (q. v.), born March 1750, lived in Hanover till 1772, when she came to England to live with her brother at Bath. When William turned astronomer, she became his constant helper; and on his being appointed private astronomer to George III., she acted as his assistant, doing all the duties of an assistant astronomer, and in that character receiving a small salary from the king. While discharging her duties in this position, she found time for a series of independent observations with a small Newtonian telescope, made for her by her brother. Her special business was to sweep the heavens for comets, seven of which she discovered, in regard to five of which she has the credit of priority of discovery; and several remarkable nebulæ and clusters of stars included in William's catalogues were described from her original observations. In 1798, she published, with an introduction by her brother, *A Catalogue of Stars taken from Mr Flamsteed's Observations, &c.* This valuable work was published at the expense of the Royal Society, and contained 561 stars omitted in the British catalogue. She lived with her brother during the whole of his career, sharing his labours and distinctions, and on his death returned to her native country. She was then 72 years of age, but she lived to be 98, retaining all her faculties to the last. In her last days, she was not idle. In 1828, the Royal Society conferred on her their gold medal for completing the catalogue of nebulæ and clusters of stars observed by her brother. She was afterwards chosen an honorary member of the Royal Society. Miss H. died in 1848, after an uncommonly long life, distinguished by most useful scientific labours.

HERSCHEL, Sir John Frederick William, Bart., only son of the astronomer, William Herschel (q. v.), born at Slough, 1790, educated at St John's, Cambridge, where, in 1813, he became senior wrangler and first Smith's prize man. His first publication was *A Collection of Examples of the Application of the Calculus of Finite Differences* (1820). In 1822, he applied himself especially to astronomy, using his father's methods and instruments in observing the heavens. For a time, he worked with Sir James South in re-examining the nebulæ and clusters of stars described in his father's catalogues. The results of the re-examination were given in 1833 to the Royal Society in the form of a catalogue of stars in order of their right ascension. The catalogue contained observations on 525 nebulæ and clusters of stars not noticed by his father, and on a great number of double stars—in all between 3000 and 4000. This important contribution to science led to his being acknowledged as the worthy successor of his father; so early, indeed, as 1826, the Royal Society had voted to him and South a gold medal apiece for their observations on double stars; but by 1833 his pre-eminence was beyond the necessity of being marked by acknowledgments. His 'Treatise on Sound' had appeared in the *Ency. Metro.* in 1830, and his 'Treatise on the Theory of Light' (in the same work) in 1831, in which year also appeared in Lardner's *Cyclo.* his well-known 'Preliminary Discourse on the Study of Natural Philosophy'—not to mention his papers in the *Trans. Astron. Soc.* The Preliminary Discourse—one of the most charmingly written books on science in any language—contributed largely to his popularity. In 1836, appeared his 'Treatise on Astronomy' in Lardner's *Cyclo.* At this time, H. was at the Cape of Good Hope, where he arrived in January 1834, with the intention of completing the survey of the sidereal heavens, by examining the southern hemisphere as he had done the northern. Here he established his observatory at a place called Feldhausen, six miles from Table Bay. On the 5th March 1834, he commenced his observations; and in four years, working all the time at his own expense, he completed them. The public interest taken in his labours was, as might be supposed, very great; but though now and then gratified by partial statements of his results, it was not till 1847, nine years after his return from the Cape, that it received full gratification in the publication of a volume of *Results of Astronomical Observations made during* 1834—1838 *at the Cape of Good Hope; being the Completion of a Telescopic Survey of the whole Surface of the Visible Heavens commenced in* 1825. It need not be said that the results of these labours are invaluable. They are now incorporated into all books on astronomy. H., when at the Cape, gave an impulse to the science of meteorology, having the merit of having suggested the scheme for taking meteorological observations simultaneously at different places. In 1844, he published, under official military authority, a book of instructions for taking and recording such observations in Southern Africa.

On his return to England in 1838, honours were showered on him. He had got the Royal Society's gold medal in 1836; he now was made a D.C.L. of Oxford; on Queen Victoria's coronation, he was created a baronet; he now succeeded the Duke of Sussex as President of the Royal Society; in 1848, he became President of the Royal Astronomical Society. In 1849, he published his *Outlines of Astronomy*, an enlargement of the publication in Lardner's *Cyclo.* In 1850, he was appointed Master of the Mint. This office, on account of ill health, he resigned in 1855. The distinguished astronomer and mathematician died 11th May 1871.



Herse.

HERSE, or HEARSE (Fr. *herse*, a harrow; hence a frame for setting candles in), had originally quite a different meaning from that in which it is now used. The term was applied to a bar or framework with upright spikes for the reception of candles, and was used at the ceremonies of the church and at funeral services. It was originally very simple in form, but in the 15th and 16th centuries herses of great splendour came into use, and were erected in the churches over the bodies of distinguished personages. The framework was of iron or brass, sometimes of beautiful workmanship, square, octagonal, &c., in plan, with pillars at the angles, and arched framework above forming a canopy. The whole was hung over with rich cloths and embroidery, and lighted up with hundreds of wax candles, and decorated with wax images. From this the transition to the modern funeral hearse (see FUNERAL RITES) can be easily traced. In Catholic churches of the present day, the hearse still exists as a triangle with spikes, on which candles are placed.

HE'RSFELD, an old town of Hesse-Nassau, Northern Germany, situated on the left bank of the river Fulda, which here becomes navigable, 32 miles south-south-east from the city of Cassel. The cathedral, built in the beginning of the 12th c., on the site of an older cathedral that had been destroyed by fire, was itself set fire to by the French in 1761. Its remains form a picturesque ruin. Pop. (1871) 6434, who carry on extensive manufactures of woollen cloth and serge.

HE'RSHIP, an old Scotch law term, denoting the offence of carrying off cattle by force.

HE'RTFORD, a parliamentary and municipal borough, market-town, and capital of the county of the same name, is situated on the Lea, 26 miles north of London by rail. It contains few buildings of any architectural importance, but there is a branch of Christ's Hospital, a grammar-school, and several charity schools. H. carries on no manufactures; there are, however, linseed-cake mills and several malting and corn-mills in the town and vicinity. There are here a fairly attended corn-market on Saturdays, and three annual fairs. The town returns one member to parliament. Pop. (1871) 7894.

The old castle of H. (scarcely a fragment of which now remains) was built about 905. It was strengthened and repaired about the Conquest. The present castle is of the time of James I.; and in the early part of the century, it was used as a college for the students of the East India Company's civil service. It now belongs to the Marquis of Salisbury, and is a private residence.

HE'RTFORDSHIRE, or HERTS, an inland county of England, is bounded on the E. by Essex, on the S. by Middlesex, on the W. by Buckingham and Bedford, and on the N. by Cambridge. Area, 391,141; pop. (1871) 192,226. The surface presents a pleasing succession of finely wooded hill and fertile valley. The chief elevations are those of the chalk downs, a branch of the Chiltern Hills, which skirt the north of the county. The principal rivers are the Lea and the Colne, both affluents of the Thames. Chalk, at a greater or less depth below the surface, forms the basis of the soil, which is various, much of it being, however, a mixture of gravel and loam, with a tract of rich loam on the borders of Essex. Climate, mild and healthy. The agriculture of the county has improved very much of late years. Immense quantities of hay and straw are sold off the land, and sent to London. Throughout the county there are numerous gardens and orchards, the fruit of which is sent to the London market. Great quantities of malt are made in the county: Ware is the chief seat of the malting trade in the kingdom. Paper and straw-plait are extensively manufactured in the west and south. Three members are returned for the county.

HERTOGENBOSCH, or HERZOGENBOSCH. See BOIS-LE-DUC.

HERTZ, HENRIK, one of the most distinguished of the Danish poets, was born in Copenhagen in 1798, of Jewish parents. In 1832, he abjured Judaism, and joined the Protestant Church. His first appearance as an author was in 1827, when he produced several clever vaudevilles and comedies, as *Kjerlighed og Politi*, *Hr Burchardt og haus Familje*, *Flyttedagen*, &c.; while three years later, appeared his *Gjengangerbreve eller poetiske Epistler fra Paradis*, which exhibited such wonderful powers of imitating the style and spirit of other writers, more especially those of his countryman Baggesen, that public attention was at once arrested. Hitherto, he had written anonymously, but the masterly manner in which he had stigmatised the affectations and puerilities which had perverted the literature and criticism of the Danish press, produced a perfect ferment in the literary circles of Copenhagen, which led before long to the discovery of the unknown writer. From this time his works followed one another in rapid succession; and striking out in an entirely different path from the one on which he had first entered, he produced, in 1837, a dramatic poem, *Iven Dyring's Hus*, founded on an old heroic saga, which, in the opinion of his countrymen, constitutes his masterpiece; among Germans, however, his lyrical drama of *Kong René's Datter* (1854) is the most popular of his works. He died February 25, 1870.

HE'RZEGOVI'NA is the name of a province belonging to European Turkey, and situated between Croatia, Bosnia Proper, Montenegro, and Dalmatia. Under the Venetians, the H. was called the Dukedom of St Saba; at a later period, it went under the name of the county of Chulm; and in 1326, was again raised to the rank of a dukedom by the Emperor Frederic III. As early as 1466, the H. fell into the hands of the Turks, remaining for more than two centuries afterwards the battle-field between Christians and Mohammedans. By the treaty of Carlowitz (1697), the H. was definitively annexed to the Turkish empire, with the exception of the town Castelnuovo and its outskirts, which up to this day belong to Austria. In the early history of Hungary, the H. plays a prominent part, as Bosnia and Bulgaria were for a considerable period under the sway of the Hungarian crown. According to the present organisation of European Turkey, the H. bears the name of the Sanjak Hersek, and belongs to the Eyalet of Bosnia. Its physical aspect, as also its political and ethnographical character, coincide with those of Bosnia (q. v.).

HERZEN, Alexander, a Russian author, was born at Moscow in 1816. Before he had concluded his university studies, he was seized, along with some of his fellow-students, on the pretext of maintaining sentiments hostile to the government; and after an imprisonment of about ten months, he was banished, in 1835, to Perm, not far from Siberia, and subsequently to Viatka and Novgorod. After 1842, he was permitted to reside at Moscow, under the strict surveillance of the police, and for some years devoted himself exclusively to literary labours. In 1847, he left Russia, to visit other parts of Europe, and resided for some time in London. In his own country, H.'s life was one long petty persecution. He was despoiled of his property, and his works were subjected to the most rigid censorship. H.'s literary performances are *Dilettantism in Science* (1842), *Letters on the Study of Nature* (1845—1846), *Whose Fault is it?* and *Doctor Kroupof* (both in 1847), *Recollections of My Travels* (1848), *On the Development of Revolutionary Ideas in Russia* (1851), *Baptized Property* (1853), or 'Serfism,' *Prison and Exile* (1854), *My Exile* (1855), *Interrupted Tales* (1856), *France or England* (1858), *Memoirs of Catherine II.* (1859), *The Old World and Russia*, *The New Phase of Russian Literature* (1864). In 1865 he took up his residence at Geneva, where he continued to publish the *Kolokol*, a Russian newspaper he had started while in London; but as he took the side of the Poles in their last rising, the journal lost its popularity, and had to be given up. He died at Paris, January 21, 1870.

HE'SIOD, next to Homer the earliest Greek poet of whom we have any knowledge, was born probably in the 8th c. B. C., at Ascra, in Bœotia, whither his father had emigrated from the Æolian Kyme, in Asia Minor. He seems to have been at first a peasant or herdsman in quite humble circumstances—in his *Works and Days*, he speaks of himself as *atimētos*, 'unhonoured,' 'noteless.' He afterwards left Ascra, and went north to Orchomenos, on Lake Copais, where he dwelt during the remainder of his life, and where in later times his tomb was shewn. This is really all we know about H., for the marvellous stories of the Neo-Platonists afford us no intelligible clue to his personal history; and in the opinion of some critics, even throw grave doubts on his historical reality altogether. This, however, is probably too extreme a view. But while it may not be necessary to reject the personality of H., it may still be allowed that he was a 'representative man,' the founder and head of a school of poets—the Bœotian or Pierian—who stand in striking contrast with the older Ionic or Homeric school. Their original region was at the foot of Mount Helicon, whence they spread over Bœotia, Phocis, and Eubœa. Their language and versification were nearly the same as those of the Homeric school, but in all other respects they appear to have been different, and even antagonistic, ignoring the sanguinary struggles of the heroic age, and preferring to sing of rural quietude and peaceful pursuits, the simple sanctities of household life, the homely duties of thrift, the education of children, and the prosaic details of commerce and politics. Hence the Spartan, Cleomenes, scornfully termed H. the 'poet of helots,' while Homer was the poet of warriors. In fine, it may be said that the poetry of the Hesiodic school indicates an advance in civilisation, morality, and thought, on the Homeric school.—The works either written by or ascribed to H. are seven in number, of which the following are the more important: 1. *Erga kai Hemerai* ('Works and Days'), in the time of Pausanias, the only one considered to be truly H.'s by the people about Mount Helicon; 2. *Theogonia* ('Generation of the Gods'), not considered genuine by H.'s countrymen, nor by most modern critics; 3. *Eoiai* or *Eoiai Megalai*, called also *Katalogoi Gunaikōn* ('Catalogues of Women'). Of these the first two are entire; while the well-known *Aspis Herakleos* ('Shield of Hercules') is supposed by some to be a relic of the third. The Hesiodic poetry was, in ancient times, if not warmly admired, at least held in great veneration. Both the priesthood and the philosophers considered the *Theogony* a great, in fact, the greatest authority, on the subjects of which it discourses, and almost all the great Alexandrine critics earnestly devoted themselves to its elucidation, but their commentaries have unhappily perished. Only here and there among the *Scholia* of the later Neo-Platonists some of their remarks are preserved. The most complete collection of these is to be found in Gaisford's *Poetæ Græci Minores*. The first edition of the Hesiodic poems appeared at Milan in 1493; subsequent editions are those of Heinsius (Amsterdam, 1667), of Robinson (Oxford, 1737), of Loesner (Leips. 1778), of Gaisford (vol. i. of his *Poet. Gr. Min.*), and of Göttling (Gotha and Erfurt, 1831; 2d ed. 1843).

HESPE'RIDES, the name of the famous sisters who, assisted by the dragon Ladon, guarded the golden apples which Hera had received, on her marriage with Zeus, from Ge. Their genealogy, as well as their number, are variously given by mythologists. The locality of the gardens was also a matter of controversy, the two favourite opinions placing them westward of Mount Atlas, and north of the Caucasus. The apples were stolen by Hercules (q. v.), but were afterwards restored by Athena.

HESSE (Ger. *Hessen*), a territory of Germany, occupied, in ancient times, by the *Catti* or *Chatti*, who first became known to the Romans in the year 15 A. D., when Germanicus destroyed their principal settlement of Mattium, the site of the present villages of Gross and Klein Maden, near Gudensberg. In the course of time, the Catti, who were settled in the districts now known as Upper and Lower Hesse, gradually merged in the Frankish tribes, with whom they took part in the great emigration into Belgium and Gaul, after which the territories which they had evacuated were occupied by Saxons, who thenceforward kept possession of the land known in after-ages as Saxon Hesse. The power of the chiefs had, in the meanwhile, become so firmly established under the Frankish empire, that on the fall of the Carlovingians, in 911, Conrad I., Duke of Franconia and Hesse, was elected to the vacant throne of Germany, as being the most powerful of the princes of the empire. The various branches of the Hessian family still extant are descended from Heinrich I., surnamed the Child (died 1306), son of Sophie Duchess of Brabant. Although he himself exercised little real power, owing to the dismemberment of H. into numerous semi-independent principalities, his descendants gradually reunited these disjointed domains, and added many valuable territories on the Rhine to their old patrimony. Philip I., the Magnanimous, who succeeded his father, Wilhelm II., as a minor, in 1509, introduced the Reformation into H., and founded the university of Marburg, with the revenues of the secularised convents and monasteries. This prince took an active part in the peasant and religious civil wars of his day; and by a will made in 1562, divided his territories among his four sons, who succeeded to their allotted possessions on his death in 1567. The eldest, Wilhelm IV., obtained the half of the Hessian domains, with Cassel for his residence; Ludwig, a fourth part, with Marburg; Philip, an eighth part, with Rheinfels; and George, an eighth part, with Darmstadt. The death of Philip and Ludwig left all the Hessian dominions in the two main lines of Hesse-Cassel and Hesse-Darmstadt (q. v.).

HESSE-CA'SSEL, or **ELECTORAL HESSE** (Ger. *Hessen-Kassel*), was formerly an electorate of the Germanic Confederation, consisting of one large and five smaller districts, including the countship of Schaumburg and Schmalkald, a part of Henneberg and Barchfeld, with various townships, impacted within the territories of other states. In consequence of the occurrences of 1866, it was annexed to Prussia on the 16th September of that year, and subsequently (December 1868) went to form a part of the new province of Hesse-Nassau, which embraces, besides H.-C., the greater part of Nassau (q. v.), and part of Hesse-Homburg, and extends from 49° 56′ to 51° 31′ N. lat., and from 7° 30′ to 10° 12′ E. long., being divided into the following two districts:

Districts.	Area in Sq. Miles.	Total Pop. in 1871.	Chief Towns.	Pop. 1871.
Cassel, . .	3864	767,304	Cassel, Marburg, Hanau, Fulda,	46,375 8,950 20,278 9,490
Wiesbaden, . .	2079	632,807	Wiesbaden,	35,463

Physical Character.—The country is generally hilly, and in some places even mountainous, forming a part of the great central elevated plateau of Germany. The most considerable of the ranges are the Habichtswald, the Thuringerwald, of which the greatest elevation is the Inselberg (2930 feet), the Meissner (2350 feet), the Hundsrück, Kellerwald, and Reinhardwald.

The principal rivers are the Werra, with its numerous small affluents, but which only belongs in part to Hesse-Nassau; the Fulda, whose course appertains almost exclusively to the province; the Edder, Weser, Maine, and Lahn.

Climate, Soil, Products.—The climate is generally mild, but in some of the mountainous districts, as the Rhöngebirge, it is at times very severe. The mean annual temperature is 48°·5 Fahrenheit.

The soil is almost unexceptionally fruitful and well adapted to agriculture. Cereals of all kinds yield good returns. The most cultivated districts are in the south-west of Hanau, where much fruit and some good wines are produced. Flax is grown in Schaumburg and Lower Hesse, and tobacco in the valleys of the Werra. It is estimated that for every hundred parts the land is distributed nearly in the following ratio: woods, 40; arable land, 37; meadow land, 11; miscellaneous, 12.

The mineral products comprise copper, lead, cobalt, vitriol, alum, clay, large quantities of iron, coal, and salt, the last three of which are the property of the state. The mountain districts have many good mineral springs, the most important of which are those at Schwalheim, Wilhelmsbad, Hofgeismar, Rodenberg, and Nenndorf.

Industry, Imports, and Exports—Trade.—In addition to agriculture and the rearing of cattle and other animals, the chief branches of industry are the weaving of linen and yarn, which, although everywhere practised, is prosecuted with most vigour about Fulda and Marburg. There are good steel and iron works at Schmalkald, and manufactories of guns at Cassel, and porcelain, glass, paper, and gold and silver wire-works in Hanau and other parts of the province. The exports consist principally of yarn and linens, iron and steel wares, fine clay, wood, leather, grain, dried fruits, and mineral waters. The transit-trade is considerable, and is principally conducted by way of Hanau, Carlshafen, and Eschwege. The internal commerce and industry centre more especially in Cassel, Hanau, Frankfurt-on-the-Maine, Wiesbaden, Fulda, Gersfeld, Carlshafen, Dillenburg, and Limburg. There are many excellent public roads throughout the province, and upwards of 400 miles of railway, in addition to which it possesses great facilities for internal trade in its numerous navigable rivers.

Receipts, Expenditure.—According to the budget of 1864—1866, the annual receipts of the electorate of H.-C. were about 5,108,310 thalers, and the expenditure 5,452,980, an excess of expenditure over the income of 344,670 thalers. The national debt in 1861 represented a capital of 3,700,000 thalers, but this was exclusive of 8½ million thalers, raised for the construction of railways, and 1½ million thalers extraordinary loans.

Army.—The army, prior to 1866, was kept at 12,000 men, of whom 5000 were on the reserve list. Military service was compulsory between the ages of 20 and 27 years.

Education.—There are, besides numerous national schools, ten gymnasia, eight arts, and various polytechnic, theological, military, and other schools. Hesse-Nassau has one university at Marburg, memorable as being the first which was founded (in 1527) after the Reformation, and without papal authority.

Religion.—The majority of the population belong to the Reformed or Calvinist faith, but the Lutherans, United Protestants, Catholics, and Jews are well represented. At the end of 1867, the number of Protestant churches in the province was 1375; Roman Catholic churches, 486; Jewish synagogues, 246; and other churches, 8. All the churches recognised by the state enjoy equal rights.

Law.—The supreme court of appeal is at Cassel, with two high courts of justice at Cassel and Fulda, under whose jurisdiction are various criminal and magisterial courts.

Electoral Hesse was formerly a limited monarchical government. The ruler bore the title of Electoral Prince and Landgraf of Hesse, Grand Duke of Fulda, Prince of Hersfeld, Hanau, Fritzlar, and Isenburg, Count of Katzenellenbogen, Dietz, &c. The dignity, which is hereditary in the male line only, is at present held by the Elector Frederick Wilhelm I. The elector was assisted in the government by a council of ministers, who were partially responsible. A new constitution, based on the federal decision of 1857, was promulgated in 1860. There were two representative chambers, the higher of which comprised the princes of the electoral family, several *Mediatised Princes* (q. v.), officers of state, and large landed noble proprietors; while the lower chamber comprised 48 members, one-third of whom represented the landed proprietors, and the remainder the civic and rural districts. The chambers were convoked at least once in every three years. Each parish was presided over by a burgher-master (*Bürgermeister*) or magistrate, each circle by a government official, and each province by a special governor.

H.-C. occupied the eighth place in the German Confederation. It had three votes in the *Plenum* or general council of the diet, and supplied a contingent of 6626, and a reserve of 2840 men to the federal army.

History.—Hesse-Cassel is the elder line of the House of Hesse, founded by Landgraf Wilhelm IV., or the Wise, son of Philip the Magnanimous, who reigned from 1567 to 1592, and held his court at Cassel. Wilhelm was succeeded by his son Maurice, who joined the Protestant Church, and five years before his death resigned the government in 1627 to his son Wilhelm V. The latter fought on the side of Sweden during the Thirty Years' War, for which he was put under the ban of the empire. His two brothers, Hermann and Ernest, respectively founded the lines of Hesse-Rotenburg and Hesse-Rheinfels; and on his death in 1637, his widow assumed the regency for their young son, Wilhelm VI., and by her ability, secured for him, as an indemnification for the losses which the country had sustained during the war, the greater part of Schaumburg and the principality of Hersfeld. The successors of Wilhelm V. pursued the practice he had begun of hiring out Hessian soldiers to fight in the service of foreign princes, a practice by which the finances of the state were considerably augmented at the expense of the welfare and morality of the people; while, in some instances, it led to the formation of important alliances on the part of the reigning House. The landgraf, Friedrich I., who succeeded his father in 1730, had become king of Sweden in 1720, in right of his wife, the Princess Ulrike Eleanor, sister of Charles XII. His brother, Wilhelm VIII., to whom he had resigned his Hessian territories, fought under the British and Hanoverian flag in the Seven Years' War, and gained considerable renown for himself and his troops during the course of the war, which was especially disastrous to the welfare of his states. Wilhelm's son, Friedrich II., persevered in the same course, and kept up a splendid court on the proceeds of the pay, amounting to £3,000,000, which the British government gave him for the services of the 22,000 Hessians who fought against the Americans in the war of independence. Friedrich, who had become a convert to the Romish Church, died in 1785, and was succeeded by his son, Wilhelm IX., who reigned as Wilhelm I., after his elevation to the rank of an elector in 1803. This prince frequently shifted sides and parties during the French revolutionary and imperial war, fighting with his Hessian mercenaries first under British colours, then in conjunction with Prussia, and in 1806 as the ally of Napoleon, who in return for his aid promised to respect the neutrality of the electorate. After the battle of Jena, the French emperor, suspecting the motives which had actuated the elector in augmenting his army, threw troops into the Hessian territory, and at the peace of Tilsit incorporated the electorate in the newly formed kingdom of Westphalia. In 1813, Wilhelm returned to his dominions after the overthrow of French power in Germany, and at once began to restore the old order of things as far as he could; while he entered upon a course of vexatious litigation to recover the state lands that had been sold during his exile, and appealed to the diet with such importunate pertinacity for indemnification, that he obtained various important concessions at the congress of Vienna, although he failed in his wish to secure the title of king, of which he was especially ambitious. In accordance with the promise which he had made his subjects on his restoration to power, he summoned a body of jurists to construct a constitution; but no sooner was a draft of this new scheme completed, than he refused to fulfil his promises. His death in 1821 was regarded as a fortunate event for the electorate; but his son and successor, Wilhelm II., by his narrow policy, increased the rapidly growing disorders of the state, while his relations to his mistress, the obnoxious Countess of Reichenbach, rendered him peculiarly unpopular with his subjects. These disorders were partially arrested by the retirement of the elector in 1831, and the nomination of the electoral prince to the rank of regent. But the history of the 16 years' regency of Prince Friedrich Wilhelm exhibits only a series of intrigues at court, dissensions between the government and the representatives of the people, and a retrogressive policy, which left H. far behind other German states in material prosperity. The death of the old elector at Frankfurt, whither he had retired on his abdication, raised the regent in 1847 to the rank of sovereign elector. The revolution of Paris, in 1848, extorted from the terrified prince many liberal promises of reform, some of which were redeemed; but in 1850, after revoking many of his pledges, he summoned the obnoxious Hassenpflug and Haynau to govern the country. Hassenpflug's measures at length drew upon him a public charge of maladministration and treason; and he having persuaded the elector that his personal safety would be endangered if he remained longer among his subjects, the prince and his minister fled by night from Cassel to Wilhelmsbad. On the 17th September 1850, an ordinance proclaimed that the seat of government had been transferred to the latter place. Hassenpflug appealed to the Confederation for its intervention, and H. became the rendezvous of troops; the Austrian and Bavarian contingents occupying the south, and the Prussians, apparently for the protection of the people against the elector, taking their position in the north. The threatened war was principally limited to angry protocols, but the result of the intervention was the restoration of the elector, who returned to Cassel. In 1852, a new constitution was promulgated, which in no way satisfied the people, whose conduct throughout the trying crisis had been marked by forbearance and moderation. But the policy of the government remained unchanged. In October 1860, on the assembling of the Chambers, a resolution was agreed to for addressing the elector, requiring the restoration of the constitution of 1831; but not till 1862, after much agitation and the interference of Prussia and Austria, did the elector so far accede to their wishes as to recognise the constitution of 1831, with the modifications of 1849. In the war between Austria and Prussia, H.-C. having sided with the former, a Prussian army entered the electorate, and it was ultimately annexed to Prussia on September 20, 1866.

HESSE-DARMSTADT, or **HESSE**, a grand-duchy of Germany, extending (exclusive of small outlying portions) between 49° 24′ and 50° 10′ N. lat., and 7° 50′ and 9° 10′ E. long., and consisting of two nearly equal parts, separated by a strip of land belonging to Hesse-Nassau. The northern district is mountainous, being intersected by the Vogelsberg, and branches of the Taunus and Westerfeld; while the southern is level, except in the east, which is occupied by the Odenwald range. H.-D. is divided into the following provinces:

Provinces.	Area in Sq. Miles.	Pop. in 1871.	Chief Towns.	Pop. 1871.
Upper Hesse,	1280	253,534	Giessen,	12,245
Starkenburg,	1150·8	349,251	Darmstadt, the capital,	39,584
Rhenish Hesse,	525·	250,058	Mainz,	53,918

Giving an area of 2955·8 square miles, and a population of 823,138 for the entire duchy.

Physical Character.—H.-D., which presents a succession of fruitful valleys and rich mountain slopes, is well watered, being traversed by the Rhine and Maine, Neckar, Nahe, Lahn, Nidda, Edder, Nidder, and Wetter.—The climate of the northern districts of H.-D. is very much more severe than that of the southern or Starkenburg district, which shares the climate of South Germany.

Agriculture is in a very flourishing condition, nearly half of the soil being occupied by arable lands. Corn is grown in sufficient quantity for exportation, chiefly in Upper Hesse, where Indian corn, or maize, and flax are also largely cultivated, while hemp, tobacco, and poppies are raised in Rhenish Hesse. The southern districts, in which a great variety of fruit is grown, including figs, almonds, chestnuts, &c., are specially noted for the excellence of their wines, the choicest of which are the Niersteiner, Laubenheimer, Bodenheimer, and red Ingelheimer, grown in the vicinity of Mainz, the Scharlachberger near Bingen, and the Liebfrauenmilch in the districts around Worms.

The mineral products, which are inconsiderable, include copper, cobalt, iron, salt, and coal, the three latter of which are most abundant in the Wetterau districts.

Industry.—The principal branches of industry are, besides agriculture, the making of wine, which in good years yields a return of upwards of four million thalers; the manufacture of cottons, linens, and stockings, and the weaving of straw in Upper Hesse; the preparation of oils and leather; and the manufacture of paper, snuff, papier-mâché goods, &c. H.-D. is well provided with post-roads, and has a network of railways; while the steam-navigation of the Rhine, Maine, and Neckar affords still more extensive means of communication, which, however, are partly or wholly closed during the winter months.

Revenue.—The budget for the years 1872—1875 gives the following estimate of the financial condition of the grand-duchy: Annual receipts, 10,817,796 florins; annual expenditure, 10,636,088 florins; leaving a surplus of 181,708 florins. The public debt, incurred mainly for the construction of railways, amounted in 1871 to 16,800,000 florins.

Army.—The troops belonging to H.-D. form the twenty-fifth division of the army of the German empire, and belong to the eleventh army corps. There is a military college at Darmstadt.

Education.—There are in H.-D. 1760 national schools, 9 normal, and 1 higher burgher school, while the educational wants of the higher classes are well supplied by the university of Giessen (q. v.), with its noble library, and the 24 scientific institutions connected with it; by 6 gymnasia, and by polytechnic, military, and theological schools. The chief towns support various scientific and literary societies, and the duchy generally is favourably distinguished in respect to the diffusion of knowledge.

Religion.—In regard to religion, the population was divided in 1871 as follows: Protestants, 589,272; Roman Catholics, 238,080; other creeds, 169; and Israelites, 25,373. The Lutherans have a consistory at Darmstadt, with three minor courts under its jurisdiction, while the Roman Catholic churches are under the supervision of a bishop who has his see at Mainz.

Law.—There was a supreme tribunal of law at Darmstadt, with lesser courts at Darmstadt, Giessen, and Mainz, and numerous local courts in the country districts, in some of which trial by jury prevailed.

Political Constitution, &c.—H.-D. supplied a contingent of 7227 men, with a reserve of 3098 to the federal army, occupied the ninth place in the German Confederation (q. v.), and had three votes in the *Plenum* or full council, and one vote in the limited council. It is a limited monarchical state. Its ruler, who must be a Lutheran, bears the title of Royal Highness, and ranks as Grand Duke of Hesse, and as a Rhenish grand duke. The succession is hereditary in the female line in default of male issue. In accordance with the law of 1856, there are two legislative chambers of representatives, which must be convoked at least once in every three years, but the real power of the government rests with the council of state and the four ministries, into which the several branches of the administration are divided.

History.—The line of H.-D., the second main branch of the House, is derived from the Hessian count, George I., who, on the death of his father, Philip the Magnanimous, in 1567, obtained the upper countship of Katzenellenbogen, with the town of Darmstadt for his residence; and succeeded in 1583, on the death of his brother without heirs, to a third of the patrimony of the latter. He was succeeded in 1596 by his eldest son, Ludwig V., while his third son, Frederick, became the founder of the Hesse-Homburg line (q. v.). Ludwig V., who acquired a portion of Upper Hesse, was the founder of the university of Giessen. Although H.-D., like every other part of Germany, suffered considerably during the French revolutionary wars, it finally acquired a great addition to its territories through the agency of Napoleon. Ludwig X., who had succeeded his father as landgraf in 1790, joined the Confederation of the Rhine, and after having acted against Austria in 1809, and in concert with the French in 1813, offered, after the battle of Leipsic, to act with the allies against France, on condition of being allowed to retain his various acquisitions of territory. He had assumed the title of grand duke in 1806, and on that occasion he promulgated various legislative edicts, and annulled the pre-existing union of the H.-D. and the Hesse-Cassel diets. In 1814, he joined the German Confederation, and made large cessions of territory to Prussia, Bavaria, and Hesse-Cassel, receiving by way of indemnification a portion of the French department of Donnersberg, or Mainz, extending to the Lahn, and the greater part of the principality of Isenberg, in right of which he assumed the additional title of a Rhenish grand duke. In accordance with the decree of the federal diet, Ludwig gave his subjects a representative form of government in 1820, the scheme of which was, however, so obnoxious to the assembled states, that the grand duke and his advisers were compelled to withdraw it, and to substitute another in its place. The task of framing this constitution occupied several diets in succession, and gave rise to much angry discussion within and without the chambers. The death, in 1830, of the grand duke, who from various causes was endeared to his subjects, widened these differences, and angry discussions soon arose in regard to the civil list to be accorded to the new grand duke, Ludwig II. In the course of the next few years, one diet after another was convoked and prorogued, but no material change was effected in the relative position of the chambers and the government. The death of the grand duke, Ludwig II., in 1848, and the accession of his son and co-regent, Ludwig III., the present grand duke, brought little change for the better. In the meantime it must, however, be admitted that, notwithstanding frequent dissensions in church and state, the duchy made considerable advances in material prosperity; railways were opened, and new roads formed;

monopolies and other commercial restrictions removed; greater freedom permitted in the curriculum of the university, and a more liberal spirit infused into the system of the education imparted in the national schools. Although these and many other improvements were grudgingly yielded, they have been permanent, but the character of the grand-ducal policy has neither been liberal nor in accordance with the wishes and views of the majority of the people. See GERMANY in SUPP., Vol. X.

HESSE-HO'MBURG, a German landgraviate prior to March 24, 1866, when it reverted to H.-Darmstadt, by which it was ceded to Prussia, September 3, 1866. It consisted of the provinces of Homburg and Meisenheim; the former bounded by H.-Darmstadt and H.-Nassau, and the latter by Rhenish Prussia and the Bavarian Palatinate.

Provinces.	Area in Sq. Miles.	Pop. (1861).	Chief Towns.	Pop.
Homburg, .	32·90	12,617	Homburg, .	8626
Meisenheim,	73·08	14,200	Meisenheim,	2758

Giving 105·98 square miles for the superficial area, and 26,817 for the population of the entire landgraviate. The former of these provinces is a fruitful district lying on the slopes of the Taunus Mountains, which produces grain, wine, and timber; while the latter is mountainous, and yields large quantities of coal and iron, and some excellent wine. The budget for 1865 gives the following amounts: namely, receipts, 500,520 florins; expenditure, 441,166 florins, leaving a surplus of 59,354 florins. The debt was, in 1865, 3,000,000 florins.

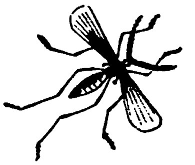
The troops of the landgraviate were 366 men, including a reserve of 100, which comprised the contingent of H.-H. to the federal army. H.-H was represented by Hesse-Darmstadt in the limited council of the diet, but it held one independent vote in the *Plenum* or full council. The established religion was Protestant, to which 19,000 of the inhabitants belonged, the great majority of whom were attached to the *Reformirte Kirche*, while there were 4950 Catholics, and about 1000 Jews. H.-H. had a legislative representative chamber, and the government was divided into the three departments of Justice, the Interior, and Finances.

The landgraviate was an integral part of Hesse-Darmstadt (to which it reverted on the failure of the direct line in 1866) till it was transferred, on the death of the landgraf, in 1596, to his younger son, Friedrich I., in whose family it remained as an independent state till 1866. Little change was effected in the province till the congress of Vienna, when it was augmented by the addition of Meissenberg. In 1817, H.-H. was admitted into the German Confederation. In 1830, disturbances broke out in Meisenheim; but although they were soon quelled, in consequence of the powers accorded to the landgraf by the diet, several severe edicts were published in 1832 against the liberals, which excited considerable disaffection. The opening of the springs and baths at Homburg in 1833 proved an unexpected source of wealth to the state, and after the addition of gambling saloons, the establishment constituted a very important branch of the revenue. Attempts were more than once made by the diet to put down the gambling-tables; but whenever the pressure of federal intervention was removed, gambling was always resumed with fresh spirit; in 1862, however, the deputies passed a law for its gradual suppression, and since the passing of H.-H. into the hands of the Prussian government, the system has been completely suppressed. Since their first opening, play, with only temporary abatement, was prosecuted at all hours and seasons by all ranks, from peasants to princes and princesses, and almost at all ages, excepting among the subjects of H.-H., who were stringently forbidden to participate in it.

In 1835, H.-H. joined the Zollverein (q. v.). The reigning landgraf, Ferdinand Heinrich Friedrich, who succeeded his brother, Philip August, in 1848, so far yielded to the wishes of his subjects for a constitutional government, as to convoke a diet to deliberate on its nature; but when the scheme of the new constitution was completed, he withdrew his promised consent, and the course of public affairs resumed the old track. See GERMANY in SUPP., Vol. X.

HESSE-NASSAU. See HESSE-CASSEL and NASSAU.

HE'SSIAN FLY (*Cecidomyia destructor;* see CECIDOMYIA), a dipterous insect, the larva of which has often proved extremely destructive to wheat in North America. Its ravages have occasionally even led to the abandonment of wheat culture for a time in considerable districts. It is black, with dusky wings, darker at the base, pale-brown legs, black feet, and hairy antennæ. There are two broods in the year. The maggots of the one brood live at the roots of the plants throughout the winter; those of the other are found in the lower joints of the straw, in the end of spring and beginning of summer.

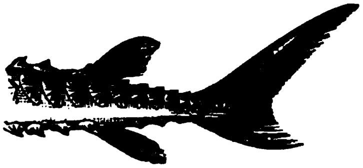


Hessian Fly (*Cecidomyia destructor*).

HE'SYCHASTS (Gr. *Hesychazo*, to be quiet), a mystic and contemplative sect of the Greek church, who renewed in the 14th c. the errors and practices of the older Euchites, and who may be described as the Quietists of the East. There is reason to believe that the principles of the ancient mystics never entirely died out among the Oriental monastic bodies; but they attracted an unusual share of public attention not only at home, but in the western church in the earlier half of the 14th century. A Basilian monk, named Barlaam, a native of Calabria, the ancient Magna Græcia, and himself of Greek origin, in the course of a visit to the monasteries of Greece, observed among the monks several practices and doctrines which he considered grievously reprehensible; and was particularly struck by the doctrinal abuses of the monks of Mount Athos, the 'holy mountain,' the great stronghold of monasticism in Greece. In common with the mystics of all times, these monks placed all perfection in contemplation, and in the elevation and abstraction of soul which contemplation produces. But among many practices which he considered objectionable, there was one which especially provoked his reprobation, and, indeed, his ridicule. Believing that in the soul lay hidden a certain divine light, which it was the office of contemplation to evoke, they withdrew at stated times to a retired place, seated themselves on the earth, and fixed their eyes steadfastly on the centre of the stomach (whence the sobriquet by which they were known, *omphalopsychoi*, *navel-souls*); and they averred that, after the allotted time of contemplation, a kind of heavenly light beamed forth upon them from the soul (whose seat, they held, was in that region), and filled them with ecstasy and supernatural delight. They declared that this light was the glory of God himself, and they connected it in some unexplained way with the light which appeared at the transfiguration of our Lord upon Tabor. Barlaam denounced these notions as fanatical and superstitious. On the other hand, they were explained and warmly defended by Gregory Palamas, the Archbishop of Thessalonica; and in order to settle the controversy, a council was held in Constantinople in 1341, which terminated in the triumph of Palamas and the monks. The controversy afterwards turned upon a point of doctrine—namely, on the nature of the so-called divine light supposed to emanate from the soul in this state of contemplation. Other councils were called, one of which, in 1351, again pronounced in favour of the monks, through the influence, it was said, of the court and of the celebrated John Cantacuzenus, who was an ardent patron of the Hesychasts. But the public voice was hostile to the sect, and on the retirement of their patron Cantacuzenus, who, in 1355, became a monk, they fell into obscurity. The controversy about the 'Thaboritic Light,' however, is still discussed in Greek theology. See Mosheim, ii. 659; also Fabricius, *Bib. Græc.* v. 247, 454; Rubenberg, *De Hesychastis Exercitat*, p. 378.

HESY'CHIUS, a Greek grammarian of Alexandria, flourished, according to some authorities, towards the end of the 4th century. He was the author of a Greek lexicon, taken partly from earlier works of a similar character, with the addition of new words and examples from the writings of poets, orators, historians, and physicians. Its value is very great, as it supplies us with extensive information concerning the Greek language and literature, especially of an antiquarian kind. The first edition is that published at Venice in 1514; the best is by Alberti and Ruhnken (2 vols. Leyden, 1746—1766), to which additions were made by Schow (Leip. 1792). Compare Ranke, *De Lexici Hesychiani vera Origine et genuina Forma* (Leip. and Quedlinburg, 1831).—Not to be confounded with the foregoing is the historian HESYCHIUS of Miletus, surnamed the 'Illustrious,' who flourished in the beginning of the 6th c., and was the author of the following works: 1. A book on eminent teachers (*Peri tōn en Paideia lampsantōn Sophōn*); 2. Another on the city of Constantinople (*Peri tōn Patriōn Kōnstantinoupoleōs*); and 3. A Chronicle or history (*Biblion Historikon*, &c.), commencing with the earliest times, and coming down to the death of Anastasius. It is now lost. See Orellius, *Hesychii Opera* (Leip. 1820).

HETEROCE'RCAL (Gr. *heteros*, different, unequal, and *kerkos*, a tail), a term introduced by Agassiz to designate a peculiarity of structure in the tail of some fishes, in which the tail is unsymmetrical with reference to the body of the fish or the vertebral column; the vertebral column being prolonged into the upper of the two lobes of the tail, and a second lobe, more or less distinct, appearing on the under side. The heterocercal tail is, among recent fishes, characteristic of the Cartilaginous Fishes, and is, therefore, a much less prevalent form than the symmetrical or homocercal (Gr. *homos*, equal) tail. It is very generally regarded as indicating an affinity to Saurian reptiles. But in the older geologic formations, the heterocercal is the prevalent form; in all the formations older than the oolitic it exclusively appears.



Heterocercal Tail (Sturgeon).

HETEROGANGLIA'TA (Gr. *heteros*, diverse, and *ganglion*, a ganglion), a term introduced by Owen, and adopted by many zoologists, in accordance with a scheme of zoological classification founded on the nervous system in animals, to designate the *Mollusca* of Cuvier, with which are ranked the 'zoophytes' of the division *Polyzoa* or *Bryozoa*. The nervous centres or ganglia are not arranged in a longitudinal series of symmetrical pairs, but are variously distributed in different parts of the body; one principal ganglionic mass, however, occupying a position above the gullet, with which all the nerves of the special senses which exist are connected. With it, also, all the other ganglia communicate.—Whether or not the new name heterogangliata, may ultimately come into general use among systematic zoologists, it certainly indicates a most important character in the organisation of the animals to which it is applied.

HETMAN, or **ATAMAN**, the title of the head or general of the Cossacks, now retained only among the Cossacks of the Don. From the earliest times the H. was elected by the voice of the assembled people; the mode of election being by throwing their fur-caps at the candidate they preferred, and the one who had the largest number of caps was declared duly elected. The power of the H. was very great, and extended over life and death. When the Cossacks, in 1654, submitted to the Russians, the H. was permitted to retain his rights as formerly. The Empress Catherine entirely abolished the dignity of H. of the Ukraine, and substituted a government consisting of eight members. The Don Cossacks have, indeed, retained their H., but even he possesses but the shadow of his former power. The last elective H. was Count Platoff, who played a prominent part in the wars with France (1812—1814). After his death, the H. was appointed by the czar, and ultimately the title was made hereditary in the grand duke, the heir to the throne.

HEVE'LIUS (known also as HEVEL or HÖVELKE), JOHANN, one of the most celebrated astronomers of the 17th c., was born at Danzig in 1611, and died in that city in 1687. He belonged to an honourable and wealthy family; and in 1641 he erected an observatory in his own house, and furnished it with large telescopes constructed by himself. He published numerous astronomical works. H. was the first astronomer, with the exception of Gassendi, to observe a transit of Mercury (Gassendi's observation was made in 1631, that of H. in 1661); and it is now generally conceded that he ranks next to Flamsteed amongst the astronomers of his day. Delambre devotes ten pages to the notice of his labours in his *Histoire de l'Astron. Mod.*, and his life has been written by J. H. Wesphal (Königsb. 1820).

HEVE'S, a small town of Hungary, in the county of the same name, is situated in the midst of a productive flax and hemp-growing district, 60 miles east-north-east of Pesth. Pop. (1869) 5703.

HE'XACHORD, a name given by the ancient Greeks, in their music, to the great sixth. In modern music, hexachord denotes the six diatonic degrees of which Guido formed his scale, better known by the six syllables, Ut, re, mi, fa, sol, la, to which the scale was sung.

HE'XAGON (Gr. *hex*, six, and *gōnia*, angle), a figure of six sides and six angles; when the sides and angles are equal, it is called a *regular hexagon.* If a regular hexagon be inscribed in a circle, the radius of the circle is equal in length to each side of it, and by joining the centre with the angular points, six equilateral triangles will be formed. This property of the hexagon furnishes a very simple method of dividing a circle into six equal parts, and at the same time constructing the hexagon, by merely laying off round the circle lines equal to the radius. Of the three figures which can completely occupy space (the equilateral triangle, square, and hexagon), the hexagon contains the greatest area within a given perimeter, the proportions between the three different figures being nearly as the numbers 4, 5¼, 6. It is thus that bees, by making their cells of a hexagonal form, enclose the greatest space with the least expenditure of wax.

HEXAHE'DRON (Gr. *hex*, six, and *hĕdra*, base), so called from its having six faces, is one of the five regular solids, according to Plato; but in modern times the term Cube (q. v.) has been used in this signification, and the hexahedron is taken to include all solid figures of six faces.

HEXA'METER (Gr. *hex*, six, and *metron*, a measure), the name applied to the most important form of classical verse. It is the heroic or epic verse of the Greeks and Romans, the grandest examples of which are the *Iliad* and *Odyssey* of Homer, and the *Æneid* of Virgil. It consists, as its name implies, of six feet or measures, the last of which must be a spondee (a measure composed of two long syllables), and the penultimate a dactyl (one long syllable and two short). If the penultimate is also a spondee, the verse is said to be spondaic. The following are examples of the hexameter:

Pōllă d' ă|nāntă, kă|tāntă, păr|āntă tĕ | dōchmĭă | t' ēlthōn.
Homer.

Tĭtyrĕ | tū pătŭ|lǣ, rĕcŭ|bāns sūb | tēgmĭnĕ | fāgi.
Virgil.

The hexameter has been frequently employed in modern poetry, especially in German and English. The facility with which the first of these languages forms compounds is favourable to its use; and Klopstock, Goethe, and Voss have produced admirable specimens of this kind of verse. It has been doubted whether the English is not too stubborn and intractable for the free-flowing majesty of the hexameter; and no small discussion with regard to this point has been carried on among scholars of the present day; although many think that the *Evangeline* of Longfellow, and to some extent the *Vacation Ramble* of Clough, have definitely settled the question in favour of the practicability of this measure being adopted into English. Our readers may judge from the opening lines of *Evangeline:*

'This is the | forest prim|eval. The | murmuring | pines
and the | hemlocks
Bearded with | moss, and with | garments | green,
indis|tinct in the | twilight,
Stand like | Druids of | eld, with | voices | sad and
pro | phetic,
Stand like | harpers | hoar with | beards that | rest on
their | bosoms.'

The last two lines shew where English versification is weak—viz., in its spondees, unaccented syllables being compelled to do the duty of accented ones.

HE'XAPLA (Gr. *hexapla*, 'the sixfold'), a celebrated edition of the Septuagint version, compiled by Origen for the purpose of restoring the purity of its text, and bringing it into closer agreement with the original Hebrew. Owing to the multiplication of transcripts of the Greek text, numerous errors had crept in; and in the frequent controversies which arose between the Jews and the Greek or Hellenist (q. v.) Christians, the latter, in appealing to the Greek text, were often mortified by the discovery that it by no means represented faithfully the Hebrew original. In order to meet this evil, Origen undertook to provide a means of at least verifying the genuine Greek text, as well as of confronting it with the original. With this view, he prepared what is known as his *Tetrapla*, or 'fourfold' version, which he afterwards extended into the Hexapla. The *Tetrapla* contained, in four parallel columns, the Septuagint version, together with those of Aquila, Symmachus, and Theodotion. The Hexapla contained, in addition, the Hebrew text, together with a transcript of that text in Greek characters. In some parts of the Old Testament there were superadded one, two, and even three other versions; so that in some parts the work contains nine columns, whence it is occasionally designated the *Henneapla*, or 'ninefold.' Of the origin of these latter versions but little is known.

The Hexapla, however, was something more than a mere compilation of these versions. In the margin were given notes chiefly explanatory, as, for instance, of the Hebrew names. But a still more important characteristic of the work were its restorations and corrections of the original, in which Origen was guided chiefly by the version of Theodotion. This, however, he did not effect by arbitrary alterations of the received text; but, while he retained the common text, by indicating with the help of certain signs (an asterisk for an addition; an obelisk for a retrenchment) the corrections which he sought to introduce. Both these texts, the common (*koinē ekdosis*) and that of the Hexapla, are found combined in existing MSS. The Hexapla, as a whole, has long been lost; several editions of those fragments of it which it has been possible to recover have been printed; by far the most complete of which is that of the celebrated Benedictine, Montfaucon (2 vols. fol. Paris, 1714), which retains, so far as it was preserved in the MSS., the arrangement and even the asterisks and obelisks of Origen. For a more detailed account, see the preface and *Prœliminaria* of this learned work.

HE'XHAM, a small market-town of England, in the county of Northumberland, is agreeably situated on the right bank of the Tyne, 20 miles west of Newcastle. The Tyne is here crossed by a bridge of nine arches. The priory church, an old cruciform structure of the 12th c., is now used as the parish church. It has a lofty central tower, and at its western end are remains of the magnificent monastery erected in the 7th c. by St Wilfrid. The chief manufactures of the town are gloves and hats. Pop. (1871) 5331.

HEYLIN, Dr Peter, an English divine, of considerable note in his own day, was descended from an ancient Welsh family belonging to Montgomeryshire, and was born at Burford, in Oxfordshire, November 29, 1600. He studied at Oxford, where he took the degree of D.D. Through the interest of Laud, in whose theory of church and king he devoutly believed, H. was appointed chaplain-in-ordinary to King Charles in 1629. Subsequently, he held a variety of livings, but was deprived of them during the period of the commonwealth. At the restoration, he was made sub-dean of Westminster, an office which many of his friends thought an utterly inadequate reward of his literary services to the royal cause. He died May 8, 1662. H. was a very voluminous controversial writer, but his works are of no value now, except as illustrative of the age in which he lived, and the ecclesiastical party to which he belonged. Among others may be mentioned, *History of the Sabbath; Ecclesia Vindicata, or the Church of England Justified; Theologia Veterum; Examen Historicum*, containing, among other things, a violent attack on Fuller's *Church History*, which involved him in a controversy with that author; *Historia Quinquarticularis*, or a defence of Arminianism; *History of the Reformation of the Church of England*; and *Ærius Redivivus, or the History of the Presbyterians.*

HEYNE, Christian Gottlob, a German scholar of great celebrity, was born at Chemnitz, in Upper Saxony, 25th September 1729. His father was a poor weaver. The pastor of Chemnitz, himself very poor, got H. educated at a school in the suburbs, and afterwards sent him to Leipsic university, but forgot to give him money for his support! His sufferings here were something frightful, but his endurance was heroic. In 1753, he obtained the situation of under-clerk in the Brühl library at Dresden. While in this humble office, he prepared his edition of *Tibullus*, which saw the light in 1755, and happening to fall into the hands of Rhunken of Leyden, excited the admiration of that scholar. In 1756, unfortunately for H., the Seven Years' War broke out. Frederick the Great marched against Dresden, and burned, among other things, the Brühl library, but not before H. had edited, from a *codex* there, the *Enchiridion* of Epictetus. For some time he led a precarious life, being often without employment, and without bread. In 1761, he married, and supported himself as best he could by writing for the booksellers; and in 1763, on the death of Gessner, professor of rhetoric at Göttingen, he was appointed his successor on the recommendation of Rhunken of Leyden (who had not forgotten his editions of *Tibullus* and *Epictetus*). This closed his period of misfortune. The rest of his long life was spent in peace and comfort and professorial activity. He died 12th July 1812. The principal works of H., besides those mentioned, are his editions of Virgil (1767, 6th ed. 1803), Pindar (1774), Apollodorus (1787), Pliny (1790), Conon and Parthenius (1798), and Homer (8 vols. 1802; 2d ed. 1804). He also executed 'almost a cart-load of translations,' besides 'some ten or twelve thick volumes of Prolusions, Eulogies, and Essays,' of which six volumes were published separately under the title of *Opuscula Academica* (Götting. 1785—1812); and finally, about 7500 reviews of books in the *Göttinger Gelehrten Anzeigen*, of which he was director from 1770. In addition to this herculean work, he had a private class or *Seminarium* for the advanced study of philology and classical antiquity, from which he sent forth, in the course of his life, no less than 135 professors! Compare the Life of Heyne by his son-in-law, Ludwig Heeren (Götting. 1813), and Carlyle's essay on the same.

HEZEKI'AH (Heb. *Hiskiah*, *Yehiskiyahu*, 'May Jehovah strengthen him'), king of Judah, son and successor of Ahaz, reigned from 726 [725] to 696 [697] B.C. 'There was none like him among all the kings of Judah,' is the praise bestowed upon him in 2 Kings xviii. 5, and scarcely less flattering is the account preserved of this monarch in 2 Chron. xxix. From the moment that, at the early age of five-and-twenty, he mounted the throne, his efforts seem chiefly to have been directed towards the abolition of the idolatry which reigned paramount in the land, and the restoration of the worship of Jehovah to its pristine purity and glory. The temple was reopened, the Priests and Levites whose genealogies had proved correct had their ancient revenues assigned to them, and recommenced the daily service; and the first passover which fell in H.'s reign, was—albeit a month after the appointed season—celebrated with almost unparalleled pomp for full fourteen days, amidst a vast concourse of people, not only of Judah, but even of Israel. Victorious in the wars he waged with the Philistines, and relying on an Egyptian alliance, into which he had entered against the advice of Isaiah, H. dared also to withhold the annual tribute imposed by Shalmanassar in the days of his father: whereupon, as would appear from cuneiform records, Sargon, Shalmanassar's successor, invaded Judea, but without success. When, however, Sargon's successor, Sennacherib, on his way to Egypt and Ethiopia, had already seized Lachish, or, according to Chron. and Isaiah, 'all the fortresses' of Judea, nothing remained for H. but to ask for peace, and to offer any ransom that Sennacherib might deem fit to impose. Sennacherib took an enormous sum in silver and gold, for which the sacred treasury and the very doors of the temple were laid under contribution:—perhaps only a stratagem to convince the conqueror of the poverty of the royal coffers. It is a moot-point whether Sennacherib, after having received the money intended to procure the peace, treacherously marched upon Jerusalem at once, or whether he continued his march to Egypt, and being beaten there before Pelusium, besieged Jerusalem on his return—which would be equal to a second invasion. H.'s efforts to render his capital impregnable were futile. Suddenly, however, 'an Angel of the Lord' (explained variously to mean the plague, an earthquake, a sudden attack by Tirhaka, or the Simoom) *slew* during one single night 180,000 men in the Assyrian camp, and Sennacherib was obliged to retreat. Whether H.'s illness—'Shechin,' ulcers, according to some, or the plague, as others understand that word—took place before or after Sennacherib's invasion, is not fully established as yet; certain it is, that after his miraculous recovery, indicated to him by the retrograde movements of the dial, he, among other visits of congratulation, also received that of the ambassadors of Merodach Baladon (Mardocampados), king of Babylon. The latter—as would appear from the Chaldean historian Berosus—was at that time likewise tributary to Assyria, and sent the embassy with a view to securing H.'s co-operation against the common enemy. H., imprudently enough, made a great display of his treasures, his magazines, and arsenals; but so far from impressing the messengers with his greatness, he only kindled in Merodach Baladon the desire to possess himself of all these things; and the later Babylonian invasion ending in the captivity, is undoubtedly to be traced back to this act of vanity on the part of Hezekiah.

The remainder of H.'s life was passed in profound peace and prosperity, so that he was enabled to turn his attention to the internal development of the resources of the country, and the fortification of its towns. He collected great treasures and executed many highly useful works, among which the aqueducts of Jerusalem take a foremost place. His was also the golden age of prophetic poetry. Besides Isaiah, there lived in his time the prophets Micah and Nahum. From a passage in Prov. xxv. 1, it would also appear that he founded a society of literati, who collected and arranged the ancient documents of Hebrew literature, more especially the Proverbs attributed to Solomon. H. himself was a poet of no mean order; witness the hymn he composed after his recovery. H. died at the age of 54 years, in the 29th year of his reign, and was succeeded by his son Manasseh.

The Mishna (Pes. 4, 9) enumerates three things for which H. is to be praised, and three things for which he is to be blamed. The unworthy burial of his father, on account of his wickedness; the breaking of the brass serpent of Moses, which had become an object of idolatry; and the hiding of a 'book of medicaments'—some superstitious work—are the three good deeds. His spoiling the doors of the temple, to pay the tribute to Sennacherib;

the stopping up of the upper Gihon during the siege of Jerusalem; and his postponing the first passover for a month (see above), are his three wicked deeds.

HIBERNA'TION (from *hibernare*, to pass the winter) is the term applied by naturalists to express a peculiar condition of sleep in which certain animals—chiefly cheiroptera and rodentia—pass the winter season. It is not very clearly known to what extent hibernation prevails in the animal kingdom. The bats, the hedgehog, and the dormouse are the animals which in this country present the most striking examples of this phenomenon.

The term hibernation is not a good one, because summer heat produces in some animals a very similar condition to that which winter cold produces in others; and hence the Germans use the words *Winterschlaf* (winter sleep) and *Sommerschlaf* (summer sleep) to express the two similar if not identical conditions.

The following are the most marked peculiarities presented by bats, hedgehogs, and dormice, when in a state of perfect hibernation:—The respiration is very nearly suspended, as is shewn (1), by the absence of all detectable respiratory acts; (2), by the almost entire absence of any change in the air in the bell-jar or case in which the animal is placed during the investigation; (3), by the subsidence of the temperature to that of the atmosphere; and (4), by the capability of supporting, for a great length of time, the entire privation of air. The circulation is reduced to an extreme degree of slowness. In an observation made by Dr Marshall Hall, the heart of a bat was observed to beat only twenty-eight times in the minute. The excretions are very scanty. The bat is observed to have scarcely any excretion during its continued lethargy. In regard to the nervous system, sensation and volition are quiescent, but reflex or excito-motary actions are very readily produced. The slightest touch applied to one of the spines of a hedgehog, or the merest shake given to a bat, induces one or two inspiratory movements. Dr Marshall Hall made the important discovery that, while the respiration is almost totally suspended, the muscular irritability is proportionally augmented. All hibernating animals instinctively adopt various measures to secure themselves, during the lethargic period, from sources of disturbance and excitement. They choose sheltered and retired situations, as caves, burrows, &c. Some form themselves nests; others congregate together in large numbers. The hedgehog and dormouse roll themselves up into a ball; the bats group together in clusters, with the head downwards, and in some species the wings are spread, so that each individual embraces and shelters its neighbour. Revivescence is due partly to the return of warmth, but mainly in all probability to the calls of hunger. The return of the respiration and animal heat to the normal standard is very gradual.

The physiological use of hibernation is doubtless to enable certain animals to avoid the consequences of severe winter cold, and (especially in the case of the insectivorous animals) the deprivation of food. Before the period of hibernation, a large amount of fat is accumulated in the organism, and this fat constitutes the fuel on which the animal lives and supports its comparatively trifling heat during the winter. The other tissues suffer to a less extent, and the total loss of weight is sometimes nearly 40 per cent.—a proportion fully as great as that which is usually sustained in death by starvation. For a full account of the phenomena of hibernation, the reader is referred to Barkow, *Der Winterschlaf nach seiner Erscheinungen im Thierreich dargestellt* (Berlin, 1846).

HIBE'RNIA, IBERNIA, IVERNIA, also **IERNE,** names by which Ireland is designated in the classical writers. The first mention of Ireland in ancient times occurs in a poem on the Argonautic expedition, attributed to the mythical Orpheus, and perhaps as early as the time of the first Darius. Aristotle speaks of two islands situated in the ocean beyond the pillars of Hercules, 'called Britannic, very large, Albion and *Ierne*, beyond the Celtæ.' Both Diodorus Siculus and Strabo report the natives to be addicted to cannibalism; but, by their own admission, on insufficient grounds. Pomponius Mela, with quite an Irish warmth of eulogy, declares the herbage to be so luxuriant that the cattle who feed on it sometimes burst. Pliny repeats this statement, and adds that the Hibernian mother trains her child from the very first to eat food from the point of a sword. But the most important of all classical authorities on H. is Ptolemy, who describes the country, and gives the names of the principal rivers, promontories, seaports, and inland towns. The island was never conquered, nor even explored, by the Romans. See IRELAND.

HIBI'SCUS, a genus of plants of the natural order *Malvaceæ*, the type of a tribe or sub-order distinguished by a double calyx and fruit of three or more many-seeded carpels united into a many-celled capsule. The species are numerous, natives of warm climates, some of them trees or shrubs, but most of them large herbaceous plants, annual or perennial. The flowers of many are very beautiful. *H. Syriacus*, sometimes called *Althaea frutex*, a native of Syria and Carniola, has long been in cultivation as an ornamental shrub, and proves sufficiently hardy in many parts of Britain. Some are favourite hothouse plants. The characteristic mucilaginous and fibrous properties of the *Malvaceæ* are very strongly developed in this tribe. *H. Abelmoschus* (or *Abelmoschus esculentus*) so abounds in mucilage, that it is much used in the north-west of India for clarifying sugar. The fruit of *H. esculentus* (or *Abelmoschus esculentus*) is in general use both in the East and West Indies for thickening soups, and otherwise as an article of food. It is called GOMBO, GOBBO, and OCHRO in the West Indies; BANDIKAI, RAM-TURAI, and DENROOS in different parts of India; and BAMMIA in the west of Africa; if indeed the East Indian *H. longifolius* and the African *H. Bammia* are, as seems probable, mere varieties. It is an annual plant, with a soft herbaceous stem, 3—5 feet high, crenate leaves, axillary sulphur-coloured flowers, and pyramidal, somewhat podlike capsules. It is cultivated in some parts of the south of Europe. The fruit is used in an unripe state. It is generally much esteemed, but is disliked by some on account of its viscidity. It enters, as an important ingredient, into the *pepper-pot* of the West Indies. The ripe seeds are sometimes used in soups as barley. The bark of *H. tiliaceus*—a tree of twenty feet high, with a very thick bole—so abounds in mucilage, that by chewing it the natives of the South Sea Islands obtain nourishment in times of scarcity. This tree, the BOLA of Bengal—supposed to be the same with the MOHO or MOHAUT of the West Indies (*H. arboreus*)—is one of the most abundant trees of the South Sea Islands; and the wood being light, tough, and durable, is much used for many purposes. The bark is very fibrous, and cordage and matting are made of the fibre in various tropical countries. Many other species yield fibres, some of them coarse, some of them fine and beautiful, which are used in different countries; but the most important in this respect is *H. cannabinus*, the AMBAREE HEMP and DECKANEE HEMP of Western India, called PALUNGOO at Madras, and MAESTA PAUT in Bengal; a plant very generally cultivated in all parts of India, although nowhere to a great extent. It is an annual herbaceous plant, having a straight unbranching stem, 3—7 feet high. The fibre is not so strong as hemp, and is useful only for ropes and coarse fabrics. It has been suggested that many species of H. might be found valuable for the manufacture of paper.—*H. Sabdariffa* is very generally cultivated in warm countries, on account of its calyx, which, as the fruit ripens, becomes fleshy, and acquires a very pleasant acidity. It is much used for making tarts and jelly, and a decoction of it, sweetened and fermented, affords a refreshing beverage, well known in the West Indies as *Sorrel Cool Drink*, the plant being called RED SORREL. *H. Abelmoschus* (or *Abelmoschus moschatus*), sometimes called MUSK SEED, another plant common in widely separated tropical countries, is cultivated for its seeds, which have a fragrance between that of musk and that of amber. They are much used by perfumers, and are called *Ambrette* or *Graines d'Ambrette*. In Egypt and Arabia they are mixed with coffee, and stimulant and stomachic qualities are ascribed to them. The petals of *H. Rosa-Sinensis* are astringent, and are used by the Chinese to stain their eyebrows and their shoes black.

HI'CCUP, or HICCOUGH, consists of sudden short convulsive inspirations, attended with a peculiar sound produced in the larynx, and immediately followed by expiration. The movements concerned in the production of hiccup are a spasmodic contraction of the diaphragm, and a certain degree of constriction in the glottis, which occasions the peculiar sound, and limits the amount of air inspired. These convulsive inspirations commonly occur in paroxysms, and succeed each other at intervals of a few seconds. The paroxysm may last only a few minutes, or may extend to hours or days; in the last-named case, it may be dangerous to life, from the exhaustion which it causes, but usually it merely excites a feeling of uneasiness or slight pain about the region of the diaphragm.

A debilitated state of the system predisposes to hiccup. In those predisposed to it, any gastric derangement, as emptiness, or over-distention of the stomach, the ingestion of cold water, excessive acidity, &c., will provoke it. Certain diseases are frequently attended by hiccup.

When the attack is slight, it may often be stopped by making a very full inspiration, and then holding the breath as long as possible, the diaphragm being thus held in a state of voluntary contraction. Strong pressure, as a belt tightly drawn round the waist, will sometimes give relief. In more obstinate cases, aromatic spirit of ammonia, camphor, musk, &c., may be resorted to. A combination of camphor and chloroform, and the frequent swallowing of small rounded pieces of ice, are perhaps the most efficient remedies.

HICKES, GEORGE, D.D., an eminent English divine and philologist, was born at Newsham, Yorkshire, June 20, 1642. He studied at Oxford, and in 1664 was elected fellow of Lincoln College. In 1665 he passed M.A., and in 1666 was admitted into orders. In 1676 he became chaplain to John, Duke of Lauderdale, whom, in 1677, he accompanied to Edinburgh. In 1678 he received the degree of D.D. from the university of Glasgow, and in 1679 from that of Oxford. In 1682 he was appointed one of the king's chaplains, and the following year made dean of Worcester. Refusing at the revolution to take the oaths to King William III., he was deprived of all his benefices. In 1693 he was sent with a list of the nonjuring clergy to the exiled king at St Germains, and in 1694 was consecrated by a prelate of his own party suffragan bishop of Thetford. His publications in controversial and practical divinity are numerous. His greatest work, entitled *Thesaurus Grammatico-Criticus et Archæologicus Linguarum Veterum Septentrionalium*, appeared at Oxford in 1705, 3 vols. fol. He died December 15, 1715.

HI'CKORY (*Carya*), a genus of trees formerly included among Walnuts (*Juglans*). The Hickories are exclusively North American. They are large and beautiful trees, attaining a height of 70 or 80 feet, with pinnate leaves. The timber of all of them is very heavy, strong, and tenacious, but decays speedily when exposed to heat and moisture, and is said to be peculiarly liable to injury from worms. Great quantities of H. are used to make hoops for casks. It is much used for handspikes. Musket-stocks, shafts of carriages, handles of whips, large screws, &c., are made of it. It is greatly esteemed for fuel. The nuts of some of the species are excellent eating, and much resemble walnuts.—*C. alba*, the SHELL-BARK or SHAG-BARK H., so called from its shaggy outer bark peeling off in long narrow plates, yields the common *hickory-nut* of the northern parts of the United States; also known as the *Kisky Thomas Nut*. It abounds on Lake Erie, and in some parts of New Jersey and Pennsylvania. The trunk is slender. The leaves are often 20 inches long. The nuts are in considerable request, and are sometimes exported. The shell is thin but hard, the kernel sweet. An oil, which is used by the Indians as an article of food, is obtained from it by pounding and boiling.—*C. sulcata*, the THICK SHELL-BARK H., a very similar tree, abounding in the fertile valleys of the Allegheny Mountains, has a nut with a thick yellowish shell, which is often brought to market in America, under the names of Springfield Nut and Gloucester Nut.—*C. olivæformis* yields the PACANE, or PECAN NUT, sometimes called the Illinois Nut.—Other species yield the MOCKER NUT, PIG NUT, and BITTER NUT.

HICKS, ELIAS, a celebrated American preacher of the Society of Friends, was born at Hempstead, Long Island, March 19, 1748. His gifts were early recognised by the society, and at the age of 27 he had become a well-known preacher, and for many years travelled through the States and Canada. His unitarianism, or denial of the divinity of Christ and a vicarious atonement, brought him into disfavour with orthodox Friends; but he preached his own views with perseverance, and at the age of 80 still travelled and preached. The result of his labours was a schism of the society into two divisions, popularly known as Orthodox and Hicksite Quakers. He died at Jericho, Long Island, February 27, 1830. See Elias H.'s *Journal of his Life and Labours* (Philadelphia, 1828).

HIDA'LGO (Spanish, in Portuguese, *Fidalgo*; a word derived by some from *hijo del Goto*, 'son of a Goth,' implying purity of descent, and by others from *hijo de alguno*, 'son of somebody') is the title of a class of the lower nobility in Spain.

HI'ERA PI'CRA, or HOLY BITTER, once a highly popular remedy, and still much employed in domestic medicine, and in veterinary practice, is composed of four parts of powdered aloes and one part of canella. It is identical with the officinal preparation known as *Pulvis Aloës cum Canellâ*. The principal objection to its use as a purgative medicine is, that the nauseous taste of the aloes is not concealed by the canella; and that, like aloetic preparations generally, it is liable to cause irritation of the lower part of the intestinal canal.

HIERA'CIUM. See HAWKWEED.

HI'ERARCHY (Gr. *hieros*, sacred, and *archo*, to govern), the name used by theological writers to designate the whole sacred governing and ministering body in the church, distributed according to its several gradations. The word, in its strict acceptation, is, of course, only applicable to the Roman Catholic Church, and to those Christian communities which retain the prelatical form of church government, or at least the distinctions of ecclesiastical order and gradation. In considering the hierarchy of the Catholic Church, it is necessary to bear in mind the well-known distinction of *order* and of *jurisdiction*. I. Considered under the head of *order*, the hierarchy embraces all the various orders or classes of sacred ministers to whom has been assigned the duty of directing the public worship, administering the sacraments, and discharging the various other offices connected with the preaching of the gospel; and these are of two kinds—the orders directly instituted by divine authority, and those established by ecclesiastical ordinance. Theologians commonly distinguish a *hierarchy of divine right*, and a *hierarchy of ecclesiastical right*. (1.) The first includes the three ranks of bishops, priests, and deacons. The bishops are believed, as successors of the apostles, to have inherited the integrity of the Christian priesthood. The order of episcopate, however, is not believed to be a distinct order from that of priesthood, but only a fuller and entirely unrestricted form of that order. In all that regards what Catholics believe to be the Christian sacrifice of the eucharist, they hold that the priest possesses the same powers *of order* with the bishop; but he cannot confer the sacrament of orders, nor can he validly exercise the power of absolving in the sacrament of penance without the approbation of the bishop. The office of deacons is, to serve as helpmates of the priests and bishops, especially in the administration of the eucharist and baptism, and in the relief of the material as well as the spiritual necessities of the faithful (Acts vi. 1, and foll.). (2.) To the three ranks thus primitively instituted, several others have been added by ecclesiastical ordinance. See ORDERS, MINOR. II. The *hierarchy of jurisdiction* directly regards, and is founded upon, the government of the church, and it comprises not only all the successive degrees of ecclesiastical authority derived from the greater or less local extension of the several spheres within which such governing authority is limited—beginning with the pope as primate of the universal church, and extending to the patriarchs as ruling their several patriarchates, the primates in the several kingdoms as national churches, and the metropolitans or archbishops within their respective provinces;—but also, although less properly, the ecclesiastical grades which, although ecclesiastical jurisdiction may be attached to them, are more directly honorary in their nature, as those of the cardinalate, the archipresbyterate, and the archidiaconate.

In the Anglican Church, with the office of the episcopate, the theory of a hierarchical gradation of rank and of authority has been retained. The Anglican hierarchy comprises bishops, priests, and deacons. In the Scottish Church it is of course unknown, as it is in the greater number of the foreign Protestant churches; while those Lutheran communities which have retained or have revived the title of bishop, concede little to the office which can be considered as imparting to the distinction of grades in the ministry which it imports a strict hierarchical character. The Lutheran bishop has little beyond his brother-ministers, except the right to bear certain insignia, and the first place in the consistories.

In the well-known work, *The Celestial Hierarchy*, falsely ascribed to Dionysius the Areopagite, the hierarchy includes Christ as its head, and the various orders of angels as his ministering spirits.

HIERA'TIC WRITING. See HIEROGLYPHICS.

HI'ERO I., king of Syracuse, succeeded his brother Gelon in the year 478 B.C. The most important event of his reign was the naval victory gained by his fleet and that of the Cumani over the Etruscans in 474, which deprived the latter of their supremacy in the Tyrrhenian Sea. In the year 472, Thrasidæus, who had meanwhile become tyrant of Agrigentum, was conquered by Hiero. H. himself was violent and rapacious, far inferior in character to his brother Gelon. His love of poetry, and the manner in which he entertained poets like Simonides, Æschylus, Bacchylides, and Pindar at his court, have perhaps caused him to be overestimated.

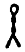
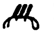
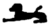
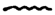
HIERO II., king of Syracuse (269—214 B.C.), was the son of a noble Syracusan named Hierocles. During the troubles which prevailed in Sicily, after the retreat of King Pyrrhus, 275 B.C., H. greatly distinguished himself, and was first appointed commander-in-chief, and then elected king. He joined the Carthaginians in besieging Messana, which had surrendered to the Romans, but he was beaten by Appius Claudius the Roman consul, and obliged to retire to Syracuse, where he was soon blockaded. In 263, seeing himself threatened by a large army under Manius Valerius Maximus, he concluded a peace with the Romans for fifteen years, during which he proved so faithful to his engagements, that in 248 peace was permanently established. H. himself visited Rome in 237, on which occasion he presented the Roman people with 200,000 bushels of corn. In the second Punic War he likewise proved himself the faithful ally of the Romans, and supported them with money and troops, especially after their defeat at the lake of Thrasymene, when the golden statues of the goddess of Victory, weighing 320 pounds, which he sent to Rome, were welcomed as a good omen. He died about the year 216, in the 92d year of his age. His son Gelon having died before him, he was succeeded by his grandson Hieronymus. H., by his clemency, wisdom, and simplicity, had gained the affections of the Syracusans, who refused on several occasions to accept his resignation of the kingly office. He devoted great attention to the improvement of agriculture, and his laws respecting the tithe of corn, &c. (*Leges Hieronicæ*), were still in force in the country in Cicero's time. He was likewise a patron of the arts, particularly architecture. In these pursuits, as well as in the construction of warlike machines, he was assisted by his friend and relative Archimedes.

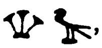
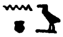
HIE'ROCLES, a common name among the Greeks. The most celebrated of this name was H., the Neo-Platonist, who lived at Alexandria about the middle of the 5th c., and enjoyed a great reputation. He is usually reckoned the author of a commentary on the golden verses of Pythagoras, of which the best edition is that by Warren (Lond. 1742). Of H.'s history we know nothing. His most celebrated works are—*On Providence, Fate, and the Harmony between the Divine Government and Man's Freewill*; of which there remain only a few extracts preserved by Photius, and published by Morelli (Paris, 1593 and 1597). Another ethical work of his, *On Justice, Reverence of the Gods, and the Domestic and Social Virtues*, is known to us from a number of extracts in Stobæus. There is also a work called *Asteia* ('a collection of jests and ludicrous stories') attributed to him, but it is now believed to belong to a much later age than that of Hierocles. This and the previous works are contained in Pearson and

Needham's Commentary on Pythagoras (Cambridge, 1709).

HIEROGLY'PHICS (literally meaning sacred sculptures), a term applied to those representations of natural or artificial objects used to express language, especially those which the ancient Egyptians and Mexicans employed for that purpose. The term *hieroglyph* would, however, be more correctly applied to these figures. The number of those used by the ancient Egyptians was probably about 1000, and by their means they were enabled to express all the ideas required with correctness, clearness, and facility. They consist of representations of celestial bodies, the human form and its parts in various attitudes, animals, fishes, reptiles, works of art and attire, and fantastic forms. These were either engraved in relief, or sunk below the surface on the public monuments and objects of hard materials suited for the glyptic art, or else traced in outline with a reed pen on papyri, wood, slices of stone, and other objects. The scribe, indeed, wrote from a palette or canon called *pes*, with pens, *kash*, from two little ink-holes in the palette, containing a black ink of animal charcoal, and a red mineral ink. The hieroglyphs on the monuments are sometimes sculptured and plain; at others, decorated with colours, either one simple tone for all the hieroglyphs, which are then called monochrome; or else ornamented with a variety of colours, and then called polychrome; and those painted on coffins and other objects are often first traced out, and then coloured in detail. On the papyri and some few inferior materials, they are simply sketched in outline, and are called linear hieroglyphs. The hieroglyphs are arranged in perpendicular columns, separated by lines, or in horizontal, or distributed in a sporadic manner in the area of the picture to which they refer. Sometimes all these modes of arrangement are found together. One peculiarity is at once discernible, that all the animals and representations face in the same direction when they are combined into a text; and when mixed up with reliefs and scenes, they usually face in the direction of the figures to which they are attached. When thus arranged, the reliefs and hieroglyphs resemble a MS., every letter of which should also be an illumination, and they produce a gay and agreeable impression on the spectator. They are written very square, the spaces are neatly and carefully packed, so as to leave no naked appearance of background. Generally, they are to be read from the direction in which they face, and the lines follow in the same succession, but many exceptions occur, in which they follow the reverse order, whether written horizontally or vertically, and this at all periods.

The hieroglyphs, in their nature, are divided into two great classes—*Ideographs*, or those which represent ideas; and *Phonetics*, or those which express sounds. No doubt, at the first commencement of the language, ideographs only were employed; but the earliest known monuments, which ascend to the 3d dynasty above 2000 years B.C., are filled with phonetic hieroglyphs, shewing that at that early period the principle of writing sounds had been completely developed. These hieroglyphs, at the most developed period of the language, comprised about one-third of the texts. The ideographs are divided into two classes—the simple ideographs, or those which express one idea; and the determinatives, which are used to indicate many. In all instances, these ideographs are occasionally found preceded by phonetic groups, which give the sound of the idea they are intended to express in the written language; the simple ideographs being found only preceded by one group; while the determinatives are preceded by many. The pure ideographs are of various classes: first, those representing the object directly, as , a dog, *uhar*, to express the idea dog; secondly, those metaphorically conveying the required meaning, as , a woman beating a tambourine to indicate 'joy,' in which the action indicates the effect produced; thirdly, that in which the attribute is expressed by the figure of some object possessing it, as , a jackal, to indicate 'cunning' or 'craft;' a flaming censer, to signify 'incense.' Or the direct action was often represented; as a bird fishing , to express the idea of fishing in general. Such a mode of depicting ideas in detail was only suited for elaborate monuments; and the number of ideographs required to express all ideas, would have been so many as to have overwhelmed the memory of the learner, and to have obscured the comprehension of the reader. In order, therefore, to reduce the number of *ideographs*, a certain number of these hieroglyphs were used to express more ideas than one in the principal classes of thought. Thus, , a seated man, originally employed to signify man, was applied to all relationships, functions, and offices of men, as *atf*, father; *sen*, brother; *mer*, governor; *hentneter*, priest; *bak*, labourer: the special meaning which it conveyed being shewn by the phonetic groups which preceded it. In the same way, all beasts or objects made of leather were expressed by a skin, ; all precious stones or objects made of the same by a ring, o; all actions of locomotion by , two legs in the act of walking; and all actions in which the arms were used by , an arm holding a stick. The number of these signs may be computed at about 175, and they resemble in their use those of the Assyrian cuneiform, in which, although to a more limited extent, the leading classes of thought were determined by a character prefixed to the phonetic group giving the particular idea. Thus, in the Assyrian, all names of men are preceded by , a single upright wedge; all countries by , three wedges disposed obliquely; and names of horned cattle by the group of five wedges . In the Egyptian system, however, the determinatives are always placed after the phonetic groups, and are more numerous. The Chinese system of writing approaches still more closely to the Egyptian, 242 radicals, as they are called, but really determinatives, being placed after other groups and symbols, which indicate the special idea intended. In this last language, the radicals are generally placed to the left, as 好, *haou*, 'good,' in which the radical is 女, *neu*, 'a woman,' except in those instances in which they enclose the phonetic or special groups. In the Egyptian hieroglyphs, every word not expressing an abstract idea, as the verb to be, or the grammatical forms, and pronouns, is accompanied by its determinative, and is incomplete without it. The genius of the writing is that the phonetics and ideographs mutually explain each other. Sometimes, indeed, by a kind of redundant pleonasm, the determinatives are placed after the special ideographs, as , the three rings of metal after the cape used to express gold and silver; , the three flowers after the lily, to signify lily; and , the skin after the goat, to mean goat. The phonetic portion of the hieroglyphs consists, at the best period of writing, of a limited number of signs, about 130, employed as a syllabarium; and although the term alphabet has been often used in speaking of the phonetic hieroglyphs, nothing of the nature of a pure alphabet existed till a later period, when the Phœnicians invented a purely alphabetic system, suppressing the vowels, which the Greeks still further improved by reintroducing them into their graphic system, and so brought to perfection the invaluable invention of alphabetic writing, at once concise, compendious, and complete. But the Egyptian hieroglyphs comprise two classes of syllables—those ending with vowels, or the so-called alphabetics, and those ending with consonants; or, in other words, of monosyllables and polysyllables. As the monosyllables enter into the composition of the polysyllabic groups, it is evident that they are older than the biliteral or dissyllabic hieroglyphs. The spoken language seems, in fact, to have originally consisted of monosyllables, which were subsequently enriched by agglomeration, and combined into biliteral and triliteral roots. Several of these monosyllabic words have descended from the ancient language to the Coptic, as *ab*, a lamb; *au*, a cow; *mau*, a lion; *ra*, the sun; *pe*, the heaven. Numerous words of this class may still be traced as the roots of the more ancient language, but it is obvious that only a few of the most manageable could be selected for the combined purposes of sound and writing. In some instances, two or more seem to have been selected for the same sounds, in order to suit the style of writing, horizontal or vertical signs being required for the careful packing of the groups in the texts. Now, it will be necessary to bear in mind that each of these hieroglyphs of the first phonetic division represents a monosyllable, of which it represents the whole by itself considered as the initial, but that it was always capable of having the vowel hieroglyph which followed the initial placed after it, and that in the hieratic or cursive Egyptian writing, this was generally the case, in order to distinguish the signs. This final vowel is, however, generally omitted in hieroglyphic texts, and is said to be *inherent*, or ought to be pronounced in the first hieroglyph. The alphabetic syllabarium is as follows:

	an eagle, A*a*.
	an arm, Ȧ*a*.
	a reed, Au.
	a calf, Au.
	a heron, Ba.
	a leg, Bu.
	a cerastes, Fi.
	an eaglet, Ga.
	a vase, Ga.
	a viper, Gi.
	leg of a stool, Ha.
	a house, Ha.
	a papyrus plant, Ha.
	fore-part of lion, HȦ.
	twisted cord, Hi.
	a tusk, Hu.
	a club, Hu.
	two reeds, Iu.
	two oblique strokes, Iu.
	a bowl, KȦ.
	leaf of water-lily, KHa.
	a mormorus fish, KHa.
	a mace, KH*a*.
	a sieve, KHi.
	a garment, KHu, or Au.
	a lion, Ru, or Lu.
	a mouth, Lu, or Ru.
	a pen, Ma.
	a weight, Ma.
	a hole, MȦ.
	an owl, Mu.
	a vulture, Mu.
	a water-line, Na.
	a red crown, Na.
	a vase, Nu.
	a goose flying, Pa.
	a shutter, Pu.
	a knee, Qa.
	a stand, Qa.
	top of quiver, Sa.
	a goose, Sa.
	a woof, Sa.
	a reed, Su.
	a bolt, Su.
	back of chair, S(en or -et).
	a garden, SHa.
	part of dress, SHa.
	a pool, SHi.
	a spindle, Ta.
	a hand, Ti.
	twisted cord, Ti.
	a muller, Tu.
	a duckling, Ui.
	a twisted cord, Ui.

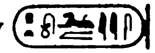
This comprises all the signs which may be considered alphabetic in their nature, at the best period, or from the 4th to the 21st dynasty, when a revolution took place in the mode of writing, and about 90 additional signs, taken from the ideographs and syllabics, were added to the preceding alphabetic, and used indiscriminately—not, indeed, all at once, but by gradual introductions, from the 21st dynasty till the 2d c. A. D. Nor are all the signs of the preceding alphabet of equal antiquity, or as much used as others. As to the inherent nature of the vowels, it may be observed that A, the commonest, is often written with its complement *u* after it, as *Au*, and that is indifferently expressed with , as , Ha. Of the three forms of the A, the first expresses the aspirate, the second the nasal, and the third the soft breathing. Besides, too, their final complement, the initial sound, especially of consonants, probably of those newly introduced into the system, was placed before them, to explain their use. Thus was often written  *Nu*, preceded by *N*, and followed by *u*, and others in the like manner. The consideration of the signs that precede and follow after, indeed determines the sonal value of certain hieroglyphics which are thus encased and explained by other phonetics.

The syllabics are constructed on the same plan. They consist of an initial hieroglyph, which is capable of expressing by itself the whole syllable, as Am, Her, but which take after them their inherent consonant or complement, as

AM, HER, and are sometimes preceded by their initial complement, as . These are more numerous than the alphabetico-syllabic class, and are as commonly used in the texts. The language had impressed upon it by this mode of writing a certain ideographic character, which it retained, certain words being only written by certain syllabics, and the use of the two syllabaries was by no means promiscuous, the examples of different modes of grouping the same word being abnormal, and referable only to long intervals of time. For although several hundred papyri exist in the museums of Europe, and no two are written precisely alike, yet the greatest differences will be observable in those which are similar texts, written at long intervals of time from each other. Nevertheless, some latitude prevails in the writing of certain words and proper names, and those hieroglyphs which appear in the corresponding places of others are called *variants* or *homophones*. Sometimes the same proper name is represented by six different groups of hieroglyphs, yet they could only have been pronounced in one way, as they represent the same name, and the different hieroglyphs are consequently only interchanged to express the same sounds.

The *language* of the hieroglyphs is nearest to the Coptic, the form which it assumed about the 3d c. A. D., when the Greek alphabet, reinforced by letters borrowed from the demotic or popular cursive hand of the period, superseded the demotic and hieroglyphic mode of writing. This language, extinct only as spoken about a century and a half ago (see COPTIC), differs considerably from the monumental texts, having been corrupted by the introduction of Greek, Latin, and Arabic words, but this contains, as its base, the old language of the country—a tongue analogous in some respects to the Semitic dialects, but in others of a construction which may be called Hamitic, or allied to the African. The great peculiarity of the hieroglyphic language is, that the verbal root both of the nouns, adjectives, and verbs remains unchanged, and that the dual and plural are made by postfixes, the cases of the nouns formed by prepositions, and the tenses of the verbs by the prefixing of the declined abstract auxiliary verbs, Au, An, or Kheper, to be; or by the affixing of the pronouns *a*, *k*, *t*, *f*, *s*, *nen*, *ten*, *sen*, preceded by prepositions, to the verbal roots. The pronouns are either detached and prefixed or affixed, and the prepositions are either simple or compound; many remarkable forms of the last class existing in the language. There is a great vagueness in their employment, and their meaning is often abnormal, and only defined by the context.

Considered as the most ancient written language, the hieroglyphs throw great light upon comparative philology, the relative antiquity of various words and locutions, the general construction of language itself, and the development of picture-writing into the abstract ciphers of sound, called letters. A great portion of the words are similar to the Semitic, either directly or indirectly: thus *iuma*, the sea, is like the Hebrew *yam; kaf*, an ape, like *qof*. The majority are, of course, purely Coptic; but at the period of the 19th dynasty, or about 1300 B. C., many Hebrew, Syriac, and Aramaic words were introduced into the language by the progress of the Egyptian arms to the East, and such words as *bata* for *Beth*, a house, *makaturu* for *Migdol*, a tower, and others, appear; they are, however, rare and few in number compared to the body of the language. Many other words appear to be Indo-Germanic. The literature will be found under the word PAPYRUS.

The invention of hieroglyphs, called *Neter kharu*, or 'divine words,' was attributed to the god Thoth, the Egyptian Logos, who is repeatedly called the scribe of the gods, and lord of the hieroglyphs. Pliny attributes their invention to Menon. The literature of the Egyptians was in fact styled Hermaic or Hermetic, on account of its supposed divine origin, and the knowledge of hieroglyphs was, to a certain extent, a mystery to the ignorant, although universally employed by the sacerdotal and instructed classes. To foreign nations, the hieroglyphs always remained so, although Moses is supposed to have been versed in the knowledge of them (*Philo*, vita Moysis); but Joseph is described as conversing with his brethren through interpreters, and does not appear to allude to hieroglyphic writing. The Greeks, who had settled on the coast as early as the 6th c. B. C., do not appear to have possessed more than a colloquial knowledge of the language; and although Solon, 538 B. C., is said to have studied Egyptian doctrines at Sebennytus and Heliopolis, and the doctrines of Pythagoras are thought to have been derived from Egypt, these sages could only have acquired their knowledge from interpretations of hieroglyphic writings. Hecatæus (521 B. C.) and Herodotus (456 B. C.), who visited Egypt in their travels, obtained from similar sources the information they have afforded of the language or monuments of the country. Democritus of Abdera, indeed, about the same period (459 B. C.), had described both the Ethiopian hieroglyphs and the Babylonian cuneiform, but his work has disappeared. After the conquest of Egypt by Alexander, the Greek rulers began to pay attention to the language and history of their subjects, and Eratosthenes, the keeper of the museum at Alexandria, and Manetho, the high-priest of Sebennytus, had drawn up accounts of the national chronology and history from hieroglyphic sources. Under the Roman empire, in the reign of Augustus, one Chæremon, the keeper of the library at the Serapæum, had drawn up a dictionary of the hieroglyphs; and both Diodorus and Strabo mention them, and describe their nature. Tacitus, later under the empire, gives the account of the monuments of Thebes translated by the Egyptian priests to Germanicus; but after his time, the knowledge of them beyond Egypt itself was exceedingly limited, and does not reappear till the 3d and subsequent centuries A. D., when they are mentioned by Ammianus Marcellinus, who cites the translation of one of the obelisks at Rome by one Hermapion, and by Julius Valerius, the author of the apocryphal life of Alexander, who gives that of another. Heliodorus, a novelist who flourished 400 A. D., describes a hieroglyphic letter written by Queen Candace (iv. 8). The first positive information on the subject is by Clement of Alexandria (211 A.D.), who mentions the symbolical and phonetic, or, as he calls it, cyriologic nature of hieroglyphics. Porphyry (304 A.D.) divides them also into cœnologic or phonetic, and enigmatic or symbolic. Horapollo or Horus-Apollon, who is supposed to have flourished about 500 A. D., wrote two books explanatory of the hieroglyphs, a rude, ill-assorted confusion of truth and fiction, in which are given the interpretation of many hieroglyphs, and their esoteric meaning. After this writer, all knowledge of them disappeared till the revival of letters. At the beginning of the 16th c., 1529 A. D., these symbols first attracted attention, and soon after Kircher, a learned Jesuit, pretended to interpret them by vague esoteric notions derived from his own fancy, on the supposition that the hieroglyphs were ideographic, a theory which barred all progress, and was held in its full extent by the learned, till Zoega, at the close of the 18th c., 1787 A.D., first enunciated that the ovals or cartouches contained royal names, and that the hieroglyphs, or some of them, were used to express sounds. More monuments were known, and juster ideas had begun to dawn on the European mind; and the discovery by the French, in 1799, of the so-called Rosetta Stone, a slab of black granite, having inscribed upon it, first in hieroglyphics, secondly in demotic or enchorial (a cursive popular form of writing extant at the period), and thirdly in Greek, a decree of the priests of Egypt assembled in synod at Memphis, in honour of Ptolemy V., gave the first clue to the decipherment. The first attempts, indeed, were made upon the demotic text by Silvestre de Sacy with some success, but it was soon discovered that the demotic was not purely alphabetic. Crude notions of the ideographic nature of the hieroglyphs prevailed till Dr Young, in 1818, first gave out the hypothesis, that the hieroglyphs were used as sounds in royal proper names. He was led to this conclusion by tracing the hieroglyphs through the cursive hieratic to the more cursive demotic; and as this last was known to be alphabetic, he deduced that the corresponding hieroglyphic signs were so. In this manner, he came to the conclusion that the first hieroglyph in the name of Ptolemy  in the Rosetta Stone (a mat) represented a P; the second (hemisphere) a T; the third (a loop) he supposed to be superfluous; the fourth (a lion) he read OLE; the fifth and sixth, the syllable MI; and seventh, the back of the seat, an S. Unaided by bilingual monuments, he essayed to decipher the name of Berenice, and altogether established the value of five hieroglyphs as letters out of two names, but was unable to proceed further. Champollion, in 1822, by means of an inscription found on an obelisk at Philæ, which had at the base a Greek inscription, recognised the name of Cleopatra, and by comparison with that of Ptolemy, at once proved the purely alphabetic, not syllabico-alphabetic nature of the signs. Extending the principle, he read by its means the names of the Greek and Roman, and finally those of the native monarchs. It was soon seen that the same hieroglyphs as those used in these names were extensively used in the texts for words, and these words turned out, in most instances, to be analogous to the Coptic. Although the discoveries of Champollion were received by many of the learned in Europe with distrust, yet his method of research was slowly adopted by Rosellini and Salvolini in 1832, and subsequently extended methodically by Lepsius in 1837, and by Bunsen, Hincks, De Rougé, Birch, Goodwin, Chabas, Brugsch, and others.

The method of interpretation adopted has been strictly inductive, the value of the characters being deduced from the equation of sounds, or homophones of similar groups. The meaning of the groups or words has been determined by examining all known instances in which they occur in passages capable of being interpreted, that of the ideographs by observing the form of the symbols; many of them have been made out from the pictures which they explain, or the phonetic groups which accompany them. A careful comparison has been instituted with corresponding Coptic and Hebrew roots when they exist. In short, a careful principle of induction has been applied to the study of the hieroglyphs.

The discovery of another trilingual inscription, that of the tablet at San or Tunis, recording a synodical act of the priests in the reign of Ptolemy Euergetes II., B.C. 238, has confirmed the results obtained by Egyptologists, the meaning of almost all the words having been previously determined; while the power of reading all documents and inscriptions afforded by their researches have resulted in the resuscitation of a knowledge of the history, science, and literature of the ancient Egyptians. The study has long passed into the category of a recognised branch of oriental learning, and the researches have assumed a more critical form. This has been owing to the number of students, and the abundance of material extant and published. The doubts with which the interpretations were at first received have succumbed to the conviction that nothing but a current system of interpretation could have obtained such logical results. Whatever doubt, in fact, may exist as to the minor details and more delicate shades of language, all the grammatical forms and three-fourths of the words of the old Egyptian language have been established.

The hieroglyphs stood in the same relation to the other two forms of writing the character, called hieratic and demotic, as type does to handwriting. Their use was chiefly for official inscriptions on public or private monuments, religious formulæ and prayers, and rituals or hermetic books (see PAPYRUS). The most remarkable hieroglyphic inscriptions are—that of Una, recording the conquest of the lands of the negroes at the time of the 6th dynasty; in honour of Khnumhetp at Benihassan, recording the investment of his family; the campaigns of Ahmes against the Hykshos at El-Kab; the annals of Thothmes III. at Karnak, the campaign of Rameses II. against the Khita, and the treaty with them; the account of the tank for gold-washings in the reign of Seti I. and Rameses II. at Kouban and Redesich; the invasion of Egypt in the reign of Meneptah by the allied forces of the Libyans, Maxyes, Achaioi or Greeks, Sicilians, Etruscans, Lycians, and other people of the basin of the Mediterranean; the star-risings on the tomb of Rameses V.; the journey of the ark of Khons to Bakhtan, in the reign of Rameses X.; the account of Cambyses and Darius on the statue of the Vatican; the already-cited synodical act of the priests in honour of Ptolemy Euergetes II., and that of the priests assembled at Memphis on the Rosetta stone in the reign of Ptolemy V., the sepulchral tablets of the family of Pasherenptah, and the long series of sepulchral tablets of the bull Apis found in the Serapeion, recording the birth, installation, and death of the bulls from the 18th dynasty to the Persians.

In connection with the hieroglyphics are two modes of writing them, first the *hieratic* writing, consisting of a kind of abridged hieroglyphs. The number of these written characters is fewer than that of the hieroglyphs, the generic determinatives being more employed, and the vocalic complements of the consonants being constantly written, in order to distinguish similar forms. This writing was more extensively used than the hieroglyphic, being employed for state papers, legal documents, memoranda, accounts, religious books, rituals, and all the purposes of private and public life. Books were generally written in hieratic. It commences as early as the 4th or 5th dynasty, and terminates only about the 3d or 4th c. of our era. At the earliest period, it is occasionally written perpendicularly, but it was afterwards only written horizontally, and has generally portions in red ink, corresponding to our initial illuminated letters or rubrics. For the literary contents of these rolls, see PAPYRUS. Some, indeed, have supposed that the hieratic alphabet gave rise to the Phœnician, and have endeavoured to trace the Phœnician alphabet from hieratic sources. But although much ingenuity has been expended in this inquiry, the precise source of Phœnician writing remains involved in obscurity, the principal fact being, that a syllabary existed long prior to the Phœnician alphabet, which did not reach the perfection of the Greeks, owing to the suppression of vowels. The second kind of hieroglyphic handwriting was the *demotic*, or so-called enchorial. It was a still further reduction of the hieratic, simpler forms being used, while the complements are not used, and it approaches still nearer the alphabetic system. It contains an alphabet of 42 letters, and a syllabary of 48 characters, and is less rich in the number of determinatives and ideographs than the hieratic. It is, like all cursive hands, more difficult to decipher than the hieratic. It was introduced into the Egyptian graphic system about the commencement of the 26th dynasty, or the 6th c. B.C., and continued in use till the 3d c. A.D. This was the last native form of writing in Egypt, the early Christians having introduced the Greek alphabet, with a few characters borrowed from the demotic. This script is rarely used for public monuments, although it appears on the Rosetta Stone; but it was universally employed for contracts, public documents, and occasionally for religious formulæ, owing to the decreasing knowledge of hieroglyphics. At the time of Clement, it was the first learned by beginners. With it the Greek language began to appear in public use.

Besides the Egyptian hieroglyphics, there are those of the Aztecs or Mexican, which were a kind of pure picture-writing, the names of monarchs, towns, and other things being painted by the objects which corresponded to their names. While in their historical writings the events themselves were portrayed, the number of the years of the reign of the king was indicated by placing in a line *en potence* in the picture the symbols of the years of the Aztec cycle, which were named after plants and animals. The Mexican hieroglyphs, in fact, consisted of conventional pictures, and they had no means of expressing grammatical form or any structural parts of a language. This mode of pure picture-writing prevailed not only in Mexico, but amongst the nations of Central America. The knowledge of these symbols has unfortunately been almost lost since the Spanish conquest, the meaning of only a few having been rescued from oblivion in the 16th c., when the greater part of the Aztec MSS. was destroyed by the Spanish ecclesiastics. It has indeed been asserted, that the monks used these symbols according to their *sounds*, to write the Lord's Prayer and other formulas; thus , a flag, pronounced *Pantli*, was used for the syllable *Pa;* , a stone, *Tetl* for *tĕ*, the two expressing *Pater;* a cactus fruit, *Nochtli*, for *Noch;* and a stone as above for *te:* these four groups expressing *Pate*(r) *Nochte*, or *Noster;* and so forth. This seems to shew the development of a phonetic system, but it was never extensively used, on account of the abhorrence entertained of the Aztec idolatry.—The term hieroglyphic was also used by the writers of emblemata or devices, symbolising Gnomic sentences taken from the Greek and Latin poets, and having no relation to Egyptian hieroglyphs.—In recent times, too, the astrological almanacs have had their symbolical representations and supposed prognostics of future events, which they called hieroglyphs.—Zoega, *De Origine Obeliscorum* (fo. Romæ, 1797); Young, *Archæologia* (1817, vol. xvii. p. 60); *Encyclop. Britannica* (1828); Champollion, *Précis du Système Hieroglyphique* (1824); *Grammaire Egyptienne* (1841—1861); *Dictionnaire* (1841); Lepsius, in the *Ann. del' Instituto Arch.* (1828); Birch, *Introduction to the Study of the Hieroglyphics* (1857); Brugsch, *Grammaire Démotique* (Berl. 1855), *Wörterbuch* (1867—1868), *Grammatik* (1872); De Rougé, *Etude d'une Stèle Egyptienne* (1858); Chabas, *Papyrus Magique d'Harris* (1861); *Zeitschrift. f. ägypt. Sprache* (1863—1874); Bunsen, *Egypt's Place* (vol. v. 1867).

HIERO'NYMITES, one of the many hermit orders (q. v.) established in the course of the 13th and 14th centuries. The Hieronymites grew out of the third order of St Francis. See FRANCISCANS. Some of the followers of Thomas of Siena, one of the Franciscan rigorists, having established themselves in various places among the wild districts which skirt the Sierra Morena, by degrees formed into a community, and obtained in 1374 the approval of Pope Gregory XI., who confirmed their rule, which was founded on that of St Augustine. The institute extended into other provinces of Spain, and also into Portugal; it was subsequently established in Italy, Tyrol, and Bavaria.

HIEROPHANT, or **MY'STAGOGUE**, the priest who presided over the mysteries at Eleusis, was always selected from the family of Eumolpus, who was regarded as their founder, and the first Hierophant. The H. was required to be a man of ripe years, without any physical defect, endowed with a fine voice, and of spotless character. He was forbidden to marry, but it is not improbable that married men were likewise appointed H., and were merely prohibited from forming a second marriage. In the mysteries, the H. represented the Demiurge or creator of the universe. He alone was authorised to preserve and explain the unwritten laws, to introduce candidates into the temple at Eleusis, and gradually initiate them into the lesser and greater mysteries. On this account, he was likewise styled *Mystagogue* and *prophet*, and no one was allowed to utter his name in the presence of an uninitiated person. At public solemnities he carried the image of the goddess, adorned with magnificent robes.

HIGH BAILIFF, is a term applied to some officers in England, who discharge ministerial duties, such as serving writs, &c., in certain liberties or franchises, exempt from the ordinary supervision of the sheriff. The term is used in contradistinction to the ordinary name of bailiff, which is now almost a term of reproach, and confined chiefly to the lowest class of officers, who execute writs against debtors.

HIGH COMMISSION COURT, a tyrannical court established by Queen Elizabeth to reform the church, abolished by 16 Ch. I. c. 11.

HIGH CONSTABLE. See CONSTABLE.

HIGH MISDEMEANOUR, an offence short of, but closely bordering on, treason.

HIGH PLACES (Heb. *Bamoth*), the name given in Scripture to certain places where illicit worship was performed by the people of Israel. The practice of erecting altars on elevated situations was common in ancient times, and originated in the belief that hilltops were nearer heaven, and, therefore, the most favourable places for prayer and incense. The fathers of the Jewish nation acted in this respect just like their neighbours. Abraham, we are told, built an altar to the Lord on a mountain near Bethel. The Mosaic law, however, true to its grand aim of securing national strength and purity by a vigorous system of isolation, prohibited the practice for the future, on the ground that the spots which the Israelites would be compelled to choose had been already polluted by idolatrous services. In spite of the vehemence with which the high places are again and again denounced in the Pentateuch, the prohibition seems to have been a long time in producing the desired effect—if, indeed, it ever really accomplished it. During the whole eventful period of the Judges, it was not only practically obsolete, but we actually find that both Gideon and Manoah built altars on high places by Divine command (Judges, vi. 25, 26; xiii. 16—23). It also occasions much surprise to read of the violations of the injunction—among others by Samuel at Mizpeh and Bethlehem, by Saul at Gilgal, by David, by Elijah on Mount Carmel. The explanations given by the rabbis of these contradictions between the conduct of the prophets and kings of the Hebrew people, and the commands of their great lawgiver, are too absurd for mention. Whatever may be the true explanation, it is quite certain that worship in high places was almost universal in Judea, both during and after the time of Solomon. The results were such as might have been anticipated. The people erected altars not only to Jehovah but to Baal, and from worshipping in idolatrous places, proceeded to worship idols themselves. At a later period (see Books of Kings and Chronicles) a series of vigorous efforts was made by the more pious monarchs to suppress the practice, and after the time of Josiah, it seems to have been finally abandoned.

HIGH-PRIEST (Hebr. *Kohen haggadol*, or emphat. *Kohen*, Gr. *archiereus*, Lat. *primus pontifex*, &c.), the chief of the Jewish Priesthood. His dignity was hereditary in the line of Eleazar, the son of Aaron, and many more restrictions attached to it than belonged to the ordinary office of a Priest. He was only allowed to marry an intact virgin, and one of his own tribe; every impure contact even of the dead bodies of his own parents he was strictly forbidden, besides having to abstain from many other things that might cause any defilement whatever. His functions consisted principally in the general administration of the sanctuary and all that belonged to the sacred service. He alone was allowed to enter the Holy of Holies on the day of atonement, and to consult the Urim and Thummim (q. v.). No less was his costume of surpassing costliness and splendour, comprising numerous vestments in addition to those of the ordinary priests. This brilliant costume, however, was laid aside by the High-Priest when, on the day of atonement, he went to perform the most awful service in the Holy of Holies: a simple garb of white linen—the funeral dress of the Jews in later times—was all he wore on that occasion. The revenues of the High-Priest were in the main the same as those of the other priests; but, according to the Talmud, he was to be richer than these, and if his own means were insufficient, he was to be provided with opulent means by his brethren, in virtue of his exalted position; the other priests never addressed the High-Priest but by *Ishi Kohen Gadol*, 'My Lord High-Priest.' Before the Law, however, the High-Priest was equal to any other Israelite. It is doubtful at what time the office of *Sagan*, or vice-High-Priest, was created. The Talmud, moreover, speaks of a '*Mashiach Milhamah*,' 'Anointed for the war;' an officer who seems to have shared almost the dignity of the High-Priest, and whose special duty it appears to have been to read the proclamation prescribed in Deut. xx. 3, in the time of war, and who may have accompanied the troops for the purposes of celebrating the service in the camp. For further historical and theological points connected with this subject, see PRIESTS, AARON, and JEWS.

HIGH SEAS, i.e., the open sea, including the whole extent of sea so far as it is not the exclusive property of any particular country. The rule of international law is, that every country bordering on the sea has the exclusive sovereignty over such sea to the extent of three miles from its shore; but all beyond, and which is not within three miles of some other country, is open or common to all countries. The part of sea within three miles' distance is generally called the territorial sea of the particular country, or *mare clausum*. The distinction has little effect on the right of navigation, but as regards fishing it is otherwise. Thus, for example, foreign fishermen have no right to fish within three miles of the British coast without a licence from the crown, or unless some special treaty—as, for example, the French and English treaty—has laid down other arrangements.

HIGH STEWARD, a judge now always a legal peer, who is specially appointed by the crown for the trial of peers indicted for treason or felony. He is a kind of speaker or chairman of the peers, and votes with the rest. It is one of the privileges of the British peerage to be tried by the court of the high steward.

HIGH TREASON. See TREASON.

HI'GHGATE, a northern suburb of London, in the county of Middlesex, and a station on the Highgate and Edgeware Railway, 5 miles north-north-west of St Paul's. It comprises may elegant villas, and some important benevolent institutions. On the slope of a hill below the church of H. is the North London Cemetery. New buildings for the Highgate Grammar-school were erected in 1867.

HIGHLAND REGIMENTS. The origin of the first of these regiments, the 42d, has been given under the head BLACK WATCH (q. v.). The valuable services of this regiment encouraged the government to augment the force; and accordingly seven other Highland regiments have been raised from time to time—viz., the 71st, in 1777; the 72d, or Duke of Albany's Own, in the same year; the 74th, in 1787; the 78th, or Ross-shire Buffs, in 1793; the 79th, or Cameron Highlanders, in 1805; the 92d, or Gordon Highlanders, in 1796; and the 93d, or Sutherland Highlanders, in 1800. The uniform of each of these corps is the Highland dress, including a distinctive tartan. The soldier wears a coatee of scarlet, a kilt (in most, but not all, of the regiments), a plaid across the shoulders, a plume, and the other attributes of the Gaelic costume. In an army where officers are appointed by general competition, nationality is necessarily disregarded; but these corps are those in which Scotch gentlemen most frequently seek appointments, and a large proportion of the officers are Scotch. Of the men, about 79 per cent. are Scotch, 11 per cent. English, and 10 per cent. Irish. The regiments are recruited in the Highlands, the depôts being stationed at Stirling, Aberdeen, Perth, Fort George, and Lanark.

HI'GHLANDS, a term generally applied to the higher parts of a country, as, for example, Highlands of the Hudson, as defining a certain high and picturesque region on the river Hudson, in the state of New York; but the term has a more special application, to a particular district in Scotland. This district has no political or civil boundary. Separated by only a vague line of demarcation from the division called the Lowlands, the Scottish H. may be briefly described as that portion of the north and north-west of Scotland in which the Celtic language and manners have less or more lingered until modern times. The Highland line, as it is usually called, extends diagonally across the country from Nairn on the Moray Firth to Dumbarton on the Clyde; but the mountainous part of the counties of Banff, Moray, Aberdeen, Kincardine, and Perth are also understood to be included in the designation Highlands. Caithness might be excluded as being a generally level country; but throughout the H. there are rich level tracts, none being more so than the eastern division of Ross-shire. The Hebrides (q. v.) or Western Isles are included in the H., but the isles of Orkney and Shetland, though to the north, are distinctly excluded, by reason of the Norwegian origin of the inhabitants.

The H. are full of lofty hills, some green and pastoral with tracts of heath, and others rugged and bare, varying in height from 1000 to 4000 feet, and having generally narrow valleys between, or else lakes and arms of the sea, called *lochs*. Besides the grander features, there are impetuous mountain torrents, picturesque ravines, and valleys or glens, in which, and on the sides of the hills, are seen the huts of the aborigines. Perhaps the most remarkable feature in the country is the line of valleys from Inverness to Fort-William, in which lies a series of navigable lochs, united by artificial channels to form the Caledonian Canal. Growing up under a system of clanship, the state of society in the H. was antiquated and unsatisfactory, in a national point of view; while the country was almost impenetrable to travellers, or to any species of traffic. The first great attempt to reform this state of affairs was the opening up of the country by roads in different directions, under the superintendence of General Wade, about 1725—1726. The next great act of melioration was the abolition of Heritable Jurisdictions (q. v.), including the ancient privileges of the heads of clans, about 1748. And lastly, not to speak of the planting of schools and churches, much was done by the establishment of the Highland and Agricultural Society in 1784. Since these events, the ancient patriarchal system has given place to improvements as regards communications, agriculture, dwellings, education, and other modern conditions, including a gradual substitution of English for the Gaelic language. Latterly, there has been a keen spirit of progress in the Highlands. Great numbers of the Celtic inhabitants, who had little chance of improving their circumstances on the spot, have been dispossessed, and their place taken by stock-farmers with capital from the Lowlands. See SUTHERLAND. While a new character has thus been given to extensive Highland pasturages, the value of estates has been further and very remarkably advanced by being let for the pursuit of game to sportsmen, chiefly persons of rank and opulence from England. What, therefore, with improved farming and shootings, Highland estates have of late years risen immensely in value. Inverness is usually spoken of as the capital of the H., and is noticed under its proper head. The Highland counties are also noticed individually. There are sundry popular Guide-books for tourists in the H.; and for minute topographical and other details, we may refer to the *Guide to the Highlands and Islands of Scotland*, by G. and P. Anderson, Lond. 1834.

HIGHNESS, a title of honour given to princes. The titles 'Your Highness' and 'Your Grace' were both used in England in former times in addressing the Sovereign, but were supplanted by 'Your Majesty' towards the end of the reign of Henry VIII. The children of royal personages are addressed 'Your Royal Highness;' those of emperors, 'Your Imperial Highness.' The sultan of Turkey is addressed as 'Your Highness.'

HIGHWAY, in English law, is the place over which a right is enjoyed by the public, of walking, driving, or riding. It is often called the Queen's highway; not because the Queen has any greater or better right than any of the public, but to denote the impartiality and equality with which all the subjects enjoy the right of way without distinction. Highways are distinguished into several kinds. 1. A footway, where the public have no right except to walk on foot; 2. A foot and horse way, where the public have the right of walking or riding on horseback; 3. A pack, and drift way—a way used for driving cattle and pack-horses; 4. A foot, horse, and cart way, where the public can walk or ride, or use vehicles of all ordinary descriptions. Navigable rivers are also called highways, but this is rather in a figurative sense. Where the right of way belongs not to the public generally, but to the owner of one or two houses and their tenants, this is called a private way, and is classed among easements.

It has often been disputed, and cannot be said to be yet thoroughly settled, whether a highway must be a thoroughfare—in other words, whether a road which does not lead to any public place can be a highway. The preponderance of authority seems rather to be in favour of the proposition, that it is essential that the highway be a thoroughfare. The mode in which a road is created is by dedication, or by grant of the owner, or by the necessity of things or act of parliament. Thus, if a person allow the public for four or five years to pass through his fields without stopping them, this will be evidence from which a jury may infer that the owner meant to make a present to the public of the right of way, and he cannot afterwards exclude the public, for the maxim holds, 'once a highway, always a highway.' The mode in which a grant of the way is proved, is generally by shewing that the public have, from time immemorial, or for a few years without interruption, and with the owner's consent, enjoyed the right of way; for if that is proved, then the law presumes that the right was given by some lost grant. There are also rights of way limited to a particular purpose, which may be proved by immemorial custom, as a way for the inhabitants of a village to or from the parish church. One of the incidents of a highway is, that if it is foundrous, or out of repair, the passenger is entitled to go over the adjacent land, whoever may be the owner of it, so as to avoid the foundrous part of the road. Another incident of the use of a highway is, that if any obstruction is placed upon it, whether in the nature of a gate, or a wall, or even if a house be built too near so as to encroach on the highway, any passenger has a right to abate the nuisance—i. e., he may himself, without any ceremony, remove the obstruction or demolish the wall, but he must take care not to do more damage than is necessary for the purpose of clearing the road, otherwise he will subject himself to an action. Another incident of the use of a highway is, that the public have an absolute right to use every part of it, and to pass to and fro in all directions. Of course, each must comply with certain well known rules, such as that of giving and taking the road, otherwise, if an accident were to occur, he would be liable for the negligence, if it arose from a neglect of such rules, for these constitute, as it were, the law of the road. It results from this principle, that no person, or body of persons, is entitled to convert part of the highway into any purpose, however useful, other than a highway. Thus in London, and other parts of the country, some vestries and surveyors lately presumed to give leave to a contractor to lay down a tramway in the streets, which was alleged to be a great public improvement; nevertheless, as it practically resulted in giving a monopoly to some persons, and moreover was an obstruction to others, this was held to be a nuisance, and the parties who took part in it were indicted for the obstruction. And on the same principle, it has been held an indictable nuisance for an electric telegraph company to place their telegraph posts on the strips of land at the side of the road; for though it might be thought for the benefit of the public, instead of the reverse, yet as it practically obstructed the public in the free passage from every part of the highway to every other, it was held to be a nuisance. Nothing but an act of parliament can legalise such uses of a highway, and no person or body now existing has authority to restrict the free use of the Queen's highway in such a manner.

The soil of the highway, or rather the right to the ground beneath the highway, is presumed to be (not, as it is said to be in Scotland, in the crown, but) in the adjoining owners. Thus, if the land on both sides of a highway belong to the same owner, then the right to the ground beneath the road belongs to him also; and if the land on one side belongs to a different owner from the land on the other side, then each is presumed to have the right to the ground under the highway up to the middle line. This rule is more than a mere theory, for though neither of the adjoining owners can ever interfere with the passage of the public, who have an absolute right for ever to use it for every lawful purpose of transit, yet the adjoining owner has all the rights incidental to the property which do not interfere with this public right of passage. Thus, if a mine were discovered under the road, the adjoining owner would have the sole right to dig it and keep the contents; all that he would require to attend to would be, to leave sufficient support to the surface of the road. So, in like manner, where there are strips of land at the side of the road on which trees or grass grow, these belong solely to the adjoining owner, and the public have no right to their use. Another remarkable consequence follows, that if, for example, a gas company or a water company were to presume to take up the highway in order to lay their pipes under the surface, this is not only an indictable nuisance as regards the public, inasmuch as it obstructs the use of the road for the time being, but it subjects the company to an action of trespass at the suit of the adjacent owner, whose property consists of all that lies under the surface of the highway. Another consequence of the same rule is, that if a person is loitering on a highway, not with the intention of using it *qua* highway, but for the purpose of poaching at night, the courts have held that he may be punished under the night poaching act, for trespassing on the land of the adjoining owners in search of game.

The repair of a highway, in general, is a burden which falls upon the occupiers of the lands in the parish. Probably the reason is, that they use those highways most, and somebody or other must keep them in repair. Sometimes, however, the burden of repair is fixed on the owner of the adjoining land, if it can be proved that he has always, from time immemorial, been in the habit of repairing, it being then presumed there was some good reason for this. The general rule is, however, that the inhabitants of the parish must repair the highways within the parish; and so indelible is this obligation, that no agreement they can enter into will relieve them of such a liability. But though bound to repair, they cannot be called on to widen the road. The common remedy, accordingly, when a road is out of repair, is to indict the parish, when, if guilty, the surveyor will be bound to make a rate, and pay the expenses.

Owing to the defects of the common law, which did not sufficiently give power to widen, shut up, and improve highways, so as to keep pace with the wants of the time, a general act of parliament was passed in 1835, called the General Highway Act, 5 and 6 Will. IV. c. 50, which still regulates the subject. Many minute details are laid down by this act, but substantially the foregoing principles of the common law still govern the subject, the chief alterations being merely in the machinery by which these principles are carried out. The highways are kept in repair by a highway-rate, levied by the surveyor, a person annually appointed by the ratepayers in each parish, and who is vested with the control of the surface of the highway to a limited extent for the purpose of keeping it in due order; so that practically each parish manages its own highways —a state of things which the legislature has to some extent remedied by acts of 1862 and 1864, &c., enabling the justices at Quarter Sessions to form several parishes into one district, and so enforce more uniformity in the management of the roads. Certain specific uses, or rather abuses, of the highway are also made more promptly punishable by the first statute, such as horsemen riding on footpaths, the tethering of cattle on the sides of the highway, playing at games, baiting bulls, lighting fires, firing off squibs, depositing materials, &c., on the highway.

When any party obstructs, or creates a nuisance on the highway, the proper remedy against him is to indict him for the nuisance; or if any individual has been specially injured by his misconduct, such individual may also bring an action against the party who caused the obstruction.

Many highways are called *turnpikes*, from the fact of their having toll-gates, bars, or turns across them, and are managed by commissioners or trustees. This is always done by some local act of parliament. Where a new road is considered to be of great public benefit, the neighbouring proprietors obtain an act of parliament to make it, with powers to take compulsorily the requisite land, and to raise money for the purpose of buying such land, as well as to keep up the road thereafter; and as a means of paying off all this expense, to erect a toll-gate, and levy a tax or toll on all who use the road. This is the history of all these turnpike-roads, the only way of paying the cost of making them being by levying this toll. Several general acts have also been passed to regulate the management of these turnpikes. Sometimes the soil of the turnpike-road is vested in these trustees. These turnpike-roads were violently opposed at first, the toll being unpopular, but they existed prior to the first general turnpike act, 13 Geo. III. c. 84. The present general turnpike act is 3 Geo. IV. c. 126, but other statutes have passed subsequently. In some cases, part of the highway-rate is ordered to be applied towards keeping up turnpikes, for the parish is bound to repair these roads as well as general highways. Several exemptions from paying toll are created in favour of farmers sending manure, hay, straw, &c., from one part of the farm to another, persons going to or from the parish church, or a funeral, or clergymen going to their church on duty, &c. So persons are exempt who do not pass above 100 yards along the road. All tolls chargeable must be stated in a table of tolls set up at the toll-house.

In the law of Scotland, highway is substantially the same, in most respects, as in England; but there are the following differences. It is generally laid down that the right to the soil of the highway is vested in the crown, and not in the adjoining owners, as in England. This theory, however, has been shaken by recent cases, and has been shewn to lead to some absurdities. Streets of burghs are said to be held by the magistrates, under the crown, for the public benefit. The general acts on the subject—viz., 1 and 2 Will. IV. c. 43, and 3 and 4 Will. IV. c. 33, were passed for the regulation of highways, which impose various rules, in detail similar to the English highway and turnpike acts. Parish roads are maintained still on the old system of statute labour. Most of the roads are regulated by special acts of parliament, which are to be taken in conjunction with the general acts. When a public-road is obstructed in Scotland, the party is not indictable; but any one of the public may raise an action of declarator, and so establish the right of the public.

HI'GHWAYMAN is not a technical legal term, the offence of robbing or assaulting on the highway being included under Larceny, Robbery, or Assault respectively.

HIGLER. See Hawkers.

HI'LARY, St, Bishop of Poitiers, and doctor of the church, although by no means among the most voluminous of the Latin Fathers, yet, from the nature of the subjects on which he wrote, chiefly connected with the Arian controversy, occupies an important place in the patristic literature of the Western Church. He was born of pagan parents at Lemonum (Poitiers) in the early part of the 4th century. His conversion to Christianity was mainly the result of his own study of the prophecies, and did not take place till he was advanced in life. About the year 350 he was elected bishop of his native city, and immediately rose to the first place in the animated contest of parties in the Arian controversy. Having provoked the displeasure of the court party, he was imprisoned, and sent into exile in Phrygia; but he appears again in the council of Seleucia in 359, and soon afterwards was permitted to resume possession of his see, where he died, 367. The church holds his day on the 13th January. His most important work is that on the Trinity, but his three addresses to the Emperor Constantius, by their vehemence, and by the boldness of their language, have most attracted the notice of critics. H.'s theological writings are especially valuable for the history of the Arian party, and particularly for the doctrinal variations of that sect, and the successive phases through which it passed between the council of Nice and the first council of Constantinople. The best edition of the works of St H. is that of the Benedictine Dom. Constant (Paris, 1693), or the reprint of it with additional matter by Maffei (Verona, 1730).—There is a second bishop of the same name who occupies a conspicuous place in the history of the 5th c., Hilary of Arles, born in 401, educated at the celebrated monastic school of Lerins, and made bishop of his native city in 429. As metropolitan of Arles, he presided at several synods, and especially at Orange in 441, the proceedings of which involved him in a serious controversy with the pope, Leo the Great. A deposed bishop, named Chelidonius, having carried an appeal to Rome, a council was summoned by Pope Leo, at which H. was present, and in which the condemnation of Chelidonius, as well as that of another bishop, Projectus, was reversed. H., however, refused to submit to the decision, and soon afterwards quitted Rome—a proceeding which drew upon himself a very severe animadversion. He did not question the authority in itself, but he maintained that it was uncanonically exercised. In the end, however, he sought a reconciliation with Pope Leo, and the dispute was brought to an amicable termination. H. died in his 48th year at Arles in 449.

HILARY TERM, one of the English legal terms during which the courts of law sit at Westminster in banc. The term is appointed by statute to commence on the 11th and to end on 31st January. The name is said to be borrowed from St Hilary, Bishop of Poitiers.

HI'LDEBRAND. See Gregory VII.

HI'LDESHEIM, an old town of Hanover, capital of a Prussian administrative division, is situated on the river Innerste, in a pleasant valley surrounded by hills, 24 miles south-east of Hanover. It is a very quiet town, with very old houses, the upper stories of which are furnished with balconies. It has been a bishop's seat since 822, and its cathedral, dating from the beginning of the 11th c., has bronze gates (date, 1015) 16 feet high, and covered with bas-reliefs. There are also in the cathedral beautiful paintings on glass, and many art and other treasures. The church of St Godehard, considered a master-piece of architecture, dates from 1133 (restored in 1852), and is surmounted with three pyramidal towers. St Michael's Church, nearly an unaltered basilica, dates from 1022 and 1186. In October 1868, some soldiers, digging on the Galgenberg, close by H., discovered at a depth of 9 feet about 60 silver vessels, belonging apparently to the best period of Roman art. Pop. (1871) 20,804.

HILL, Sir Rowland, K.C.B., post-office reformer, was born at Kidderminster, December 3, 1795. His father conducted a school near Birmingham, which was celebrated in connection with the 'Hazelwood system of education' (afterwards removed to Bruce Castle, Tottenham), and in which H. was engaged as a teacher until the year 1833. He there joined an association which obtained an act for establishing the colony of South Australia, with the design of reducing to practice Mr Gibbon Wakefield's scheme of colonisation. H. became secretary to the Royal Commissioners, who at first managed the affairs of South Australia. He was also a member of the committee of the Society for the Diffusion of Useful Knowledge. The high rate of postage had for many years engaged his attention, and in 1837 he published a pamphlet recommending a low and uniform rate of postage throughout the British Isles. Petitions were poured into the House of Commons in favour of H.'s plan, and in 1837 the House appointed a committee to investigate the merits of penny-postage. In 1840, the principle of a uniform rate of postage was adopted, and an experimental charge of 4d. per letter was levied. This was shortly afterwards followed by the present uniform penny-rate. H. was placed in the treasury, and was working out his measure when the Tory government succeeded to power, and dismissed him. A subscription was got up at once to reward a public benefactor, and mark the public sense of his dismissal, and the sum of £15,000 was presented to Hill. In 1846, when the Whigs returned to office, H. was appointed secretary to the Post-master General. In 1854, he succeeded Colonel Maberley as secretary to the Post-office, an appointment which he held till failing health compelled him to resign in 1864. His full salary of £2000 a year was awarded him for life, and he also received a parliamentary grant of £20,000. He was made K.C.B. in 1860, and D.C.L. (Oxon) in 1864 (see Post-office). The Money-order Office is one of the offshoots of penny postage; and parliament, in 1861, engrafted a system of Post-office Savings-banks upon the postal-service, which was carried out by H. with his usual administrative ability and success.—His eldest brother, Matthew Davenport Hill, till 1866 the recorder of Birmingham, has distinguished himself by his labours for the education of the people, and the reformation of criminals. One of his brothers, Mr Edwin Hill, was the inspector of stamps at Somerset House; and another, Mr FREDERIC HILL, was the first to propound and enforce those humane principles upon which modern prison discipline is founded; and his work, *On Crime*, is a standard authority for legislators. He is (1875) assistant-secretary to the Post-office.

HILL, VISCOUNT (ROWLAND HILL), British general and commander-in-chief, a scion of the ancient and distinguished family of the Hills of Shropshire, was second son of Sir John Hill, Bart., of Hawkstone. He was born August 11, 1772, entered the army at the age of fifteen, and obtained a captaincy before he was twenty. He took part in the disastrous campaign in which Sir John Moore lost his life. He also served in the campaigns of 1809, 1810, and 1811, under the Duke of Wellington, and displayed conspicuous gallantry, as well as great talents as a commander. In the Peninsular engagements, he was usually intrusted with the most important duties next to those which devolved upon the Duke of Wellington; and when the army returned home, the fame of H. was second only to that of the great commander. He was created Baron Hill of Almarez and Hawkstone, received a parliamentary grant of £2000 a year; and both title and annuity were granted to his nephew in remainder. He was also made G.C.B. He commanded a division at Waterloo, and remained with the army of occupation, as second in command, until it evacuated the French territory. He succeeded the Duke of Wellington in 1828 as commander-in-chief of the army, and dispensed the patronage which he possessed with great impartiality. In 1842, his health declined, and the Duke of Wellington once more took the command of the army. After his resignation, H. was created a viscount. He died unmarried at Hardwicke Grange, county of Salop, December 10, 1842, in his seventy-first year. He was succeeded in his titles and estates by his nephew, Sir R. Hill, Bart.

HILL MUSTARD. See BUNIAS.

HILL STATES, a number of small principalities of India on the left or east side of the Upper Sutlej, comprise about 10,000 square miles, and about 550,000 inhabitants. With the exception of this aggregate name, they have but little in common with each other. Perhaps twenty may be reckoned which have a distinct existence—those best known being Bhagul, Bussahir, and Gurwhal.

HI'LLAH, or **HILLA**, a town of Turkey in Asia, in the pashalic of Bagdad, and 60 miles south of the city of that name, is situated on both banks of the Euphrates, and is built on the ruins of ancient Babylon (q. v.). Here the Euphrates is 450 feet in width, and is crossed by a floating bridge. H. is a fortified town, contains a citadel, a mosque, and several well-stocked bazaars. Dyeing, tanning, and manufactures of silk are here carried on. The population, which is fluctuating, may be stated at between 7000 and 10,000.

HI'LLEL, HABABLI (the Babylonian), or HAZAKEN (the Elder), one of the most eminent and influential doctors of the Jewish law, was born about 112 B. C. in Babylonia, of poor parents, but in the female line of royal (Davidian) descent. Forty years old—so the legend runs—he migrated into Palestine for the sake of studying the law; and of the small sum he earned by hard manual labour, he gave half to the door-keeper of the academy, where Shemaja and Abtalion, the great masters of the period, expounded the Halacha (q. v.); and before long, he became one of the favourite and foremost pupils of Abtalion. Five or six years (Sabb. 15 a.) after Herod had mounted the throne, H. was elected Nasi, or president of the sanhedrim. The range of his acquirements is said to have been immense; embracing not only Scripture and tradition, but nearly all branches of human and '*superhuman*' knowledge. Yet he was one of the meekest, most modest, kind, and simple-hearted men. 'Be of the pupils of Aaron, a friend of peace, a promoter of peace, loving mankind, and bringing them nearer to the Divine law' (Aboth, i. 2). 'Do not confide in thyself, until the day of thy death' (Aboth, ii. 3). 'Do not judge thy neighbour, until thou hast been in his place thyself' (Aboth, ii. 5). Such were some of his most favourite sayings. Still more characteristic, and highly curious, if compared with Matt. vii. 12, is the answer he gave to a heathen who, in a spirit of mockery, requested him to teach him 'all the law of Moses' while he could stand on one leg. 'Do not unto others as thou wouldst not have others do unto thee,' H. replied; 'that is all the law; the rest is mere comment' (Babyl. Talm. Shabb. 31 a.). H. was also the first who collected the numberless traditions of the oral law, and arranged them under six heads (see MISHNA). The often alluded to and highly exaggerated dispute between H. and his school and Shammai (q. v.), the contemporaneous supreme judge of the Sanhedrim (*Ab-Beth-Din*), and his school, resolves itself into a mere theoretical one: the decisions themselves are, with a very few and unimportant exceptions, identical. H., however, was the more popular of the two, and the majority was, on account of the better authorities he was able to quote in his support, generally on his side.

The time of H.'s death is uncertain. He is said to have lived, like Moses, 120 years: 40 years in ignorance of the Law, 40 years as the humblest pupil of the Law, and 40 years as the highest master of the Law. A verse of the dirge composed at his death has survived: 'Woe for the pious, the modest, the disciple of Ezra' (Sanh. 11 a.). For the further influence of his house and school, see GAMALIEL and TALMUD.

HILTED, a term used in Heraldry, to indicate the tincture of the handle of a sword.

HIMÂLA'YA ('the abode of snow,' from the Sanscrit, *hima*, snow, and *âlaya*, abode), in south central Asia, is the most elevated and stupendous mountain system on the globe. It is not, as sometimes represented, a single chain, but a range of rugged snowy peaks depending from the high tableland of Tibet, and separated by deep gorges, the outlets of the streams originating in the melted snow and ice of the interior. The mass of the H. proper extends from the great bend of the Indus in the west, to the junction of the Sanpu with the Brahmaputra in the east, or from long. 73° 23′ to 95° 40′ E., a distance of nearly 1500 miles, following the curve from south-east to north-west. The mean elevation of the range is from 16,000 to 18,000 feet, but 45 of its peaks are now known to exceed 23,000 feet in height. Of these there are, in Kumaon, Nanda Devi, 25,749 feet; in Nepaul, Dhawalagiri, 26,826 feet; Mount Everest, 29,002 (the highest known point on the globe); and Kunchinjinga, 28,156 feet; in Bhotan, Chumalari is 23,946 feet above the sea. The southern surface of the H. comprises three distinct regions—first, adjoining the plains of Hindustan, the *Turai*, a grass-covered marshy plain; next, the great belt of *Saul Wood*, stretching along a great part of the range; and beyond it the *Dhuns*, a belt of detritus, extending to the foot of the true mountains.

Above these regions, which are extremely unhealthy, are placed the Sanitaria for troops—

Darjeeling, Simla, Murree. There are no plains and but few lakes in the H.; the chief of the latter are Nainital, in Kumaon, 6520 feet, and the lake of Cashmir, 5126 feet above the sea.

Snow falls at rare intervals in the mountains as low as 2500 feet, but at 6000 feet it snows regularly every winter. The limit of perennial snow in the H. is 16,200 feet on the south, and 17,400 feet on the north side; an anomaly probably owing to the dry atmosphere of Tibet, and the small quantity of rain and snow that falls there. The high range of the H. forms a vast screen which intercepts and condenses nearly all the moisture carried by the winds from the Indian Ocean, and deposits it on the southern face of the mountains; hence at Chirra Punji, 4200 feet above the sea, as much as 600 inches of rain has been known to fall in one year. Glaciers are found in every part of the range above the snow line, one of these, that of Deotal in Gurhwal, is 17,945 feet above the sea. The mean height of the passes in the H. is 17,800 feet, the highest known is Ibi-Gamin Pass into Gurhwal, 20,457 feet, and the highest used for traffic is the Parang Pass in Spiti, 18,500 feet above the sea. All the passes above 16,000 feet are closed with snow from November till May. Trees and cultivated grains attain their highest limits in the mountains at 11,800 and shrubs at 15,200 feet above the sea. The tea-plant can be cultivated along the entire southern face of the H. to an elevation of 5000 feet, but the best is produced at from 2000 to 3000 feet above the sea. Tigers and apes are found at an elevation of 11,000, and the leopard at 13,000 feet, while the dog follows the herds over passes 18,000 feet high. Snakes are found at an elevation of 15,000 feet, but the highest limit of the mosquito is 8000 feet above the sea. The geological structure of the Himalayas consists of crystalline rocks, with granite, gneiss, and a schistose formation, comprising micaceous, chloritic, and talcose schists. Earthquakes are of frequent occurrence in the central range. About the meridian of 82° E., near the Mansarowar Lake, a great transverse range, which further north is called the Giang-ri mountains, abuts against the H. from Tibet. This ridge forms the watershed between the Sanpu (afterwards the Brahmaputra) on the east, and the Indus and Ganges on the west. These vast river systems, with their magnificent tributaries, derive their chief supplies from the melting of the snows in the Himalaya, and consequently are in flood at the hottest season of the year when the moisture they supply is most needed.

On account of the majestic height of this mountain-range, and the apparent impossibility of reaching its summit, the imagination of the ancient Hindus invested it with the most mysterious properties, and connected it with the history of some of their deities. In the Purânas, the H. is placed to the south of the fabulous mountain Meru, which stands in the centre of the world (see MERU), and described as the king of the mountains, who was inaugurated as such when Prithu was installed in the government of the earth. As the abode of Siva, he is the goal of penitent pilgrims, who repair to his summit in order to win the favours of this terrific god. His wife was Menâ, whom the Pitris or demigods Vairâjas engendered by the mere power of their thought.

HI'NCKLEY, a manufacturing and market town of England, in the county of Leicester, 13 miles south-west of the town of that name, and 99 miles north-north-west of London. Its parish church, with a beautiful old oak roof, is supposed to have been erected during the reign of Edward III. H. has manufactures of cotton hosiery. Part of the town is in Warwickshire. Pop. (1871) 6902.

HI'NCMAR, a celebrated churchman of the 9th c., was born in 806. The exact place of his birth is unknown, but from his being of the family of the Counts of Toulouse, it is presumed to have been in that province. He was educated in the monastery of St Denis, and, with the sanction of the council of Paris (829), he was intrusted with the framing and carrying out a plan for the reformation of the monastery. Some time afterwards, he was named abbot of the abbeys of Compiègne and St Germain; and in 845 was elected Archbishop of Rheims. The most important event, considered historically, in the career of H., is his controversy with Pope Nicholas I. in the year 862 (see NICHOLAS I.). Rothadius, Bishop of Soissons, and suffragan of H., deposed a priest of his diocese, who appealed to H. as metropolitan, and was ordered by him to be restored to office. Rothadius resisting this order, and having been, in consequence, condemned and excommunicated by the archbishop, appealed to the pope, who at once ordered H. to restore Rothadius, or to appear at Rome in person or by his representative, to vindicate the sentence. H. sent a legate to Rome, but refused to restore the deposed bishop; whereupon Nicholas annulled the sentence, and required that the cause should again be heard in Rome. H., after some demur, was forced to acquiesce. The cause of Rothadius was re-examined, and he was acquitted, and restored to his see.

The conduct of H. is also historically interesting in relation to the temporal power of the medieval papacy (see POPES). Under the successor of Nicholas, Adrian II., a question arose as to the succession to the sovereignty of Lorraine on the death of King Lothaire, the pope favouring the pretensions of the Emperor Lewis in opposition to those of Charles the Bold of France. To the mandate which Adrian addressed to the subjects of Charles and to the nobles of Lorraine, accompanied by a menace of the censures of the church, H. offered a firm and persistent opposition. He was equally firm in resisting the undue extension of the royal prerogative in ecclesiastical affairs. When the Emperor Lewis III., in opposition to the solemn judgment of the council of Vienne, sought to obtrude an unworthy favourite, Odacer, upon the see of Beauvais, H. boldly remonstrated, and fearlessly denounced the unjustifiable usurpation. H. died in the year 882. His works were collected in two vols. folio by Père Sirmond, S. J. (Paris, 1645). Several other pieces of his are found in the 8th vol. of Labbe's *Collection of Councils*, and in the 5th vol. of that of Hardouin; as also in Père Cellot's *Concil. Duziac.* (Paris, 1658). Many others of his works, still in MS., are enumerated in Wetzer's *Kirchen-Lexicon*, v. 308.

HIND, the female of the Stag (q. v.) or Red Deer. The term is also sometimes used to designate the female of some other species of deer—never being so applied, however, to any other British or European species; and is sometimes even extended to female antelopes. In the strictest use of the term hind, according to the ancient laws and customs of 'venerie,' it did not become the designation of a female red deer until the third year of its age.

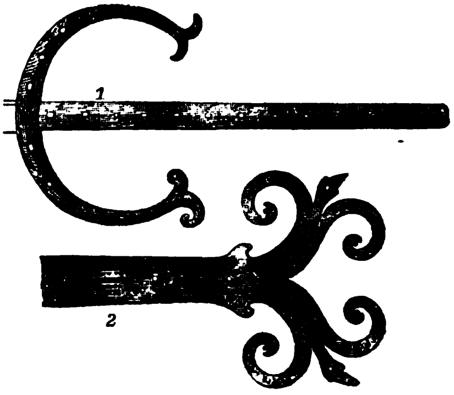
HIND, JOHN RUSSELL, an English astronomer, was born at Nottingham, May 12, 1823. At an early period he became an enthusiast in the study of astronomy, and in 1840 obtained, through the influence of Professor Wheatstone, a situation in the Royal Observatory at Greenwich, where he remained till June 1844. H. was then sent as one of the commission appointed to determine the exact longitude of Valentia, and on his return was appointed to a post in Mr Bishop's Observatory, Regent's Park, London. Here he made those observations, the results of which have rendered his name renowned in the scientific world. He has calculated the orbits and declination of more than seventy planets and comets, noted sixteen new movable stars, and three nebulæ, and discovered ten new planets, viz., Iris and Flora in 1847, Victoria in 1850, Irene in 1851, Melpomene, Fortuna, Calliope, and Thalia in 1852, Euterpe in 1853, and Urania in 1854. In 1851, H. obtained from the Academy of Sciences, Paris, the Lalande Medal, and was elected a corresponding member. In 1852, he obtained the Astronomical Society of London's gold medal, and a pension of £200 a year from the British government. He also superintends the publication of the *Nautical Almanac.* H.'s scientific papers have generally been published in the *Transactions of the Astronomical Society*, in the *Comptes Rendus* of Paris, and the *Astronomische Nachrichten* of Altona. H.'s popular works are—*Recent Comets and the Elements of their Orbits* (published in the *Athenæum*, August 9, 1845); *Astronomical Vocabulary* (16mo, 1852); *The Comets* (12mo, 1852); *The Solar System* (8vo, 1852); *Illustrated London Astronomy* (8vo, 1853). *Elements of Algebra* (Lond. 1855); *Descriptive Treatise on Comets* (1857), &c.

HINDU KUSH, or **INDIAN CAUCASUS**, forms the westward continuation of the Himalaya, being sometimes reckoned a part of that colossal range. It extends from the Upper Indus on the E. to the Bamian Pass (q. v.) on the W., stretching in N. lat. between 34° and 36°, and in E. long. between 68° and 75°. Separating Afghanistan on the S. from Turkestan on the N., it sends off the Oxus through the latter, and the Helmund through the former, to two salt lakes—the Oxus to Aral, and the Helmund to Hamûn. The loftiest summit is Hindu Koh, situated about 80 miles to the north of the city of Cabul, and estimated to be more than 20,000 feet above the sea. Unlike the Himalaya Proper, the chain is a water-shed, and is also remarkably destitute of timber; while, like the ridge in question, it presents an appearance of much greater height towards the south than towards the north.

HINDU LAW, RELIGION, &c. See INDIA.

HINDUSTA'N, meaning *The Land of the Hindus*, is a term of the same class as Turkestan, Afghanistan, Farsistan, Beloochistan, or Frangistan (the oriental name of Western Europe). See INDIA.

HINGE, the pivots or joints on which doors, shutters, &c. revolve. The simplest form of hinge is a projection cut upon the substance of which the door is made, and fitted into a hole. This is sometimes done with wooden shutters, and there are examples extant of *stone shutters* hinged in this manner. The cathedral of *Torcello*, near Venice, which dates from the 11th c., still has the windows protected with shutters formed of large slabs of stone, hinged on stone pivots. During the middle ages, hinges, as well as every other useful article, were made subjects of ornamentation. The earliest ornamental hinges date from about the 10th century. The first examples are cramped and stiff, and the scrolls are frequently terminated with animals' heads. In the early English and decorated styles, the hinges and other metal-work were very elaborate and beautiful in design, and frequently extended over the whole of the doors. In the perpendicular style, hinges were usually very simple in form, the panelling of the wood-work not admitting of much ornamental iron-work. In modern times, hinges have almost entirely lost their ornamental character. They are chiefly made of brass and iron, and fitted on the edges of the doors and shutters, where they are concealed. 'Double-jointed edge-hinges' are those now most in use. The revival of medieval architecture has, however, given an impulse to the manufacture of ornamental metal-work, and hinges of varied and good design are now generally used in connection with Gothic architecture.



Hinge (copied from Parker's *Glossary of Architecture*): 1, Compton, Berks; 2, Laon cathedral.

HINNOM, VALLEY OF. See GEHENNA.

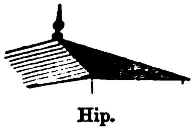
HINNY, the hybrid produced between a horse and a female ass. It is smaller than a mule, but the body is more bulky in proportion to the legs, and its strength is inferior. It is less valuable than the mule, although it is more docile. The hinny is rare. It was described by some of the earlier naturalists as a hybrid between the ox and the ass, and even Buffon seems to have entertained this notion.

HINOJOSA-DEL-DUQUE, a town of Spain, in the province of Cordova, and 45 miles north-west of the city of that name, consists of spacious streets, with neat white-washed houses, each with a garden or court attached. It has several convents and hospitals, and linen and woollen manufactures. Pop. between 7000 and 8000.

HIOUEN-THSANG, a celebrated Chinese traveller, professing the Buddhist creed, who visited 110 countries and places of India in the first half of the 7th c. (629—645), and gave a very detailed and interesting account of the condition of Buddhism as it prevailed at that period in India. His inquiries having been chiefly devoted to the objects of his veneration, he did not enter so much into details concerning the social and political condition of India as might be desired; but considering the many curious notices he gives on other matters which, besides those of Buddhist interest, came under his observation, and the high degree of trustworthiness which his narrative possesses, his memoirs must be looked upon as one of the most important works on the history of India in general, and of Buddhism in particular, during the period stated. Apparently, he travelled alone, or with a few occasional companions; and wearing the garb of a religious mendicant, with nothing but a staff, wallet, and waterpot, he does not seem to have been exposed to any dangerous adventures on his journey from China to India. It is more remarkable, however, that he incurred no impediment on his way home, when he travelled with 500 packages of books, besides images of Buddha and various sacred relics; and his immunity from danger affords a remarkable proof of the civilised condition of the countries which he described. It does not appear that the account of his travels was written by himself, for of the two works relating to them neither is the performance of Hiouen-Thsang. The first is a bibliographical notice of him, in which his travels form a principal feature; it was composed by two of his pupils, Hoeï-li and Yen-Thsong. The latter bears the title of *Ta-thang-si-yu-ki*, or 'Memoirs of the Countries of the West, published under the Thang,' and was edited by Pien-ki, since H. himself, who during 17 years had spoken none but foreign languages, had perhaps lost the facility of writing elegant Chinese. According to a remark added to the title of his work in the imperial Chinese edition, it would follow that it had been translated from Sanscrit into Chinese; but this statement, as Professor Stanislas Julien observes, can only mean that the fundamental part of the work relating to history, legends, &c., was taken from Hindu sources, since it is obvious that the indication of distances and numerous personal observations must have come from H. himself. Both works have been published in a French translation by the distinguished Chinese scholar, M. Stanislas Julien, who has acquitted himself of the great and peculiar difficulties of his task in so creditable a manner, that his *Histoire de la Vie de Hiouen-Thsang* (Paris, 1853), and his *Mémoires sur les Contrées Occidentales, par Hiouen-Thsang* (2 vols. Paris, 1857—1858), have not only become indispensable to the student of Chinese and Sanscrit literature, but will be a lasting honour to M. Julien's industry and scholarship. An abstract of both works, by the late Professor H. H. Wilson, appeared in the 17th volume of the Journal of the Royal Asiatic Society, pp. 106—137.

HIP, or **HEP**, the fruit of the rose. It is almost always red, and consists of the enlarged fleshy tube of the calyx filled with hard seed-like *achænia*, which are surrounded with bristly hairs (*setæ*). The fleshy covering contains mucilage, sugar, gum, malic and citric acids, tannin, resin, and a number of salts. The setæ excite itching in the skin. The fleshy part of hips, beaten to a pulp, and preserved with sugar, finds a place in the pharmacopœia, under the name of Conserve of Hips (*Conserva Rosæ Fructûs*, *Confectio Rosæ Caninæ*, &c.). It is slightly refrigerant and astringent, and is often used as a vehicle or basis for other medicines. Hips eaten entire are a popular remedy for ascarides, on which their action is purely mechanical, and is owing to the irritating setæ. The hips of different species of rose are almost indiscriminately used. In some parts of Europe, hips are preserved in sugar as an article of food, or are dried and used in soups and stews, the achænia and setæ being removed. For this purpose, the large soft hips of the Apple Rose (*Rosa pomifera*) are preferred.

Hip (*Rosæ Caninæ*):
a, hip opened, shewing position of seeds; *b*, a seed.

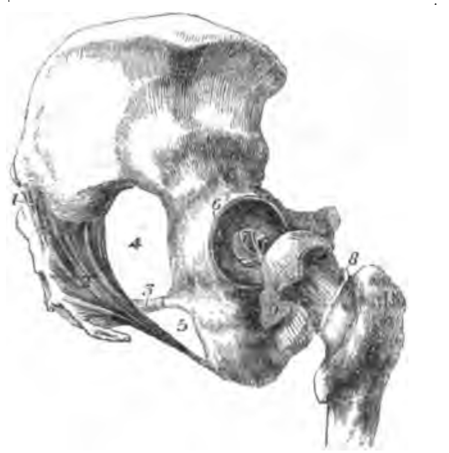


Hip.

HIP, in Architecture, the rafter at the angle where two sloping roofs meet. A roof is called a hipped roof when the end is sloped upwards so as to form a hip on each side (see fig.).

HIP-JOINT, is a ball-and-socket joint formed by the reception of the globular head of the thigh-bone (or femur) into the deep pit or cup in the *os innominatum*, which is known as the *acetabulum* (so called from its resemblance to the vinegar cups used by the Romans). If the variety of the movements of this joint—viz., flexion, extension, abduction, adduction, and rotation inwards and outwards, and at the same time its great strength are considered, it may well claim to be regarded as the most perfect joint in the whole body.

The reader will form a tolerably clear conception of the relative forms of the acetabulum and the head of the thigh-bone from a glance at the figure, in which the surrounding parts are cut away, and the thigh-bone is drawn out of its socket. The ligaments are usually described as five in number—viz.: 1. The capsular; 2. The ilio-femoral; 3. The *teres* or round; 4. The cotyloid; and 5. The transverse. Of these, the capsular ligament, supposed to be removed in the figure, is the most important, and extends from the edge of the cup to the circumference of the neck upon which the ball is carried, enclosing the bony parts in a strong sheath. The ilio-femoral is merely an accessory band of fibres which give increased thickness to the capsular ligament in front, where strength is specially required. The great use of the capsular ligament is to limit the extension of the hip-joint, and thus to give steadiness to the erect posture. The only other ligament requiring notice is the *L. teres*, or round ligament, which is in reality triangular rather than round, and has its apex attached to the head



Hip-joint:
1, 2, 3, pelvic ligaments; 4, 5, the greater and lesser sacro-ischiatic foramina; 6, the cotyloid ligament; 7, the round ligament; 8, the cut edge of the lower part of the capsular ligament.

of the thigh-bone, while its base is connected with the cavity of the acetabulum. Its use is not very clearly known, but probably is, to limit movement in one direction. It is sometimes absent in cases in which no special weakness of the joint was observed during life, and is of by no means constant occurrence in mammals. The joint is much strengthened by a large number of surrounding muscles, some of which are of considerable power.

In such a joint as this, although the ligaments materially assist in preventing dislocation, it is obvious that the articular surfaces cannot, under ordinary circumstances, be kept in apposition by them, inasmuch as they must be loose in their whole circumference, to permit of the general movements of the joint. The experiments of Weber shew that atmospheric pressure is the real power by which the head of the femur is retained in the acetabulum when the muscles are at rest. 'One convincing experiment is easily repeated—that, namely, of holding up a side of the pelvis, with its appended lower extremity, the joint not having been opened, and then boring a hole through the acetabulum, so as to admit air into the joint, when the weight of the limb will cause it to drop from half an inch to an inch, the head of the thigh-bone being pulled out of the acetabulum as soon as the air is permitted to pass between the articular surfaces.' —Humphry *On the Human Skeleton*, p. 74.

DISEASE OF THE HIP-JOINT. Hip-disease differs in so many points of importance from other joint-diseases, and is so serious an affection, that it requires a special notice. Its connection with scrofula is more distinctly marked than that of most other joint-diseases, and it almost always occurs before the age of puberty. It comes on, in children or young persons of a scrofulous constitution, from very slight causes; thus, it is often traced to over-exertion in a long walk, a sprain in jumping, or a fall; and in many cases no apparent cause can be assigned.

In the early stage of the disease, the whole of the structures of the joint are inflamed, and by proper treatment at this period, the morbid action may be sometimes subdued without any worse consequences than a more or less rigid joint. Usually, however, abscesses form around the joint, and often communicate with its interior; and the acetabulum, and the head and neck of the thigh-bone, become disintegrated, softened, and gritty. In a still more advanced stage, dislocation of the head of the thigh-bone commonly occurs, either from the capsular ligament becoming more or less destroyed, and the head of the bone being drawn out of its cavity by the action of the surrounding muscles, or from a fungous mass sprouting up from the bottom of the cavity, and pushing the head of the bone before it.

It is of extreme importance that the symptoms should be detected in an early stage of the disease; and on the least suspicion of this joint being affected, surgical aid should at once be sought.

As the disease advances, abscesses (as already mentioned) occur around the joint, which sometimes, from the tension they exert on the obturator nerve, occasion extreme pain in the inside of the thigh. True shortening of the limb now takes place, which at the same time becomes adducted and inverted. From this stage, if the health is pretty good, and the lungs are sound, the patient may be so fortunate as to recover with an anchylosed (or immovable) hip-joint; but the probability is that exhaustion and hectic will come on, and that death will supervene, from the wasting influence of the purulent discharges occasioned by the diseased bone.

The duration of the disease may vary from two or three months to ten or more years.

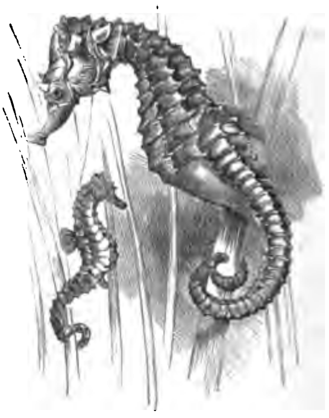
As the treatment must be left entirely in the hands of the surgeon, it is unnecessary to say more than that the most important points are *perfect rest* to the affected part, which may be secured by a strong leather splint, or by a starch bandage, the internal administration of cod-liver oil and tonics, and the application of counter-irritation by means of an issue behind the great trochanter.

HIP-KNOB, an ornament carved in stone or wood, set on the apex of a gable or hipped roof, and forming a kind of Finial (q. v.).

HIPPA'RCHUS, the first systematic astronomer on record, was born, according to Strabo, at Nicæa, in Bithynia, about the beginning of the 2d c. B. C. Of his personal history, nothing is known. According to Fabricius, H. wrote nine separate works, of which only the last and least important, *A Commentary on Aratus*, has come down to us. The other works treated of astronomy and geography. The only authority we have regarding the discoveries made by H. is the *Syntaxis* of Ptolemy, and from it we learn that H. discovered the 'precession of the equinoxes,' determined the place of the equinox among the stars, established the solar and lunar theories, invented the Astrolabe (q. v.), and drew up a catalogue of upwards of 1000 stars, determining the longitude and latitude of each. As Ptolemy was also an astronomer, there is some difficulty in allotting to each his meed of praise for the discoveries mentioned in the *Syntaxis*, which difficulty has given rise to much discussion, resulting in favour of the claims of Hipparchus. See Delambre's *Histoire de l'Astronomie Ancienne* (Paris, 1817).

HIPPOBOSCIDÆ. See FOREST FLY and SPIDER FLY.

HIPPOCA'MPUS, a genus of Osseous Fishes, of the order *Lophobranchii* (q. v.), and of the family *Syngnathidæ* (see PIPE-FISH), by some naturalists made the type of a separate family, *Hippocampidæ*, remarkably distinguished by the prehensile tail, which is tapering, and quite destitute of fin. The species, which are not very numerous, but some of which are found in the seas of all parts of the world, are fishes of very extraordinary form and habits. They have the jaws united and tubular, as in the pipe-fishes; the body compressed, short, and deep; the whole length of the body and tail divided by longitudinal and transverse ridges, with tubercles at their intersections. The scales are ganoid, clothing the whole body in a kind of armour. The males have pouches on the tail, in



Hippocampus Brevirostris.

which the eggs are carried till they are hatched. From their appearance, these fishes have received the name of SEA-HORSE. They swim in a vertical position, and are always ready to entwine their tails around sea-weeds, or even with one another. They are very interesting objects in an aquarium. One species, *H. brevirostris*, is occasionally found on the shores of Britain, particularly in the south.—H. in the Grecian mythology was a sea-horse—half fish, half horse—which served Poseidon (Neptune).

HIPPOCRAS, an aromatic medicated wine, formerly much used in this country, and still employed on some parts of the continent. The following was the method of preparing it: Twelve pints of Lisbon were mixed with an equal quantity of Canary wine. Bruised spices of various kinds were digested in the wine for three or four days, after which it was strained, and two pounds and a half of lump-sugar were added. It was doubtless an admirable cordial.

HIPPO'CRATES, the most celebrated physician of antiquity, was the son of Heracleides, who was also a physician, and belonged to the family of the Asclepiadæ, the subject of the present notice being either the 19th or the 17th in descent from Æsculapius. His mother's name was Phænarete, who was said to be descended from Hercules. He was born in the island of Cos, probably about the year 460 B.C. He is said to have been instructed in medicine by his father and by Herodicus, and in philosophy by Gorgias of Leontini, the celebrated sophist, and Democritus of Abdera, whose cure, when affected by madness, he afterwards effected. After spending some time in travelling through different parts of Greece, he settled and practised his profession at Cos, and finally died at Larissa, in Thessaly. His age at the time of his death is uncertain, and is stated by different ancient authors to have been 85, 90, 104, and 109 years. Clinton (*Fasti Hell.*) places his death 357 B.C., at the age of 104. We know little more of his personal history than that he was highly esteemed as a physician and an author, and that he raised the medical school of Cos to a very high reputation. His works were studied and quoted by Plato. Various stories are recorded of him by Greek writers, which are undoubtedly fabulous, and to which it is therefore unnecessary to advert; and we find legends regarding him in the works of Arabic writers, who term him 'Bokrât,' while the European story-tellers of the middle ages celebrate him under the name of 'Ypocras,' and, in defiance of chronology, make him professor of medicine at Rome, with a nephew of wondrous medical skill, whom he despatched in his own stead to the king of Hungary.

The works bearing the name of H., and termed the Hippocratic Collection, are more than 60 in number, and, as Dr Greenhill observes in his article on H. in Smith's *Dictionary of Greek and Roman Biography*, &c., 'the classification of these, and assigning each (as far as possible) to its proper author, constitutes by far the most difficult question connected with ancient medical writers.' Dr Greenhill divides the Hippocratic Collection into eight classes, of which we need specify only two. (For convenience, we give the Latin instead of the Greek titles.)

Class I.—Works *certainly* written by H., containing *Prognostica; Aphorismi; De Morbis Popularibus; De Ratione Victus in Morbis Acutis; De Aëre, Aquis, et Locis;* and *De Capitis Vulneribus.* Some eminent critics doubt the genuineness of some portions of the *Aphorismi*, the work by which H. is most popularly known.

Class II.—Works *perhaps* written by Hippocrates. These are eleven in number, and one of them is the well-known *Jusjurandum*, or 'Hippocratic Oath.'

The others consist of works written before H.; works whose author is conjectured; works by quite unknown authors; and wilful forgeries.

For anything like a full account of his views, we must refer to the various writers who have treated of the history of medicine. We can here only mention that he divides the causes of disease into two principal classes: the first consisting of the influence of seasons, climates, water, situation, &c.; and the second of more personal causes, such as the food and exercise of the individual patient. His belief in the influence which different climates exert on the human constitution is very strongly expressed. He ascribes to this influence both the conformation of the body and the disposition of the mind, and hence accounts for the differences between the hardy Greek and the Asiatic. The four fluids or humours of the body (blood, phlegm, yellow bile, and black bile) were regarded by him as the primary seats of disease; health was the result of the due combination (or *crasis*) of these, and illness was the consequence of a disturbance of this crasis. When a disease was proceeding favourably, these humours underwent a certain change (or *coction*), which was the sign of returning health, as preparing the way for the expulsion of morbid matter, or *crisis*, these crises having a tendency to occur at definite periods, which were hence called 'critical days.' His treatment of diseases was cautious, and what we now term expectant; it consisted chiefly and often solely in attention to diet and regimen; and he was sometimes reproached with letting his patients die by doing nothing to keep them alive.

The works of H. were translated at an early period into Arabic. They were first printed in a Latin translation in 1525 at Rome. The first Greek edition (the Aldine) appeared the following year at Venice; an edition by Mercurialis appeared in 1588, one by Foësius in 1595, and one by Van der Linden (still much esteemed) in 1665. Other editions have appeared under the editorship of Chartier, Kühn, &c. The latest, and incomparably the best edition, is that of Littré, in 10 volumes, the first of which appeared in 1839, and the last in 1861. An edition by Ermerins, with a Latin translation, is now in course of publication at Utrecht, at the expense of the university of Amsterdam. The Latin title runs as follows: *Hippocratis et aliorum Medicorum veterum Reliquiæ. Edidit Franciscus Zacharias Ermerius.* The first three volumes appeared between 1859 and 1863. An excellent English translation of *The Genuine Works of Hippocrates* was published in 1849, in 2 vols., by the late Dr Adams, under the auspices of the Sydenham Society.

HIPPOCRE'NE (derived from *hippos*, a horse, and *krênê*, a fountain) is a fountain on Mount Helicon, about 20 stadia above the grove of the Muses, and, according to the mythical account, was produced by a stroke from the hoof of the horse Pegasus (q. v.). It was sacred to the Muses. In modern times, some have attempted to identify it with a fine spring at Makaristissa, and this opinion is most probably correct. See HELICON.

HIPPODAMI'A, the beautiful daughter of Œnomaus, king of Pisa, in Elis, and the Pleiad Asterope. It had been predicted to her father that he should be slain by his future son-in-law; he therefore stipulated that every suitor of his daughter should run a chariot-race with him, and that death should be the consequence of defeat. Thirteen, or, as some say, seventeen suitors had already been conquered and slain, when Pelops came to Lydia. Pelops bribed Myrtilus, the king's charioteer, and thus succeeded in reaching the goal before Œnomaus, who, in despair, killed himself. H. became the wife of Pelops, and the mother of Atreus and Thyestes. She afterwards destroyed herself from grief, at being reproached with having led her sons to murder each other.

HI'PPODROME (Gr. *hippos*, a horse, and *dromos*, a race-course), the Greek name for the place set apart for horse and chariot races. Its dimensions were, according to the common opinion, half a mile in length, and one-eighth of a mile in breadth. In construction and all important points of arrangement, it was the counterpart of the Roman Circus (q. v.), with the exception of the arrangement of the chariots at the starting-place. In the hippodrome, the chariots were arranged so as to form two sides of an isosceles triangle, with the apex towards the goal and a little to the right side. But as this would have given the chariots on the left side a longer course than those on the right, the hippodrome was constructed with the right side longer than the other (see figure of CIRCUS). The start was effected by setting free the chariots on the extreme right and left, and when they came opposite the next two, by setting them free also, and so on till all were in motion. The hippodrome was also much wider than the Roman circus, to allow room for the greater number of chariots, for though we have no precise information as to the number that usually started in one race, we know that Alcibiades on one occasion sent seven; Sophocles mentions ten chariots as competing at the Pythian games; and the number at the Olympic games must have been considerably greater. There is a beautiful description of a chariot-race in Homer (*Iliad*, xxiii. 262—650). The golden age of the hippodrome was during the Lower Greek Empire. The Blue and Green factions in the hippodrome carried their animosity into all departments of the public service, and laid the foundation of that perpetual disunion which rendered the Byzantine empire a prey to every aggressor.—The term Hippodrome has been given to a circus constructed in 1845 at Paris, and also to a large field in the plain of Longchamp, near Boulogne, used as a race-course.

HI'PPOGRIFF, or HIPPOGRYPH (Gr. *hippos*, a horse, and *gryph-*, griffin), a fabulous animal, which has been represented as a winged horse, with the head of a griffin. The hippogriff figures largely in the *Orlando Furioso* of Ariosto.

HIPPO'LYTUS, the name of several saints and martyrs of the early church, among whom the chief interest is concentrated upon one who is believed to have flourished in the early part of the 3d c., to have been Bishop of Portus, near Rome, and to have suffered martyrdom under Alexander Severus. All the facts connected with the history of this saint have long been the subject of much doubt and controversy; and the interest of the discussion has been much heightened of late years by the discovery of a very curious and important work, certainly of the age of the supposed H., and calculated, if a genuine work of that author, to throw a most curious light upon the early history of the church. The work in question was one of several Greek MSS. obtained at Mount Athos in 1842, by M. Menas, an agent of the French government, and was published in 1851, at the expense of the university of Oxford, to which it was recommended as a work of exceeding interest for the history of the early church, by M. Emmanuel Miller, who undertook the task of editing it. M. Miller published it as a work of Origen, under the title of *Origenis Philosophumena*. The late Baron Bunsen was the first to conjecture that the true author was H., but he was mistaken as to the particular work of H., which he took it to be; and for a time the question of the authorship remained in much uncertainty. Some critics still adhered to the opinion that the author was Origen; some ascribed the work to the Roman priest Caius; others, again, to Tertullian; and others, in fine, to some unknown Novatian heretic. The result of the discussion, however, seems to be, that although Bunsen was mistaken in supposing this treatise to be a work of H., which Photius has described as a '*little treatise* against heresies,' by that author, yet it is in reality a *larger treatise* on the same subject and by the same author.

There still remained, however, a further question, namely, Who is the H. who is to be regarded as the author? Without reckoning many later saints of that name, Dr Döllinger, in his *Hippolytus und Kallistus*, enumerates at least six contemporaneous, or nearly contemporaneous, with the supposed H. of Portus. It must suffice to state, that although not absolutely certain, the opinion that the author of the *Philosophumena* was the H. already known in the ancient church as a writer and as a martyr, has met with almost universal acceptance.

From the autobiographical details contained in the treatise, added to the particulars already known, we learn that this H., the time and place of whose birth are uncertain, was, about the year 218, Bishop of Portus, near Ostia, a suburban see of Rome, and as such, a member of the ecclesiastical council of that city. This fact receives a very decisive confirmation from a statue discovered in Rome in 1561, inscribed with the name of H., the title of his see, 'Portuensis,' and the paschal cycle of which H. is known to have been the author. In the persecution of Maximin, 235, H. was exiled to the island of Sardinia, from which he was permitted soon afterwards to return; but in a new outbreak of the persecution, he was put to death, probably in 238. Probably, from the connection of his see with the Roman Church, H. took an active part in the affairs of that church, and placed himself in violent opposition to the Bishop Callistus, whom he denounces in the treatise in the most unmeasured terms, both as to his private character and his public administration, as a person of most disreputable antecedents, as well as criminally lax in the government of the church, and especially in the administration of penance, after his election to the see. The tone which he adopts towards the Roman bishop, indeed, is so disrespectful as to appear to the Protestant critics a clear and conclusive evidence that, in the church of the 3d c., that bishop cannot have possessed the supremacy which the advocates of the papal pretensions ascribe to him. It is difficult, in truth, to conceive any bishop in the modern Roman system addressing the pope in such terms as those which H. applies to Callistus.

The Roman Catholic critics reply, that the very violence of the language employed, and the unscrupulous nature of the imputations, contain their own refutation; and they contend that no argument can be founded on H.'s opposition to the authority of the Roman bishop, inasmuch as not only the opinions expressed in this very treatise, but also the direct testimony of Prudentius (Hymn xi. v. 170—180), shew him to have been tainted with the Novatian heresy, or rather, although somewhat earlier, with the same opinions which in Novatus were condemned as heretical, and which eventuated in the Novatian schism. The validity of this plea, however, is strongly controverted by Bunsen. The works of H., which are numerous, and which comprise dogmatical, exegetical, ascetic, and chronological treatises, were first published in a collected form by Fabricius, at Hamburg, 1716—1718. They are also found in the second volume of Gallandus.—See Bunsen's *Hippolytus and his Age* (1852; 2d ed. 1854); Miller's *Origenis Philosophumena* (Oxford, 1851); Döllinger's *Hippolytus und Kallistus* (Regensburg, 1853); Wordsworth's *St Hippolytus and the Church of Rome in the Third Century* (Lond. 1853).

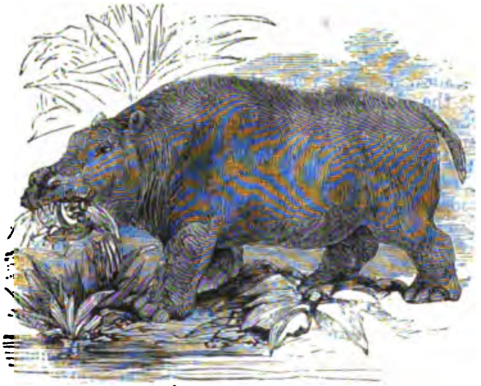
HI'PPOMANE. See Manchineel.

HI'PPOPHAË. See Sallow-thorn.

HIPPO'PHAGI ('eaters of horse-flesh,' from Gr. *hippos*, a horse, and *phagein*, to eat), according to the accounts of the old geographers, were a Scythian people, living north-east of the Caspian Sea, where roam, at the present day, the Kalmuck hordes, who, retaining all the peculiarities of the old Scythians, still regard horse-flesh as a dainty. In Europe, repeated attempts have been made in modern times to introduce the practice, which has even been defended on economical grounds, but as yet they have failed to create a public *taste* for horse-flesh.

HIPPOPO'TAMUS (Gr. river-horse), a genus of pachydermatous quadrupeds, constituting a family by itself, and of which, until very recently, only one species was known as now existing, although the fossil remains of others indicate the greater abundance and wider distribution of the form in other periods of the earth's history. The largest and best known species, *H. amphibius*, is—or, within historic periods, has been—found in almost all parts of Africa, to which quarter of the globe it is entirely confined. A smaller species, *H. Liberiensis*, has recently been described as an inhabitant of the rivers of Western Africa within the tropics, and is said to differ remarkably from the common species, and from all the fossil species in having only two incisors, instead of four, in the lower jaw. The common H. is one of the largest of existing quadrupeds, the bulk of its body being little inferior to that of the elephant; although its legs are so short that its belly almost touches the ground, and its height is not much above five feet. It is extremely aquatic in its habits, living mostly in lakes or rivers, often in tidal estuaries, where the saltness of the water compels it to resort to springs for the purpose of drinking, and sometimes even in the sea, although it never proceeds to any considerable distance from the shore. Its skin is very thick—on the back and sides, more than two inches; it is dark brown, destitute of hair, and exudes in great abundance from its numerous pores a thickish oily fluid, by which it is kept constantly lubricated. The tail is short. The feet have each four toes, nearly equal in size, and hoofed. The neck is short and thick. The head is very large, with small ears, and small eyes placed high, so that they are easily raised above water, without much of the animal being exposed to view. The muzzle is very large, rounded, and tumid, with large nostrils and great lips concealing the large front teeth. The H. cuts grass or corn as if it were done with a scythe, or bites with its strong teeth a stem of considerable thickness neatly through. The skull, while it is distinguished by remarkable peculiarities, corresponds in the most important characters with that of the hog. The respiration of the H. is slow, and thus it is enabled to spend much of its time under water, only coming to the surface at intervals to breathe. It swims and dives with great ease, and often walks along the bottom, completely under water. Its food consists chiefly of the plants which grow in shallow waters, and about the margins of lakes and rivers; and it probably renders no unimportant service in preventing slow streams from being choked up by the luxuriance of tropical vegetation, the effect of which would, of course, be an increase of the extent of swampy land. It often, however, leaves the water, chiefly by night, to feed on the banks, and makes inroads on cultivated fields, devouring and trampling the crops. It is a gregarious animal; and the havoc wrought by a herd of twenty or thirty is very great, so that wherever cultivation extends, war is waged against the H., and it disappears from regions where it formerly abounded. Thus it is no longer found in Lower Egypt, although still abundant further up the Nile. It is taken in pits, which are digged in its usual tracks; it is killed by poisoned spears, is pursued by means of canoes, is harpooned, and is shot with the rifle. The flesh is highly esteemed; the fat, of which there is a thick layer immediately under the skin, is a favourite African delicacy, and when salted, is known at the Cape of Good Hope as *Zee-koe speck*—that is, Lake-cow bacon. The tongue, and the jelly made from the feet, are also much prized. The hide is used for a variety of purposes; and the great canine teeth are particularly valuable as ivory, and are a very considerable article of African commerce.

The H. is lively and playful in its native waters; it soon learns to avoid man, and when it cannot retire among reeds for concealment, it dives and remains long under water, raising only its nose to the surface when another breath becomes necessary. The female H. may sometimes be seen swimming with her young one on her back. The H. is generally inoffensive, but is occasionally roused to fits of rage, in which it becomes extremely dangerous, particularly to those who pursue it in boats. The voice of the H. is loud and harsh, and is likened by Burckhardt to the creaking and groaning of a large wooden door. That the H. is capable of being tamed, and of becoming much attached to man, has been sufficiently proved by the instances of living specimens in London and Paris. The first H. brought to Europe in modern times, a young one from the Nile, arrived in London in 1850. The H., however, sometimes appeared in the spectacles of the ancient Romans. It is very generally supposed to be the Behemoth of the book of Job.



Hippopotamus (*H. amphibius*).

Fossil species.—Some six species of H. have been described from the later Tertiary strata—the Pleiocene and Pleistocene of Lyell. They occur in fresh-water marls, and in the bone-caves, into which they had been carried for food by the carnivorous animals that used the caves as dens. One species found in England and in considerable abundance in the southern countries of Europe, was of a size as much greater than the living species, as its companion, the mammoth, was greater than the living elephant.

HIPPU'RIC ACID ($C_{18}H_8NO_5,HO$) is a compound of great interest both to the chemist and to the physiologist. It derives its name from its having been first discovered in the urine of the horse, and that fluid, or the renal secretion of the cow, affords us the best and readiest means of obtaining it. The crystals of hippuric acid are moderately large, colourless, but subsequently becoming milk-white, four-sided prisms, which are devoid of odour, but have a faintly bitter taste. They dissolve readily in boiling water and in spirit, but are only sparingly soluble in cold water and in ether. Its chemical bearings shew that hippuric acid is intimately associated with benzoic acid on the one hand, and with glycine (or glycocoll) on the other. The acid is a product of the metamorphosis of the bodily tissues, especially of herbivorous animals. It is a normal constituent of the urine of the horse, cow, sheep, goat, hare, elephant, &c.; and most probably is to be found in the urine of all vegetable feeders. In the human urine of healthy persons living on an ordinary mixed diet, it occurs in very small quantity, but it is increased by an exclusively vegetable diet, and in the well-known disease diabetes.

Although hippuric acid usually occurs in mere traces in human urine, we can artificially produce it at will in the body, and cause it to be eliminated in comparatively large quantity by the kidney. If we swallow benzoic acid, it seems to take up glycine or the elements of glycine in its passage through the system, and thus to form hippuric acid, which appears abundantly in the urine. The hippuric acid occurring in the animal organism exists in combination with bases, and chiefly as hippurate of soda and hippurate of lime. The last-named salt can be obtained by the mere evaporation of the urine of the horse.

HIPPURITES, a very remarkable genus of fossil bivalve shells, peculiar to the Cretaceous strata, and so abundant in some of the Lower Chalk beds of the Pyrenees and other places, that the series has received, from some continental geologists, the name of Hippurite Limestone. The external form of the shell is so anomalous, that the genus has been tossed about by naturalists in an extraordinary manner; some have called it a coral, others an annelid, others a balanus, but the majority hold it to be a mollusc, differing, however, among themselves whether it is a brachiopod, a conchifer, or a cephalopod. The true relation of the genus has been lately determined by Mr S. P. Woodward, who has published a full description of its curious and anomalous structure in the *Journal of the Geological Society*, vol. xi. p. 40. He has shewn that it is a lamellibranchiate mollusc. The lower and fixed valve is produced and tapering, in some species reaching a length of more than a foot. On the one side are three furrows, representing the siphonal, muscular, and ligamental inflections of the shell. The upper and free valve formed a flat covering to the large lower valve. Sixteen species have been described.

HIRING is a contract by which one employs, for a limited time, another's property or labour for some consideration or reward. Where the thing hired is land or houses, see LANDLORD AND TENANT. In the Roman law, hiring was divided into—1. *Locatio rei*, or the hiring of a thing; 2. *Locatio operis faciendi*, or the hiring of work and labour; 3. *Locatio custodiæ*, or the hiring of care and services to be performed or bestowed on the thing delivered; 4. *Locatio operis mercium vehendarum*, the hiring of the carriage of goods from one place to another. These phrases are still sometimes employed both in the law of England and Scotland, but the subjects are more conveniently treated under other heads: see INN, LODGINGS, SERVANTS, CARRIERS, SHIPPING. The only branch of the subject which seems to fall properly under this head, is the hiring of task-work or job-work. Sometimes it is difficult to establish a contract of this kind, but in general there must be either an express or implied contract to pay for the services. Thus, if A, seeing B's horse running away, at some expense catches it, and brings it back to B, there having been no contract or engagement on B's part to pay, he is not bound to pay A for his services, however beneficial they have been, nor can A keep B's horse till such expenses are paid. So, if B has deposited a chattel with A, who has incurred extraordinary expense in preserving it, B is not bound to pay anything. In the Roman law, however, and in the law of Scotland, A could keep the horse or chattel till he was repaid his expenses, or he could sue B for these. In England, however, there must at least be some implied request or contract. When a person is hired to do a thing in a given time, and takes much longer, or deviates from the contract, he is nevertheless entitled to be paid for his services, for the contract is not rescinded on these grounds, unless there was an express stipulation to that effect. During the progress of the contract, it is sometimes material to know which of the parties bears the loss in case of fire. It is difficult to lay down the rule in such cases, for everything depends on the nature of the contract. Whoever is the owner, in law, of the material at the time, bears the loss of it by an accidental fire. If, for example, a tailor engage to make a coat and to furnish the materials for a fixed sum, this is, in fact, two contracts—viz., a sale of the materials, and also work and labour bestowed on them; and in case of destruction of the subject before completion, the loss of the materials falls on the hirer, and the loss of the labour falls on the workman. So if a printer engaged for a fixed sum per sheet to print and complete a book, the hirer would bear the accidental loss of the paper, and the printer the loss of his labour and skill. Much, however, depends in all these cases on the terms of the contract. Where a workman engages to do work, he impliedly warrants to have reasonable skill, otherwise, if the work is useless, he cannot recover his money. In the case of robbery while goods are in the hands of a workman to work up, if the robbery resulted from his negligence, he bears the loss. So if he merely lost it. In case of a horse or chattel being hired, and accidental damage done, the *onus* in England lies on the owner to prove negligence in the hirer; but in Scotland the contrary rule prevails, and it lies on the hirer to prove he used due care.

HI'RSCHBERG, an important manufacturing town of Prussia, in the province of Silesia, is romantically situated at the foot of a mountain, and at the confluence of two streams, the Bober and the Zacken, 30 miles south-west of Liegnitz. The town is ancient, and is still girt about by a double line of walls. Its Protestant church, a Gothic edifice, is worthy of mention for its beauty, its magnitude, and its excellent organ. H. is the centre of the extensive linen and other manufactures of the district. Pop. (1871) 11,780.

HISPA'NIA, the name by which Spain was known to the Romans. According to W. von Humboldt, it is only a modified form of the original name, which he derives from *Ezpaña*, a Basque word, meaning a 'border' or 'limit,' and which he understands to imply that the country formed the margin of Europe towards the Western Ocean. Of the other ancient names of the country, the chief are *Iberia*—the common designation among the Greeks, and believed to denote specially the region of the Iberus (modern Ebro)—and *Hesperia*, on account of its western situation.

Little definite or accurate knowledge of H. was possessed before the time of the Romans. The conquests of the Carthaginians first excited the alarm of the Romans, and led to the struggle on Spanish soil of these two great rivals. The triumph of the Romans, as every reader knows, was ultimately complete, and for the next two or three centuries, these indefatigable conquerors set themselves to the thorough subjugation of the whole country. This was finally effected in the time of Augustus, who also founded many Roman cities, adorned with splendid architecture, such as Cæsar Augusta (*Zaragoza*), Emerita Augusta (*Merida*), Pax Julia (*Beja*), Pax Augusta (*Badajoz*), Legio VII. Gemina (*Leon*), &c. In addition, that emperor completed the system of military roads across the peninsula—one of the great features of Roman conquest everywhere—begun as early as 124 B. C., and thus threw open Spain from end to end; so that great numbers of Romans flocked into the country, and settling there, mixed with and modified the native Iberi, some of whom completely adopted Roman habits, and were spoken of as *Togati*.

To what stock of the human family the old Iberi of H. belonged, is one of the *quæstiones vexatæ* of scientific ethnography. That they are represented in modern times by the Basques (q. v.) is, however, universally admitted. Niebuhr holds that H. was originally divided among two peoples, the Celts and the Iberi, from a mixture of whom arose the *Celtiberi* (q. v.). The more common opinion, however, both in ancient and modern times is, that the Celts were not equally aboriginal with the Iberi, but invaders from Gaul; and that they, rather than the Iberi, were victorious in the strife that ensued.

HISPANIO'LA (Little Spain). See DOMINGO, SAN, and HAYTI.

HISTO'LOGY (derived from the Greek words *histos*, a web or texture, and *logos*, a discourse) is the science which classifies and describes the structural or morphological elements which exist in the solids and fluids of organised bodies. It is identical or nearly so with general minute anatomy and with microscopic anatomy. Although its origin may be traced to the times of Malpighi (1628—1694), who discovered the blood corpuscles, and of Leuwenhoek (1632—1723), who, with comparatively imperfect optical means, added much to our knowledge of the minute structure of the tissues, it never made any definite progress till the second decennium of the present century, when the compound microscope began to assume its present improved form. It was by means of this microscopico-chemical examination that the structure of the different horny tissues was first clearly exhibited, and it was thus proved that nails, cow's horn, and whalebone are similarly composed of aggregations of individual cells. Again, in the investigation of the nervous tissue, and of many other structures, chemistry and the microscope have been most usefully combined.

During the last quarter of a century, no department of medical science has made such rapid progress as histology. In Germany, it has been successfully cultivated by Schwann, Hewle, Valentin, Remak, Kölliker, Virchow, Leydig, Frey, and a host of others, scarcely less distinguished; in Holland, it has been actively prosecuted by Donders, Harting, and others; Lebert, Mandl, Robin, and others, have contributed to the French literature of the subject; while amongst our own countrymen, the names of Todd and Bowman, of Goodsir, Queckett, J. H. Bennett, Lockhart Clarke, and Beale, deserve honourable notice.

HIT (the *Is* of Herodotus), a town of Turkey in Asia, is situated on the right bank of the Euphrates, in the pachalic of Bagdad, and 110 miles west-north-west of the city of that name. It is estimated to contain about 1500 houses, and is remarkable for the fountains of bitumen in the neighbourhood. These fountains or pits are as abundantly productive at the present day as they were in the earliest ages. From them bitumen and naphtha are obtained in great quantity, and exported.

HITCH, a knot or noose by which one rope is fastened to another, or to some other object, as a hook, a cleat, a ring, &c. There are many sorts of hitches—as clove-hitch, midshipman's hitch, rolling-hitch, &c. Several of these knots will be described and figured under KNOT.

HITCHCOCK, EDWARD, D.D., LL.D., an eminent American geologist, born at Deerfield, Massachusetts, United States, May 24, 1793, was head of the academy in his native place, 1815—1818; pastor of the Congregational church at Conway, 1821—1825; professor of chemistry and natural history in Amherst College, 1825—1845; principal and professor of natural theology and geology, 1845—1854; and was principal till shortly before his death, 27th Feb. 1864. In 1824, he published *The Geology of the Connecticut Valley*, a work which was well received, and opened the way to H.'s advancement. In 1830, he was appointed a state geologist, and as such, made a thorough survey of the geology and mineralogical resources, including also the botany and zoology, of Massachusetts, in 1830; of part of New York in 1836, and of Vermont in 1857. He published the fruits of his researches regarding Massachusetts in 1831; and after issuing supplementary reports in 1833 and 1838, embodied the whole in his *Final Report on the Geology of Massachusetts* (2 vols. 1841), which is the standard work on this subject. In 1850, H. was appointed agricultural commissioner for his native state, and received instructions to visit and examine the chief agricultural schools of Europe, which he did; and subsequently published his *Report on the Agricultural Schools of Europe*, a valuable work. But he chiefly distinguished himself in the geological department of natural theology. His work on the connection between geology and religion—*The Religion of Geology and its connected Sciences* (1851) —has had a very wide circulation on both sides of the Atlantic. H. came forward prominently as an expositor of the fossil footprints in the Connecticut Valley. The most important of his works, besides those mentioned above, are *Elementary Geology, with an Introductory Notice by Dr Pye Smith* (1840), a work which has become extremely popular, having gone through 25 editions in America, and nine in England; *Fossil Footmarks in the United States* (1848); *Ichnology of New England* (1858); *Report on the Geology of Vermont* (1861).

HITOPADE'SA (literally, 'good advice,' or 'salutary instruction,' from the Sanscrit *hita*, good, salutary; and *upadesa*, advice, instruction) is the name of the celebrated Sanscrit collection of fables, the contents of which have passed into almost all the civilised literatures of the earth. The collection itself, in the form in which we possess it, is founded on older works of a kindred nature, and is classed by the Hindus among their ethical works. See SANSCRIT LITERATURE.

HI'TTEREN, a considerable island on the west coast of Norway, lies about 47 miles west of the town of Trondhjem, and is about 30 miles long by 10 miles broad. Pop. about 3700, most of whom live by fishing.

HITZIG, FERDINAND, a German biblical scholar, was born 23d June 1807, at Hauingen, Baden, and educated at Heidelberg, Halle—where the influence of Gesenius determined him in favour of Old Testament studies—and at Göttingen. In 1833, he was called to Zürich as professor of theology, with a special view to the exegesis of the Old Testament; but his lectures have embraced also the New Testament, and the languages of the East, especially the Semitic. In 1861, H. returned as professor to Heidelberg. The first work which established his fame was his *Uebersetzung u. Auslegung d. Proph. Jesaias* (1833). Besides a translation of the Psalms, with a commentary (1835—1836), he wrote commentaries on the twelve minor prophets (1838; 2d ed. 1851), on Jeremiah (1841), Ezekiel (1847), Ecclesiastes (1847), Daniel (1850), the Song of Solomon (1855), the Book of Proverbs (1858), and Job (1874). He published a new translation of the Psalms, with a commentary, in 1863—1865. He is also known by *Die Erfindung d. Alphabets* (1840), *Urgesch. u. Mythologie d. Philistäer* (1856), *Geschichte des Volkes Israel* (1869), &c., and by considerable contributions to periodicals. He died on January 22, 1875.

HIVA-O'A, the principal island of the Marquesas group in the South Pacific Ocean, is about 22 miles long by 10 miles broad. Its northern point is said to be in lat. 9° 34′ S., and in long. 139° 4′ W. Pop. stated at 6500.

HI'VITES ('Midlanders' according to Ewald, or 'Villagers' according to Gesenius), a Canaanitish people, who in the time of Jacob are found occupying the uplands of Ephraim, and later, the slopes of Hermon and the region westward towards Tyre.

H'LA'SSA, the capital of Tibet, situated on the Dzangtsu, in lat. 30° 45′ N., and long. 91° 27′ E.; the largest town in Central Asia, about 9500 feet above the level of the sea. It is famous for the convents in and near it, composing the ecclesiastical establishments of the Dalai-lama, whose personal residence is in a convent on the adjacent Mount Botala. H. is to Buddhism what Rome is to Catholicism, it is the head-quarters of the hierarchy of lamas, who, by means of the Dalai-lama, exercise priestly control over nearly all Mongolia, as well as Tibet. The city lies in a fertile plain, extending about 12 miles from north to south, and about 125 miles in length. Mountains and hills encircle it. A Chinese garrison is quartered near the Mount Botala, whose temples are resplendent with gold and precious stones. Since the expulsion of the Nepaulese in 1792, no foreigners are allowed entrance from the south. Pop. conjectured at 24,000.

HOADLEY, BENJAMIN, D.D., an eminent English prelate, was the son of the Rev. Samuel Hoadley, master of the Norwich Grammar School, and was born at Westerham, in Kent, November 14, 1676. In 1691, he entered Catherine Hall, university of Cambridge, where he became tutor after taking his degree of M.A. In 1701, he was chosen lecturer of St Mildred in the Poultry, London, and from this time began to attract attention as a controversial writer. His *Reasonableness of Conformity to the Church of England*, appeared in 1703, which, like all his other performances, though agreeable to the sentiments of the educated laity of the Church of England, was exactly the reverse to the great body of the clergy, both established and dissenting. Next year, he obtained the rectory of St Peter-le-Poor, London, and was soon after engaged in a controversy with Dr Atterbury (q. v.) on the extent of the obedience due to the civil power by ecclesiastics. This contest was conducted by H. in such a way as to secure for him the applause of the House of Commons, who, in their address to the queen (Anne), referred to the important services he had rendered to the cause of civil and religious liberty. In 1710, H. was presented to the rectory of Streatham, in Surrey; and in 1715, when the accession of George I. had secured the triumph of Whig principles, was made Bishop of Bangor; but it is affirmed that he never visited this see, for fear of exciting a 'party fury.' He was, however, far from remaining idle. In 1717, he preached before the king a sermon on the text, 'My kingdom is not of this world,' in which he endeavoured to shew that Christ had not delegated his powers to any ecclesiastical authorities. He carried out this idea to great length, and maintained that it was the best and safest ground to take up in attempting to refute both Roman Catholics and Dissenters. Hence originated the famous Bangorian Controversy, regarding which Hallam says, that it was 'managed, perhaps on both sides, with all the chicanery of polemical writers, and disgusting both from its tediousness, and from the manifest unwillingness of the disputants to speak ingenuously what they meant.' H.'s principal opponent was William Law. Hallam speaks of having read forty or fifty pamphlets on the question. In 1721, H. was transferred to the see of Hereford; in 1723, to that of Salisbury; and in 1734, to that of Winchester. In 1735, he published a *Plain Account of the Nature and End of the Lord's Supper;* and in 1754—1755, two volumes of sermons, which were highly esteemed. He died April 17, 1761, in the 85th year of his age.

HOANG-HO. See HWANG-HO.

HOAR-FROST. See DEW.

HOARSENESS. See THROAT, DISEASES OF.

HO'BART TOWN, the capital of Van Diemen's Land, or Tasmania, stands on the Derwent, near its entrance into Storm Bay, on the south coast of the island. It is in lat. 42° 53′ S., and long. 147° 21′ E. The mean temperature for the year is 52°·3, being 42°·1 in winter, and 63°·1 in summer. According to the latest returns, the population is over 21,000. Besides the official buildings, which it possesses as the seat of government, H. T. has a college and several public schools; and its naturally excellent harbour is bordered by a noble quay, along which ships of the largest size can lie.

HOBBES, THOMAS, was born at Malmesbury, on the 5th April 1588, and was the son of a clergyman of that town. At the age of 14, he went to Oxford, and was put through the usual course of Aristotelian logic and physics. His instructions in the syllogism he afterwards held in very small estimation. At the age of twenty, having taken his degree and quitted Oxford, he was recommended to Lord Hardwicke, afterwards Earl of Devonshire, as tutor to his eldest son, this being the commencement of an intimate connection with that great family which lasted through his long life.

In 1610, he went abroad with his pupil, and made the tour of France and Italy. After his return, he still continued to live with the Devonshire family, and his residence in London afforded him opportunities of becoming acquainted with Bacon, Raleigh, Ben Jonson, and the other distinguished men of the time. Meantime, he was occupied with his classical, political, and philosophical studies, and prepared for publication his first work, a translation of Thucydides, which came out in 1628, he having now attained the mature age of forty.

The Earl of Devonshire having died in 1626, and the young earl, Hobbes's pupil, in 1628, he was plunged in great grief, and took the opportunity afforded him of going abroad with the son of Sir Gervase Clifton, and remained some time in France. In 1631, however, his connection with the Devonshire family was resumed. By the desire of the dowager-countess, he undertook the education of the young earl, the son of the former pupil, then only thirteen. In 1634, he went to Paris, and on this occasion was much in the society of Father Mersenne. He returned to England in 1637. He seems then to have applied himself to the composition of his first original work, entitled *Elementa Philosophica de Cive*, which was printed in Paris in 1642. This is the first exposition that he gave of his moral and political philosophy. His advocacy of pure and unrestrained monarchy as the best possible form of government, with an absolute submission on the part of the subjects both in law and in morality and religion to the will of the monarch, has probably given more general offence than any political theory ever propounded. It has been made the subject not merely of incessant attack, but of gross misrepresentation. He published soon after two small treatises, entitled *Human Nature*, and *De Corpore Politico*. The first contains his views as to the constitution of the mind, and entitles him to be considered as the father of modern systematic psychology. Although the work is valuable in itself, he still considers it as a prelude to the other treatise, *De Corpore Politico*, or on the nature of society, which is here handled for the second time by him, and in much the same strain. He goes over the whole ground a third time in the *Leviathan*, published in 1651, the fullest and perhaps the best known exposition of his views on mind, politics, morals, and religion. Here he contends as before in favour of pure monarchy, which he represents to have grown out of a primitive contract between the sovereign and the people, moved by the desire to escape from all the evils of a state of nature, which is a state of war. He is far from justifying tyranny; on the contrary, he enjoins upon the monarch a government according to just laws, and considers that this is more likely to be obtained by the government of a single person, whose selfish aims must be sooner satiated than if the supreme power were distributed in a number of hands.

After the meeting of the Long Parliament in 1640, he had returned to Paris, from his dread of the civil troubles. In 1647, he was appointed mathematical tutor to the Prince of Wales, afterwards Charles II., and stood high in the esteem of that prince; but the obnoxious character of his writings, especially after the publication of the *Leviathan*, so offended the royalist clergy, in common with all other sects, that Charles was induced to part with him; and he himself, being constitutionally timid, took the alarm for his personal safety, and abruptly fled from Paris to England. In England, he found himself safe, the Protestant government according him the most ample toleration. Very different was his position after the 'glorious' restoration of his own friends; for although Charles granted him a pension of £100 a year, the dislike to his views was so general that they were condemned by parliament in 1666, and he was even in danger of still severer measures. His connection with the Earl of Devonshire, with whom he lived in the latter part of his life, was no doubt a powerful protection to him. His old age was fruitful in additions to his writings, and was marked by some sharp controversies. His last works were a translation of Homer, and a History of the Civil Wars. He died on the 4th September 1679, in his 92d year.

HOBBY (*Falco subbuteo*), a small species of falcon, a native of all or most parts of Europe, and of many parts of Asia and Africa. It is in its utmost length, about 12 or 14 inches. It is grayish-black or bluish-gray on the upper parts, each feather edged with yellowish-white, and the whole form is very elegant. The H. is occasionally seen in Britain, but is rare—rarer now than it seems to have been in former times. It was often employed in falconry, and trained to fly at pigeons and even at partridges.

Hobby (*Falco subbuteo*).

HO'BOKEN, a city in New Jersey, United States, America, on the west bank of the Hudson River, opposite New York, with which it is connected by several steam-ferries. It has beautiful pleasure-grounds, called the Elysian Fields, and heights which afford a fine view of the cities of New York and Brooklyn, harbour, and fortifications. It is a great summer resort, and is rapidly becoming an important city. Pop. (1870) 20,297.

HOCHE, LAZARE, one of the most eminent generals of the French republic, was born 25th June 1768, at Montreuil, a faubourg of Versailles. In 1785, he entered the army, rapidly obtained promotion, and was raised, in 1793, to the command of the army of the Moselle. Here he was opposed to the Duke of Brunswick, the commander of the Prussian army, and was by him repeatedly defeated. He was more successful against the Austrians, whom he drove out of Alsace. His next important service was putting an end to the civil war in La Vendée, which he accomplished in a prudent and patriotic manner. After having been sent, in the winter of 1796, as commander of the troops in the unfortunate expedition to Ireland, he was on his return appointed to the command of the army of the Sambre and Meuse. On the 18th April 1797, he crossed the Rhine at Neuwied, and had defeated the Austrians in several battles, when his career was stopped by the armistice concluded between the Archduke Charles and Bonaparte at Leoben. After the 18th Fructidor, he was suddenly taken ill in the camp at Wetzlar, and died 18th September 1797.

HO'CHHEIM, a small town of Prussia, in the province of Hessen-Nassau, on an elevation sloping down to the right bank of the Main, about 3 m. from Mainz on the road to Frankfurt. The sunny slopes which here skirt the Main produce excellent wine of several varieties, which go by the general name of *Hochheimer;* from this comes the English name

Hock, now given indiscriminately to all wines from the Rhine regions.

HO'CHKIRCH, or **HOCHKIRCHEN**, a village in the district of Bautzen, in Saxony, half-way between Bautzen and Löbau, was the scene of a battle between the Austrians and Prussians (14th Oct. 1758) during the Seven Years' War. Frederick II. of Prussia, with an army 30,000 strong, having taken up an almost untenable position at H., was attacked at five A. M., under cover of a thick fog, by Marshal Daun, with 50,000 Austrians, and compelled to retire to the heights of Dressa. Here he was again attacked by the Duke of Aremberg, and after a conflict of five hours' duration, again retired. He lost 9000 men killed and wounded, and 101 cannons. He himself, and almost all his generals, were wounded. The Austrians lost 8000 men. On 20th and 21st May 1813, a series of battles took place here between the French and allies. See Bautzen.

HO'CHSTADT. See Blenheim.

HODGKINSON, Eaton, professor of the mechanics of engineering in University College, London, and the chief authority on the application of iron to architecture and engineering, was born at Anderton, near Northwich, Cheshire, 26th February 1789. At the age of 21, he settled in Manchester, and there commenced the study of mechanics. At this time the principal authority on iron beams was Tredgold (q. v.), but his theories were overturned by H., who satisfactorily established a theory of his own on this subject. H. next made a series of 227 experiments on the strength of pillars, and here again his opinions came into collision with those of Tredgold, Moseley, &c., and with the same triumphant result. Almost all these researches were carried on in conjunction with, and at the expense of, Mr Fairbairn (q. v.). For his important experiments and calculations, and general co-operation in the construction of the Britannia Bridge, he received a first-class medal at Paris in 1855. His investigations are in general scattered through the *Transactions* of the British Association for the Advancement of Science (see especially vols. iv. and v.), and in the Memoirs of the Manchester Society (the most important of which are in the volumes for 1822, second series, and 1831). He also edited *Tredgold on the Strength of Cast Iron*, adding a supplementary volume containing his own theories (1842—1846). H. died in June 1861, at Broughton, near Manchester. See Strength of Materials, and Tubular Bridges.

HODO'METER is an instrument for measuring the distance travelled over by any conveyance, and consists of an arrangement of toothed wheels, like clock-work, fixed on one side of a machine, and connected with the axle, from which motion is communicated to it. An index and dial shew the exact distance the vehicle has travelled.

HOE, an implement of gardening and of agriculture used for stirring the soil, drawing up earth to plants, thinning plants in drills, clearing the ground of weeds, &c. There are many forms of this implement, all of which may be referred to two classes—*draw-hoes* and *thrust-hoes*, the former having the blade almost at right angles to the handle; the latter almost in the same plane with it. The thrust-hoe, or *Dutch Hoe*, is chiefly used for killing weeds, and for stirring ground to a very slight depth. The draw-hoe, although much used as an implement of gardening, is scarcely used in Britain as an agricultural implement, except for the thinning (*singling*) of turnips, in which it is always employed. But in some countries it is very extensively used in place of the spade. In some parts of the West Indies almost all the tillage of the ground is done by the hoe. It is more adapted than the spade to the use of labourers whose feet are not provided with shoes. Hoes intended for tilling the ground, instead of the plough and spade, are much larger and heavier than those used in British gardening, and are raised much higher, and brought down to the ground with greater force, somewhat like the pickaxe. Hoes for stirring very stiff soils are sometimes made with prongs instead of a blade.

In the improved agriculture of the present day, implements called *Horse-hoes* are extensively used. They are intended for purposes corresponding with those of the thrust-hoe, and may be generally described as consisting of thrust-hoe blades, variously modified, and attached to a frame in order to be drawn by a horse. Various contrivances are employed to accommodate the blades to inequalities of surface, &c. Horse-hoes can only be employed for crops sown in drills; and the drills must be perfectly parallel, if more than one interval is to be cleaned and stirred at once. With the sowing machines now in use, however, this is secured. In turnip-husbandry, a horse-hoe with several blades is often used to clear away the weeds from one interval.

HOE'S MACHINE. See Printing.

HOEVEN, Jan Van der, a distinguished Dutch naturalist. He was born in 1801 at Rotterdam, and after studying medicine at Leyden, established himself as a physician in his native town, where he remained till 1835, when he was elected to the professorship of zoology in the university of Leyden, an office which he held till his death in 1868. His most important work is his *Handboek der Dierkunde* (Leyden, 1827—1833), of which a second edition, entirely recast, appeared in 1846; a German translation was published in 1848; and an English translation, by Professor Clark of Cambridge, under the title *Handbook of Zoology*, was issued, with important additions, both by the author and the editor, in 1856—1858. The fact that most of his works are memoirs, and written in Dutch, is a great check to their general perusal by English and French naturalists.

Jan must not be confounded with his brother, Cornelius Pruys Van der Hoeven, who is professor of medicine in the university of Leyden, and is the author of several important works, amongst which may be especially mentioned *De Historia Medicinæ* (Leyden, 1842), and *De Historia Morborum* (Leyden, 1846).

HOF, a manufacturing town of the kingdom of Bavaria, in Upper Franconia, is situated in a fruitful district on the Saale, 32 miles north-east of Bayreuth. Besides extensive manufactures of leather, and linen and woollen fabrics, an important transit trade, arising from its position on the frontiers of Bavaria, and on the railway connecting that country with Saxony, is here carried on. Iron and coal mines are worked in the vicinity. Pop. (1871) 16,010.

HOFER, Andreas, the patriotic leader of the Tyrolese, was born at St Leonard, in the valley of Passeyr, 22d November 1767. In 1796, he led a body of Tyrolese against the French on the lake of Garda; in 1808, secret deputies, among whom was H., arrived at Vienna, to represent to the Archduke John the sufferings of the people, and their wish to be reunited to Austria. By the desire of the archduke, Baron von Hormayr sketched for them a plan of an insurrection, which met with such success that, in three days, from the 11th to the 13th of April 1809, nearly the whole country was liberated. Napoleon, however, was victorious in Austria, and at once marched three armies to the Tyrol, to subdue the rebellious peasantry, who had been abandoned by the Austrians, in accordance with the armistice of Znaim (July 12, 1809). At first, H. concealed himself in a cave in the valley of Passeyr; but when Spéchbacher, Joachim Haspinger, a Capuchin, and Peter Mayer, at the head of the armed population, renewed the defence of the Tyrol, and repeatedly defeated the enemy, H. issued from his retreat, and took the leadership of the Tyrolese. At the battle fought on the 12th of August on the Iselberg, Lefèbvre was driven from the Tyrol. H. continued to conduct the civil and military administration till the peace of Vienna (14th October). The French and Bavarians poured, for the third or fourth time, into the country, and after a brief struggle H. was obliged to take refuge in concealment. After a lapse of two months, he was betrayed into the hands of the French by a priest named Douay, conveyed to Mantua, tried, and condemned to be shot. The sentence was carried into execution on the 20th February 1810. His family were indemnified for the loss of their property by the Emperor of Austria in 1819, and his son ennobled. A statue of H., executed by Schaller, was erected in 1834 in the church of the Franciscans, at Innsbruck, near the tomb of the Emperor Maximilian I.

HOFFMANN, Friedrich, one of the most celebrated physicians of the last century, was born at Halle in 1660, and died in that city in 1742. At the age of fifteen, he lost his parents, who died from typhus fever, and very shortly afterwards became deprived by a fire of the small patrimony that devolved to him. Undismayed, however, by these misfortunes, he repaired in 1678 to Jena, to study medicine, and from thence proceeded to Erfurt, to become a pupil of the distinguished chemist Gaspard Cramer. He commenced practice at Minden in Westphalia, where he had influential connections, and where in a very short time he acquired a high reputation. After a residence of little more than two years in Minden, during which time he visited Holland and England, he removed to Halberstadt. In 1693, Frederick, Elector of Brandenburg, afterwards king of Prussia, appointed H. to the professorship of medicine in the newly constituted university of Halle. It was on his recommendation that the celebrated Stahl (q. v.), who had been his fellow-student at Jena, and subsequently became his great rival, was appointed one of his colleagues. At the urgent request of the king, he subsequently removed to Berlin, where he remained for three years; but finding that he could not pursue his studies in the atmosphere of the court, he returned to Halle; and although he subsequently attended the king at Berlin during a long illness, Halle was his place of residence during the remainder of his life.

As a physician and a medical teacher, H. enjoyed a celebrity second only to Boerhaave, who contemporaneously occupied the chair of medicine at Leyden. It is unnecessary here to enter into his special doctrines, which, although they long survived his time, are now of little practical value. Haller asserts that he amassed a large fortune by the sale of secret remedies, one of which (although its composition is now known) is still designated Hoffmann's Anodyne Liquor (q. v.).

Of his numerous works, the greatest is his *Medicina Rationalis Systematica* (Halle, 1718—1740, 9 vols. 4to), which occupied him for more than twenty years, and was concluded in his eightieth year. His complete works have gone through various editions. His *Opera Omnia Physico-medica, Denuo Revisa, Correcta et Aucta*, were printed at Geneva in 1640, in six folio volumes, and were reprinted after his death with five supplementary volumes of previously unpublished *Opuscula*. These were reprinted at Venice in 1745, in 17 volumes 4to, and twice subsequently at Naples on a still larger scale.

HOFMANN, August Wilhelm, F.R.S., a distinguished living chemist, born at Giessen in 1818. After obtaining the degree of doctor of philosophy, he became assistant to Liebig in the Giessen Laboratory, and subsequently he was appointed extraordinary professor of chemistry in the university of Bonn. When the Royal College of Chemistry was established in London in 1845, H. was recommended by Liebig as highly qualified for the important post of superintendent to the new institution. This college, which has since merged into the Laboratory of the Royal School of Mines, owes much of its high character to his teaching and his scientific reputation. On the elevation of Professor Graham from the post of chemist to the Mint to the office of master of that institution, H. was appointed his successor. In 1865, H. accepted an appointment to be professor of chemistry in the university of Berlin, with the commission to found a chemical institute. He was a juror at all the international exhibitions (London, 1851 and 1862; Paris, 1865 and 1867). In conjunction with Dr Bence Jones, he edited the later editions of Fownes's *Manual of Chemistry*. His numerous contributions to the *Annalen der Chemie und Pharmacie*, to the *Transactions of the Chemical Society*, and to the *Philosophical Transactions of the Royal Society*, are for the most part on the very highest departments of organic chemistry; and in 1854 a royal medal was awarded to him for his *Memoirs on the Molecular Constitution of the Organic Bases*. It was in the course of these researches that he discovered in coal-naphtha aniline, the basis of the new colours mauve and magenta, which had previously been only obtained from indigo. For his practical applications of this discovery, one of the great prizes was awarded to him at the Paris Exhibition of 1867. H.'s *Introduction to Modern Chemistry* (1865; 5th edition, 1871) has led to great reforms in the teaching of chemistry.

HOFFMANN'S ANODYNE LIQUOR is the old name for the *Compound Spirit of Sulphuric Ether* of the London pharmacopœia, and is a mixture of ether, alcohol, and ethereal oil. It is often prescribed with laudanum, in order to prevent the nausea which the opium preparations frequently excite, and may be given in water, unassociated with anything else, as a stimulant and antispasmodic, in doses varying from half a drachm to two drachms.

HO'FWYL, a village of Switzerland, in the canton of Bern, and situated six miles north of the town of that name. It has been long famous as the seat of the educational and agricultural institution founded here by the late M. Fellenberg (q. v.). Not many years after the death of M. Fellenberg, the institution was given up.

HOG (*Sus*), a genus of pachydermatous quadrupeds, of the family *Suidæ* (q. v.). The neck is carried straight forward from the trunk, and is very thick and strong. The skin is very thick, and mostly covered with stiff bristles, among which a short curled hair is often also found. The bristles of the back of the neck generally become a mane in wild hogs, and particularly in the males, although, in domestication, this tends to disappear. The muzzle is elongated, and terminated by a movable cartilaginous disc, furnished, as in the mole, with a special small bone, and used, along with the tusks, as an implement for turning up the soil in search of roots and other food. There are 6 incisors, 2 canine teeth, and 14 molars in each jaw, the lower incisors projecting forwards; the canine teeth long and strong, projecting and curved, becoming formidable tusks in wild boars, and large and powerful even in the females in a wild state. The feet have each four toes, the lateral ones small, and scarcely touching the ground, all separately hoofed. The tail is short. The stomach shews mere traces of division. The food is chiefly vegetable, but perhaps no animals may more properly be called omnivorous; and although, even in a wild state, hogs are not to be reckoned among beasts of prey, they not unfrequently, even in domestication, kill and eat small animals that come in their way, as many a housewife has had occasion to observe in respect to chickens.—The Common Hog (*S. scrofa*) appears to be a native of most parts of Europe and Asia, and domesticated swine were found by the first navigators in many of the islands of the southern seas. The wild boar is still found in the forests of many parts of Europe, and was at one time an inhabitant of those of Britain, where it was protected by game-laws in the 10th and 11th centuries; but at what time it ceased to exist as a wild animal in Britain is uncertain. The adult males, in a wild state, are generally solitary; the females and young gregarious; and when assailed by wolves or other beasts of prey, wild swine defend themselves vigorously, the stronger animals placing themselves in the front, and the weaker seeking shelter in the rear. The chase of the wild boar is one of the most exciting sports of Europe or of India, particularly when carried on without the rifle, and on horseback with the spear ('pig-sticking'). The speed of the animal is very considerable, and the chase sometimes extends to six or seven miles. Although the use of its flesh was prohibited to the Jews, and the prohibition has been adopted in the Mohammedan law, the hog has been a domesticated animal from a very early period, and its flesh constitutes a large part of the food of many nations. The fecundity of the hog is great; with proper treatment, it will produce two litters annually, generally of 4—8 pigs each, although sometimes there are as many as 14 in a litter. Vast quantities of the flesh are consumed in various forms in the British Islands and North America, as pork, fresh or salted, bacon, ham, &c. Brawn (q. v.) is an esteemed English luxury. The fat of the hog, which is produced in a thick layer under the skin, is an article of commerce, and of various use under the name of Lard (q. v.). The skin of the hog is made into leather, which is particularly esteemed for saddles. The bristles, particularly of the wild boar, are much used for brushmaking.

There are numerous varieties of the domestic hog, of which some have erect, and some pendent ears; and those are most esteemed which exhibit the greatest departure from the wild type, in shorter and less powerful limbs, less muscular and more rounded forms, &c. The *Chinese* breed and the *Neapolitan* have been of great use in the crossing and improving of the breeds commonly reared in Britain, giving rise to the improved white and black breeds respectively. Hogs are profitably kept wherever there is much vegetable refuse on which to feed them, as by cottagers having gardens, farmers, millers, brewers, &c. They are often allowed to roam over fallow ground, which they grub up for roots, and over stubble-fields, which they glean very thoroughly. They are also fed in woods—an ancient practice—where they consume acorns, beechmast, and the like. When they are fed, as is sometimes the case, chiefly on animal garbage, their flesh is less palatable and less wholesome.

The hog has a reputation which it does not deserve, of peculiar filthiness of habits. It is true that it wallows in the mire, as the other *pachydermata* also do, to cool itself and to provide itself with a protection against insects, and it searches for food in any puddle; but its sleeping-place is, if possible, kept scrupulously clean. The too common filthiness of pigsties is rather the fault of their owners than of their occupants; and a clean and dry sleeping-place is of great importance to the profitable keeping of hogs.

The hog is not inferior to other quadrupeds generally in intelligence. It can be easily rendered very tame and familiar. Its acuteness of scent has been turned to account in making it search for truffles; and an instance is on record of a pig having been used as a pointer, in which service it learned to acquit itself extremely well. Instances have occurred of the use of the hog as a beast of draught.

The forests of the island of Papua or New Guinea produce a species or variety of hog (*S. Papuensis*), more widely different from the common hog than its breeds are from one another. It is 18 or 20 inches high, with short ears, and very short tail. The colour is mostly brown. The Papuans have not properly domesticated this animal, although they often trap the young ones and keep them till ready to be killed for use. The flesh is very delicate.

The Babyroussa (q. v.) is another and very remarkable species of hog.

The *Bosch Vark*, or Bush Hog of South Africa (*Choiropotamus Africanus*), is about two feet six inches high, covered with long bristles; it has projecting tusks, a large callous protuberance on each cheek, and long sharp tufted ears. It is gregarious, subsists chiefly on vegetable food, and makes destructive inroads on cultivated fields.

HOG PLUM, SPANISH PLUM, and BRAZILIAN PLUM, names given in the West Indies and other tropical countries to the fruit of certain species of *Spondias*. The genus *Spondias* belongs to the natural order *Anacardiaceæ*, or, according to some botanists, to a small order called *Spondiaceæ*, differing from *Anacardiaceæ* in the want of a resinous juice, and in the drupe having a nut with 2—5 cells and seeds, instead of one cell and one seed. The species of *Spondias* are trees and shrubs with pinnate leaves, which have a terminal leaflet, and flowers in racemes or panicles. Some of them produce very pleasant fruits, among which may be reckoned *S. purpurea* and *S. lutea*; the species generally called Hog Plum in the West Indies, because they are a common food of hogs, which revel in their abundance. *S. purpurea* has fruit about an inch in length, ovate or

Hog Plum.

oblong, purple or variegated with yellow; the pulp yellow, with a peculiar but agreeable acid and aromatic taste. The fruit of *S. tuberosa*, called IMBUZEIRO in the north of Brazil, is about twice the size of a large gooseberry, oblong, yellowish, with a leathery skin and sweetish acid pulp. A much esteemed Brazilian dish is prepared of milk, curds, sugar, and the pulp of this fruit, from which also a refreshing beverage is made for use in fevers. The tree is remarkable for the numerous round black tubers—about eight inches in diameter—which it produces on its widely spreading roots, and which are very cellular, and full of water. They are evidently intended for the wants of the tree in the dry season, and are often dug out by travellers for the sake of the water, of which each tuber yields about a pint.—Closely allied to *Spondias* is the genus *Poupartia*, to which belongs the VI or TAHITI APPLE, formerly *Spondias dulcis*, a very fine fruit of the South Sea Islands.

HOG RAT, or **HUTIA** (*Capromys*), a genus of quadrupeds, of the family *Muridæ*, differing from rats in having four grinders on each side in each jaw, with flat crowns. The tail is round and slightly hairy, and is used for support in sitting erect, as by kangaroos, and for aid in climbing trees, in which these animals are very expert. They make much use of their fore-paws, as of hands. Their food is entirely vegetable. They are natives of Cuba, where they are found in large numbers in the woods. They were much used as food by the aborigines. The best known species is of the size of a small rabbit.

HOGARTH, WILLIAM, a celebrated painter and engraver, born in London in the year 1697, served his apprenticeship to a silversmith in Cranbourne Street, named Ellis Gamble, and next studied for some time under Sir James Thornhill, the historical painter, but not with any marked success. About 1720, he set up for himself, and his first employment was to engrave coats of arms, crests, shop-bills, &c., after which he undertook to execute plates for booksellers, the chief of which are the prints illustrative of *Hudibras* (Lond. 1726). He now tried his hand at portrait-painting, and soon had ample employment, though he never cared anything for this branch of art. In 1730, he married (clandestinely) a daughter of Sir James Thornhill, and soon after began to display his extraordinary talent for representing in pictures the follies and vices of his time. In 1733, appeared his 'Harlot's Progress,' a series of six pictures, which, like his other works, were engraved by himself. It was these engravings, and not the original paintings, that made H. a rich man, and enabled him to keep his carriage at the age of forty-eight. The 'Harlot's Progress' was followed by other moral histories and satirical representations of vice and folly, such as 'The Rake's Progress,' published in eight engravings, 'Southwark Fair,' 'A Modern Midnight Conversation,' 'The Distressed Poet,' and 'Strolling Actresses in a Barn.' The success of these was great, and inspired H. with the belief that he could also win a reputation as an historical painter. After several ineffectual attempts, he recovered from his delusion, and returned to the path which nature had appointed him. In 1741, he published 'The Enraged Musician;' in 1745, 'Marriage à la Mode,' in a series of six engravings, the pictures for which were purchased for the National Gallery; and in 1748, 'The March to Finchley.' In 1753, he published his *Analysis of Beauty*, a work which excited much opposition and ridicule, and H. is generally held to be erroneous in the conclusions at which he arrives. In 1755 appeared 'Four Prints of an Election;' and in 1762, 'The Times,' a cutting satire upon Pitt. He died in 1764, and was buried at Chiswick, where a handsome monument was erected to his memory, with an inscription by his friend Garrick. In the technical part of his art, H. was long thought not to have excelled, but modern opinion is more favourable in this respect. There has never, however, been any but one opinion regarding the greatness of his thought and invention, and his deep insight into the characteristics of his time and country. The moral of his satire is always stern, true, and unmistakable. A handsome edition of his works from the original plates, retouched by Heath, was published by Nichols (3 vols. Lond. 1820—1822); others appeared at Leipsic (1831—1835; 3d. edit. 1841), and at Stuttgart (1839—1840).

HOGG, JAMES, a Scottish poet, was born in the district known as the Forest of Ettrick, in Selkirkshire, in 1772, and was at school for two or three winters before he reached the age of eight. At that early age, he entered upon the occupation of shepherd. His first song appeared anonymously in 1801, and having gone shortly after to sell his employer's sheep in Edinburgh, he threw off 1000 copies of verses which he had written. In the same summer, Scott visited the Ettrick Forest in search of materials for his *Border Minstrelsy*, when H. made his acquaintance, and placed in his possession a number of ballads, taken down from the recitation of persons resident in the district, which appeared in the third volume of the *Minstrelsy*, in 1803. In the same year, he published *The Mountain Bard*, the proceeds of which, together with two prizes for essays he received from the Highland Society, amounted to £300. With this sum he took a farm, which proved a disastrous speculation. In 1810, he began a course of regular authorship. In 1813, his poem *The Queen's Wake* appeared. In 1814, he married; and although he afterwards went to live on a farm given to him by the Duke of Buccleuch, he busied himself more with books and booksellers than with sheep and grazing. His pen was profitable, which was more than he could bring his farm to be. He died at Altrive, on the 21st November 1835. His works are numerous, comprising, in addition to those already mentioned, *Madoc of the Moor*, *The Pilgrims of the Sun*, *The Jacobite Relics of Scotland*, *Queen Hynde*, *The Border Garland*; and some songs of great beauty. He also wrote extensively in prose. His prose works are—*The Brownie of Bodsbeck*, *Winter Evening Tales*, *The Three Perils of Man*, *The Three Perils of Woman*, *The Altrive Tales*, a volume of *Lay Sermons*, and a *Life of Sir Walter Scott*.

After Burns, H. is unquestionably the greatest peasant-poet which Scotland has produced. His finest work, both in conception and finish, is *The Queen's Wake*. The general flow of the poem is lively and harmonious, while in one portion, that of 'Kilmeny,' the reader seems to hear 'the horns of Elfland faintly blowing;' and in another, 'The Witch of Fife,' he is introduced into the weirdest witch and wizard world. His prose works are very unequal, but they occasionally display great humour, and always abound in graphic description.

HOGMANA'Y, or **HAGMENA**, a word of doubtful derivation, applied in the north of England and Lowlands of Scotland to New Year's Eve. See NEW YEAR. It is customary for persons to go, on 'Hogmanay night,' from door to door, asking in rude rhymes for cakes and cheese (and sometimes for money), on receiving which they pass on to the next house.

HO'GSHEAD, an old English measure of capacity. For wine, it was equivalent to 63 gallons; for ale and beer, to 54 gallons. In the United States, it is still used as a measure for liquids, equivalent to 63 gallons; but when used for tobacco, it varies in different states from about 750 to 1200 lbs.

HOGUE, Cape La. See Cape La Hogue.

HOHENLI'NDEN, a village in Upper Saxony, with 250 inhabitants, famous for the victory gained there by Moreau over the Archduke John, 3d December 1800. After the expiration of the armistice concluded at Paersdorf, on the 13th November, Moreau's army took up a position on the plateau between the Isar and the Inn, and the Austrian army, under the Archduke John, on the right bank of the Inn. The Austrian main body advanced amidst drifting snow, and attacked the divisions of Grénier and Grouchy with the utmost fury; but the French receiving considerable reinforcements under Ney, the assailants were driven back; and being attacked in the rear, were totally routed. The victory was likewise decided at other points in favour of the French, who were only prevented from pursuing the vanquished by the inclemency of the weather, the badness of the roads, and the short winter day. The Austrians had 8000 men killed and wounded, 11,000 made prisoners, including 180 officers and 100 pieces of artillery. The French had 5000 men killed and wounded. In consequence of this battle, the negotiations between the belligerent powers were resumed, and shortly after ended in the peace of Lunéville.

HO'HENSTAUFEN, a German princely house, which kept possession of the imperial throne from 1138 to 1254. The founder of the family was Frederick von Büren, who lived about the middle of the 11th c., and assumed the name of H. from a castle of that name, the ruins of which are still to be seen on the summit of the Hohenstaufen Berg (2240 feet), a hill on the left bank of the Danube, about 30 miles below Stuttgart. A son of his was the Chevalier Frederick von Staufen, Lord of H., who steadfastly supported the Emperor Henry IV., and in return received the duchy of Swabia. Duke Frederick, at his death in 1105, left two sons—Frederick II., the One-eyed, and Konrad; the former was immediately confirmed in Swabia by Henry V.; and in 1112 the latter received the duchy of Franconia. After the death of Henry V., his family estates fell to the House of H.; and Lothaire of Saxony was elected as his successor in the empire.

On Lothaire's accession, he revoked the grants made by previous emperors to the House of H., and thus gave rise to a furious war, in which Duke Frederick (his brother Konrad being absent in the Holy Land) had to encounter, single-handed, the whole power of the emperor, the House of Zähringen, and Henry the Proud, Duke of Bavaria and Saxony. After Konrad's return, fortune at first seemed to favour the brothers, but in 1135 they were compelled to implore the emperor's forgiveness. They were then put in possession of all their estates. Konrad, in 1138, was elected Emperor of Germany, under the title of Konrad III. The succeeding emperors of this family were Frederick I. (q. v.) (1152—1190), Henry VI. (1190—1197), Philip I. (1198—1208), Frederick II. (q. v.) (1212—1251), and Konrad IV. (1251—1254).

HO'HENSTEIN, a small manufacturing town in the kingdom of Saxony, situated 12 miles north-east of Zwickau. Woollen, cotton, and linen goods, and machinery, are the principal items of manufacture. Pop. (1871) 5669.

HOHENZO'LLERN, a province of Prussia, consisting of a narrow strip of land entirely surrounded by the territories of Würtemberg and Baden. Superficial area about 480 square miles; pop. (1871) 65,558. The territory, whose surface is generally mountainous, is divided into the districts of Sigmaringen and Hechingen, which rank as mediatised principalities. The seat of provincial government is at Sigmaringen. H. is watered by the Neckar and some of its affluents, and by the Danube, which crosses it; it is also traversed by the eastern offshoots of the mountain-ranges of the Black Forest, the Rauhe Alb, and the Hart. The mountain valleys are productive, and yield an abundance of fruit and corn, and flax in sufficient quantities for exportation; the forests abound in fine timber; there are iron mines in some of the mountain districts, which also yield gypsum, salt, and coal. The principal branches of industry are agriculture and the rearing of cattle, and the manufacture of toys and other articles in wood.

The population belongs almost exclusively to the Roman Catholic religion, and is under the jurisdiction of the Archbishop of Freiburg. There is a Catholic college at Hechingen.

The Hohenzollern family traces its descent from Count Thassilo, who lived about the beginning of the 9th c., and founded a castle near Hechingen, on the Zollern heights, whence his descendants derived their patronymic. About 1165 the first separation took place, Frederic IV. founding the elder or Swabian, and Konrad I. the younger or Franconian line. The elder line was subdivided, in 1576, into the branches of H. Hechingen and H. Sigmaringen. Frederic VI., the representative of the younger line, in 1415 received from the Emperor Sigismund the investiture of the electorate of Brandenburg, thus founding the present reigning dynasty of Prussia. The two branches of the elder line continued unbroken till 1849, when, in accordance with a family compact formed in 1821, which declared the king of Prussia chief of the joint Houses, the reigning princes of H. Hechingen and H. Sigmaringen ceded their respective rights and principalities to that monarch, who agreed to pay an annual pension of 15,000 thalers to the former, and one of 25,000 thalers to the latter. The princes were to retain their estates and bear the title of Highness, but were to exercise no act of sovereignty.

HOKIA'NGA, a river of New Zealand, enters the Southern Ocean on the west coast of the North Island—its mouth being in lat. 35° 30′ S., and long. 173° 26′ E. This point is almost the antipodes of Tangier, on the south side of the Strait of Gibraltar.

HOLBACH, Paul Heinrich Dietrich, Baron Von, a French philosopher of the 18th c., was born of wealthy parents, at Heidelsheim, in the Palatinate, in 1723. At an early age, he went to Paris, where he continued to reside during the remainder of his life. He died 21st June 1789. As H. was remarkable for his agreeable social qualities, and kept a good table, the most eminent thinkers and writers of the day, such as Condorcet, Diderot, Duclos, Helvetius, Raynal, Rousseau, Buffon, &c., were in the habit of assembling at his house. The witty Abbé Galiani called H. the *maître d'hôtel* of philosophy. Here speculation, it is said, was carried to such daring lengths, that Buffon, D'Alembert, and Rousseau were compelled to withdraw from the circle. H. was the zealous champion of naturalism, and contended not only against Christianity, but against every positive religion. His principal work is the *Système de la Nature* (published in 1770). In this work, the author endeavours to expound the natural principles of morality, and to investigate the origin of the conflicting opinions on virtue and vice. He discusses the maxims of religious morality, and takes a rapid survey of social and savage life. He touches on the so-called 'social compact,' and in the course of his observations tries to prove, among other things, that self-interest is the ruling motive of man, and that God is only an ideal being, created by kings and priests. The materialism of the French *philosophes* of the 18th c. is nowhere more pernicious and paltry than in the writings of Holbach. It is but fair to state that his life was better than his books. He was a man of good heart, and in spite of his theory, of most unselfish benevolence. When the Jesuits fell into disgrace during the reign of Louis XV., H., though he hated their system, and had written against them in the days of their prosperity, made his house an asylum for his old foes when the clouds gathered round them.

HOLBEIN, Hans, the Younger, one of the first masters of German art, was born at Grünstadt in 1497. He learned the rudiments of art from his father, Hans Holbein the Elder, also a painter of great merit (born 1450, died 1526). When little more than 16 years of age, he adorned several houses and churches at Basel with portraits, frescoes, and altar-pieces. Tradition has preserved many of his droll sayings, and his life is as rich in anecdotes as those of the greatest Italian painters. H. growing tired of Basel, Erasmus, who took a great interest in him, and endeavoured to induce him to abandon his irregular course of life, introduced him to Sir Thomas More, who kept him employed in England for nearly three years, and then invited Henry VIII. to view the pictures. Henry, surprised and delighted, exclaimed: 'Is the artist still alive, and is he to be had for money?' More presented H. to the king, who took him into his service, and rewarded him liberally. H. continued to reside in England, highly esteemed and fully employed, till, in 1554, he died of the plague. Though chiefly, and at many periods of his life almost exclusively, a portrait-painter, in this style he stands on a level with the great Italian masters, and takes precedence of all his German contemporaries. His portraits are not ideals, but nature apprehended in its most intellectual features; the execution is rich and perfect. To the earlier part of his career belong his most celebrated paintings, including 'The Last Supper,' 'The Dance of Death,' several pictures in the Dresden Gallery, two famous portraits of courtesans, &c. At a later period, his execution is slighter, and his style of colouring not entirely free from the mannerism of those Flemish painters who had studied in Italy. Some splendid and able portraits by H., belonging to this period, are to be seen in the Louvre at Paris, in the Berlin Museum, at Longford and Windsor Castles. Eighty-seven sketches of persons belonging to the court of Henry VIII. by H. are still extant. His 'Dance of Death,' the illustrations of the Old Testament, and three sets of alphabet initials, would certainly entitle him to rank as one of the first wood-engravers, supposing them to have been not merely designed, but likewise engraved by him. This opinion has, however, been disputed, and the question remains undecided at the present day. A selection from H.'s pictures in the library at Basel were published in lithographs in 1829, by Birmann and Sons at Basel.—Compare *Hans Holbein der Jüngere* (Berlin, 1827).

HOLBERG, Ludvig, the creator of modern Danish literature, and not only the earliest, but the wittiest and best writer of light comedy in Denmark, was born in 1684 at Bergen, in Norway, at the period when the latter country formed part of the Danish dominions. The ten years which succeeded his appointment, in 1718, as professor of metaphysics in the university of Copenhagen, where he had studied with the original intention of entering the church, embrace the most active literary period of his life; for during that time he composed his various satirico-heroic poems and romances, and the greater number of his numerous comedies, which are still regarded by his countrymen as the best productions of their kind in the Danish language. The creation of a national theatre in 1722 by King Frederick IV., who sent for French actors to teach Danish players the art of declamation, had led H. to try his talents in dramatic writing, and the success which attended the attempt was speedily followed by others still more felicitous. Wealth and honours poured in upon him as he advanced in years, and he received a patent of nobility in 1746. He died in 1754, bequeathing his property to the Danish Royal Military Academy of Soroe. H.'s collected works were published in 27 volumes octavo at Copenhagen in 1826; and in 1842, an association was established in that city for the better editing of his writings, the dramatic portion of which was edited by Liebenberg in 1843—1847.

H.'s first satirico-heroic poem of *Peder Paars* (1719), and his *Niels Klims underjordiske Reise* (1741), which appeared originally in Latin, but which was speedily translated into several modern languages, rank among his best productions, although among his numerous comedies there are many that have enjoyed an almost equal popularity. Of these we may instance as especially notable for their broad humour and truth to nature, *Den politiske Kandestoeber*, *Jeppe paa Byerget*, *Den Stundesloese*, and *Julestuen*.

HO'LCUS. See Soft Grass.

HOLD is that interior compartment of a vessel throughout her length which is nearest to the keel. From the lowermost deck it extends to the very bottom of the ship; it is always below the water-line, and dependent on the hatchways for ventilation and what little natural light it obtains. In merchant-vessels, the greatest portion of the cargo is stored in the hold; in men-of-war, it contains the bread-room, filled with provisions, the water-tanks for the supply of the ship's company, and almost all miscellaneous stores, such as spare masts, sails, blocks, &c. For this latter purpose, the hold is subdivided into several sections by bulk-heads. The *after-hold* lies abaft the main-mast, the *main-hold* just before the same mast, and the *fore-hold* is from the bow nearly to the main hatchway.

HOLDING, the term in Scotch Law used to denote the manner in which heritable estate is holden, corresponding to the English Tenure (q. v.). All the land in Scotland is presumed to be holden of the crown as the superior, and all persons who hold the lands are called vassals. The great proprietors are called crown-vassals, and the little proprietors, who generally hold under the crown-vassals, are called vassals. The chief holding is called feu-holding, which means that the vassal holds the land for ever, subject to a feu-duty or annual payment in money or grain to the superior. Each vassal can carve out his land into smaller feus, and sell them to sub-vassals, to whom he stands in the relation of a superior, and so on to infinity. This is not a mere form, but enters into the substance of land transfers, and entails great expense on all landholders, because each vassal must always have his title complete, which means he must pay up the little dues and perquisites which constantly result out of this feudal principle to his superior. In England, this practice of subinfeudation was put a stop to by 18 Edw. I., and now most of the land in England is held in freehold, which means that each owner is entire master of his land, and pays fees or perquisites to nobody, not even to the crown. Besides feu-holding in Scotland there is blench-holding, which means a holding where the payment is nominal. Formerly, there were also ward-holding and Mortification (q. v.), the latter being the holding by which churches and religious houses were held. There is also burgage-holding, applicable to lands within Burghs (q. v.), and the transfer of burgage tenements has been lately put on a similar footing to other tenements.

HOLDING OVER, a phrase in English Law, meaning that a tenant, after a regular notice to quit, or the end of his term, still refuses to quit, and holds over. In such a case, the tenancy is held to be renewed on the same terms from year to year, if the landlord chooses not to enforce the quitting; but if the tenant himself gave the notice to quit, or the landlord demands possession at the expiration of his notice, and then the tenant refuses to quit, he is thereafter liable to double rent, or double value according as the notice to quit came from the tenant or the landlord. In Scotland, this renewal of the contract is called *Tacit Relocation* (q. v.); but no liability to double rent is incurred.

HOLIDAY, in Law, means Christmas Day, Good Friday, and any other day appointed for a public fast and thanksgiving. There are other holidays usual in public offices and courts of law. When a bill of exchange falls due on a Sunday, payment must be made the day previous. If it falls due on any of the bank holidays, the bill is payable the day after. In England, the courts excuse a man for not giving notice of dishonour of bills of exchange not only on Sunday, Good Friday, and Christmas Day, but also even on the festival days of his own religion; and though there has been no decision in Scotland on the subject, the same rule would no doubt be applied to fast-days prescribed by different sects, and a notice sent on the day following would suffice. But as a general rule, and in all other respects, it may be laid down that no sect, established or unestablished, nor any court or public body, has any power whatever to declare a holiday which has any legal effect, or which can bind the public or the rights of third parties. Nothing but an act of parliament has that effect, and not even a proclamation of the Crown would be sufficient. Hence it is that when a solemn national fast is proclaimed, which is to be put on the same footing as a Sunday, it requires a special act of parliament to make it binding on the public in matters of business.

HOLINSHED, Raphael, an English chronicler, was born of a Cheshire family, in the early part of the 16th c., and died between 1578 and 1582. The work by which he is remembered is entitled *The Chronicles of Englande, Scotlande, and Irelande* (2 vols. fol. Lond. 1577). This edition—the first—is known as the 'Shakspeare' edition, from the fact of its having supplied the great dramatist with materials for his historical plays. It contained some passages disagreeable to Queen Elizabeth, which were omitted in the second edition of 1587. A modern edition, in 6 vols., was published in 1807—1808, with the 'disagreeable passages' restored. H., although the principal, was not the only author of these *Chronicles*. He was assisted in his labours, among others, by William Harrison, who wrote the historical descriptions of the island of Britain; and by Richard Stanihurst, who contributed an account of the condition of Ireland, to which John Hooker added the 'Conquest of Ireland' (a translation from the Latin of Giraldus Cambrensis). H. has always been a great favourite with black-letter scholars, and has been freely used by modern historians.

HOLKAR, the name of a powerful Mahratta family, the members of which have at various times been formidable enemies to the British empire in Hindustan. The founder of the family was Mulhar Rao Holkar, who was born in the Deccan, 1693, and having gained by his valour the favour of the Peishwah, obtained from him the western half of Malwah, with Indore for his capital. In 1761, he joined the great league of the princes of Hindustan, formed to bar the progress of Ahmed Shah Durani, and was present at the battle of Paniput, 14th January 1761; but as he fled shortly after the battle had commenced, he was suspected of treason. H. was the only Mahratta chief of note who returned from that dreadful slaughter. He died in 1768, and was succeeded by his niece, Aylah-Baee, who resigned the military power to Tokhagi Holkar. On his death in 1797, his natural son, Jeswunt Rao Holkar, a man able, brave, and unscrupulous, seized Indore, but was driven out by Scindia. Such, however, was H.'s reputation for energy and ability, that part of the victorious army deserted to him, with whom, and his own troops, he obtained a signal victory over Scindia and the Peishwah (October 1802). After fighting a long time against the British with varying success, he was compelled to conclude peace, and died insane, October 20, 1811. His son, Mulhar Rao Holkar II., a minor nine years old, succeeded, and in 1817 declared war against the British, but his army was totally routed at Mahedpore, 21st December; whereupon he sent offers of peace, which were accepted, and *an English residency was established at Indore in January* 1818. He died in 1833. Martund Rao Holkar, Hurri Rao Holkar, and Kumdi Rao Holkar, successively ruled after him; but the last of these dying without heirs, the East India Company assumed the right of nominating Mulkerji Rao Holkar, who was educated under the auspices of the British government, and who has displayed great ability since he assumed the reins of government in 1852. On the breaking out of the mutiny in 1857, he took the field in support of the British, but the refractory behaviour of his troops prevented his rendering any effective assistance.

HOLLAND, Lord, Henry Richard Fox, Vassall-Holland, third baron, F.R.S., an English statesman, was descended from Henry Fox, first baron, secretary of state to George II. H. was born at Winterslow House, Wilts, in 1773, and succeeded to the title on the death of his father, the second baron, in 1774. He went to Eton, and thence to Christ Church. He was trained for public life by his celebrated uncle, Charles James Fox, and made his first speech in the House of Lords in January 1798. After the death of Mr Fox, H. held the post of lord privy seal in the Grenville ministry for a few months. He then shared the long banishment of the Whigs from the councils of their sovereign. During this long and dreary interval, H., to use the language of Macaulay (who has paid an eloquent tribute to his memory), was the 'constant protector of all oppressed races and persecuted sects.' He held unpopular opinions in regard to the war with France, and signed a protest against the detention of Napoleon at St Helena. On the other hand, he laboured to ameliorate the severity of the criminal code; made manful war, though a West India planter, on the slave trade; threw his whole heart, though a landowner, into the struggle against the Corn Laws; and although by rank and breeding an aristocrat, laboured incessantly to extend and confirm the rights and liberties of the subject. In 1830, he became chancellor of the duchy of Lancaster, and a member of the reform cabinet of Earl Grey, and these posts he also held in the Melbourne ministry. He died at Holland House, Kensington, October 22, 1840. In his ample person and expressive features, he resembled his celebrated uncle.

HOLLAND, a name frequently applied to the kingdom of the Netherlands (q. v.), although in the strictest sense it is applicable only to the provinces of North and South Holland (q. v.).

HOLLAND, New, the name formerly applied to the island or continent of Australia (q. v.).

HOLLAND, Parts of. See Lincolnshire.

HOLLAND, North, a province of the kingdom of the Netherlands, lying between 52° 10′ and 53° 18′ N. lat., and 4° 30′ and 5° 20′ E. long. Area, 1050 square miles, and population (1872) 591,338. North H. consists of a peninsula joined to the mainland at its southern extremity, and of the islands of Wieringen, Texel, and Vlieland, lying at its northern extremity. It is bounded on the W. by the German Ocean, and on the E. by the Zuider Zee. The surface is marshy, and in many places lies below the level of the sea, from whose encroachments it is protected by dunes and dykes, while canals intersect and drain it in every direction. The principal river is the Amstel. The canal from Amsterdam to Nieuwediep is an important waterway, but will soon be superseded (for large ships) by one in process of construction (1874).

The Haarlem Lake (q. v.) has been drained and converted into productive land, with a population (in 1870) of 11,272, but there still exist various small lakes or ponds in the marshy districts. The chief towns of the province are Amsterdam, Haarlem, Alkmaar, Zaandam or Saardam (q. v.).

HOLLAND, South, a province of the kingdom of the Netherlands, lying between 51° 45′ and 52° 20′ N. lat., and 3° 50′ and 5° 10′ E. long. Area, 1162 square miles, and population (1873), 710,753. It is bounded on the N. by North Holland, E. by Utrecht and Gelderland, S. by the Maas, which separates it from Zeeland and North Brabant, and W. by the German Ocean. South H. comprises the land around the embouchures of the Rhine and Maas, which is cut up in its southern portions into several islands—viz., Voorne, Overflackkee, and Goeree, Putten, Ysselmonde, Beijerland, &c.

The country is flat and low, and is broken by no elevation beyond the downs, which protect it from the sea. Streams and canals intersect it in all directions, and it abounds with lakes and with *polders*, or lands that have been recovered from the sea or lakes by draining. One of the most noted of these is the Biesbosch, land recovered from a marshy lake which was formed by the terrible inundation of 1421. The chief rivers are the Old Rhine, the Yssel, Lek, Maas, and Merwede. The principal towns of South H. are the Hague, Leyden, Rotterdam, Dordrecht, Gorinchem, Brielle, Gouda, Delft, and Schiedam (q. v.). The two provinces of Holland rank among the most populous districts of Europe, and their inhabitants are distinguished for indefatigable industry and habits of great cleanliness. The rearing of cattle, of which there are upwards of a million in North and South Holland, and the preparation of butter and cheese, constitute the principal sources of industry in the rural districts. Alkmaar in North Holland, and Gouda in South H., are the great centres of the cheese-trade. The provinces of Holland enjoy the largest share of the national commerce and wealth.

HOLLAND, Sir Henry, Bart., M.D., F.R.S., D.C.L., &c., an eminent physician, born at Knutsford, Cheshire, in 1788. He received his professional education in London, and subsequently at the university of Edinburgh, where he graduated as M.D. in 1811. He then spent two or three years in the east of Europe; and in 1815, after his return to England, published his *Travels in Albania, Thessaly, &c.*, in a 4to volume. He settled in London, and soon rose to high eminence in his profession, of which he became one of the recognised heads. In 1828, he was elected a Fellow of the Royal College of Physicians, a distinction at that time very rarely conferred upon a Scottish M.D. In 1840, he was appointed physician-in-ordinary to the Prince Consort, and in 1852, physician-in-ordinary to the Queen. In the following year, he was made a baronet. In 1856, the university of Oxford conferred on him the honorary degree of D.C.L., and he has likewise received the degree of LL.D. from the university of Cambridge, Massachusetts. In 1840, he published a volume entitled *Medical Notes and Reflections*, consisting of 34 essays upon various of the most interesting departments of medicine and psychology, which has passed through several editions. In 1852, his *Chapters on Mental Physiology* appeared, which are expansions of those essays in his former work which treated of 'that particular part of human physiology which comprises the reciprocal actions and relations of mental and bodily phenomena.' His *Essays on Scientific Subjects*, published in 1862, and embracing the consideration of many of the most profound subjects in physics, shew that if his special studies had taken a different direction, he would have attained fame as a natural philosopher. The *Recollections of Past Life* he published in 1871. H. died Oct. 1873.

HOLLANDS. See Gin.

HOLLOW-WARE. A trade term, applied to such common iron utensils as are hollow, such as caldrons, sauce-pans, kettles, &c.

HOLLY (*Ilex*), a genus of trees and shrubs of the natural order *Aquifoliaceæ*, chiefly natives of temperate climates; with evergreen, leathery, shining, and generally spinous leaves; small flowers which have a 4—5-toothed calyx, a wheel-shaped 4—5-cleft corolla, 4 or 5 stamens, and the fruit globose and fleshy, with 4 or 5 stones (*nuts*). The Common H. (*I. aquifolium*), the only European species, and a native also of some parts of Asia, is a well-known ornament of woods, parks, and shrubberies in Britain, the stiffness of its habit being so compensated by the abundance of its branchlets and leaves, as to make it one of our most beautiful evergreens. It is found as a native plant in Scotland, although Britain is nearly its northern limit; and it attains a greater size and displays greater luxuriance in the northern than in the southern parts of its geographic range, often appearing in the former as a tree of considerable size, 20 to 50 feet high, whilst in the latter it is generally a mere bush. It prefers light soils. There are numerous varieties of H., produced, or at least perpetuated by cultivation, exhibiting great diversity in the leaves, of which the *Hedgehog H.* may be mentioned as extremely sinuous and spinous, whilst others are prized for their colour, golden, silver-blotched, &c. The flowers of the H. are whitish, axillary, nearly umbellate; the fruit small, scarlet, rarely yellow or white. The abundance of the fruit adds much to the ornamental character of the tree in winter, and affords food for birds; but to man it is purgative, emetic, and diuretic, and in larger quantities poisonous. The leaves are inodorous, have a mucilaginous bitter and somewhat austere taste, and have been used medicinally in cases of gout and rheumatism, as a diaphoretic, and also as an astringent and tonic to correct a tendency to diarrhœa, &c. The leaves and small branches, chopped, are sometimes used for feeding sheep in severe winters. The root and bark are emollient, expectorant, and diuretic. Bird-lime (q. v.) is made from the inner bark. The wood is almost as white as ivory, very hard and fine-grained, and is used by cabinet-makers, turners, musical instrument-makers, &c., and sometimes for wood-engraving. Handles of tools and handles of metal tea-pots are very often made of it. The H. is often planted for hedges, as it bears clipping well, and makes an excellent fence. A H. hedge may either be kept low, or, as is the case at Tyninghame, in East Lothian, allowed to grow to the height of 20 or 30 feet. In the gardening of former days, hollies were often clipped into fantastic shapes. The name H. is said to be derived from the use of the branches and berries to decorate churches at Christmas, from which the tree was called Holy Tree.—Numerous other species of H. are found in North America, most of them in swampy situations, in South America, Nepaul, Japan, and other parts of the world; some of which have now become not unfrequent ornamental trees and shrubs in Britain.—MATÉ (q. v.), or *Paraguay Tea*, is the leaf of a South American species of H. (*I. Paraguensis*).

HOLLY SPRINGS, a village in Northern Mississippi, United States, America, on the Central Railway, 25 miles south of its junction with the Memphis and Charleston line. It is the principal town in Northern Mississippi, and contains several churches, four academies, a bank, and two or three newspapers, with a large trade in cotton and merchandise. Pop. (1870) 3000.

HO'LLYHOCK (*Althæa rosea*), a plant of the natural order *Malvaceæ*, commonly referred to the same genus with the Marsh Mallow (q. v.). It has a tall, straight, hairy stem; heart-shaped, crenate, wrinkled, 5—7-angled leaves, and large axillary flowers almost without stalks; the leaves diminishing into bracts, and the upper part of the stem forming a spike; the petals hairy at the base. The H. is a native of India, the south of Europe, &c., is to be seen in almost every garden in India, and has been much cultivated in gardens in Britain from a very early period. At present, it is a favourite flower, and varieties, the result of cultivation, are very numerous. It varies much in the colour of the flowers, and double and semi-double varieties are common. It is an autumnal flower, continuing till the frost sets in. It is a biennial or perennial plant. The stem rises to a height of 8—15 feet, unbranching, or nearly so. The fibres of the plant have been made into yarn, but it is not yet certain if it is really valuable for cultivation on this account, or for the manufacture of paper. It is not improbable that it might be cultivated with advantage to afford green fodder for cattle, which are very fond of its leaves, and the leaves are produced in great abundance if the plant is prevented from flowering. The flowers are mucilaginous and demulcent, and are sometimes used like those of mallows and marsh mallows. The leaves yield a fine blue dye.—The CHINESE H. (*A. Chinensis*) is an allied species.

HOLMES, OLIVER WENDELL, M.D., an American physician and author, was born at Cambridge, Massachusetts, August 29, 1809. In 1829, he graduated at Harvard College, and entered upon the study of law, but soon adopted his father's profession—medicine. He studied in Europe, graduated as doctor of medicine in 1836, and two years after was appointed professor of anatomy and physiology in Dartmouth College; and in 1847, was transferred to the same chair at Harvard, the medical department of which is at Boston, where he has since resided. Dr H. is not only a man of science, but a humorous and satirical poet of much ability. Several of his lyrics also are among the most exquisite produced in America. Most of his poems have been delivered before college literary societies, as *Poetry, a Metrical Essay; Terpsichore; Urania;* and *Astræa*. In 1857 he contributed his *Autocrat of the Breakfast Table*, a connected series of prose essays, to the *Atlantic Monthly*, which was followed by *The Professor at the Breakfast Table*, which has the added interest of a story. A remarkable work is the singular romance, *Elsie Venner* (1861). Dr H. is one of the most popular of public lecturers. Of medical writings may be mentioned *Boylston Prize Dissertations, Lectures on Homœopathy and its Kindred Delusions*, a *Report on Medical Literature*, besides many articles in professional periodicals. In 1868, he published a second novel, entitled *The Guardian Angel;* and in 1870, *Mechanism in Thought and Morals*.

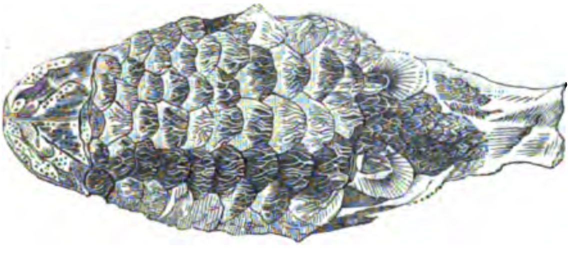
HOLOCA'NTHUS, a genus of fishes, of the family *Chætodontidæ* (q. v.), remarkable for the great beauty and symmetry of their colours, and for their excellence as articles of food. They have the very compressed form and other general characters of the *Chætodontidæ*, a single dorsal fin, and a large spine on the gill-cover. They are natives of the seas of warm climates. *H. imperator* is one of the most esteemed fishes of the East Indies, rivalling the salmon in flavour. Its greatest size is about 15 inches long; its colour is deep blue, with numerous narrow bands of orange, the pectoral fins black, the tail bright yellow. It is known in some parts of the East as the *Emperor of Japan*.

HO'LOCAUST. See SACRIFICE.

HOLOFE'RNES. See JUDITH.

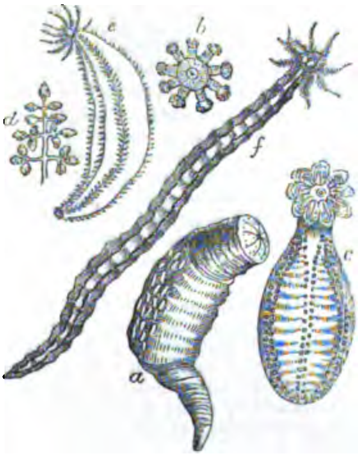
HO'LOGRAPH (Gr. *holos*, all, and *graphe*, writing), deed or writing, in Scotch Law, means a writing in which the author or maker does his own penmanship. Considerable privileges are given to this species of writing, whereas, in England and Ireland, it is in general utterly immaterial whose penmanship is used, provided the party sign or seal the writing or deed. In Scotland, if a person execute his will or a deed in holograph, this dispenses with the usual formalities which would be requisite if he merely signed a paper written by another hand, for no witnesses are required to attest holograph deeds or testaments. If the handwriting, however, is disputed, evidence must be given as to whose handwriting it is. In England, it is quite immaterial whether a person writes out his own will or not; in either case there must be two witnesses. So in the case of holograph missive writings and accounts, there is a difference as to the period of prescription applicable in Scotland, but in England there is no distinction merely on this ground. The distinction between holograph and other deeds also prevails in the law of France and other continental countries.

HOLOPTY'CHIUS (*holos*, all, and *ptychē*, wrinkle), a remarkable genus of fossil ganoid fishes, so named from the wrinkled appearance of the enamelled scales. They were of large size, some species probably reaching the length of 12 feet. The small head was covered with large tuberculated plates, like those of the crocodile, and the body was completely encased in large scales, more like those of a reptile than a fish. Some scales have been found measuring 3 inches in length by 2¼ in breadth, and a full eighth of an inch in thickness. They were composed internally of porous bone, in numerous layers, arranged alternately at right angles to each other, and the outside was covered with a bright glossy corrugated enamel. The spines of the fins were large and hollow; the bones were partially ossified; the centre remained in its original cartilaginous condition, and consequently appears hollow in the fossil. The jaws were covered with hard enamel instead of skin, and were furnished with a double row of teeth; the outer row, placed along the edge of the mouth, were small and thickly set; the inner range were widely set, and very large, at least twenty times the bulk of the others. The specimen figured was obtained at Clashbennie, on the Firth of Tay, by Mr Noble; it now forms part of the British Museum collection. It is a foot across by two feet and a half long without the tail, which is wanting. It is nearly perfect, lying on its back, with the scales and the ventral fins in their original position.



Holoptychius Nobilissimus (Agass.).

The genus is peculiar to the Old Red Sandstone and Carboniferous Measures; eight species being found in the former, and nine in the latter. It has been proposed to confine the name Holoptychius to the fossils of the Old Red Sandstone, and to give that of Rhizodus, which Owen applied to the teeth remains before their connection with the fish was known, to the Holoptychians of the Coal Measures, which have the outer row of teeth more robust and obtuse, and the inner set longer, sharper, and more slender than in the older species.



Holothuria:
a, H. phantapus; *b*, buccal appendages of H. phantapus; *c*, H. papillosa; *d*, an isolated branch of the buccal appendages of H. papillosa; *e*, H. cucumis; *f*, H. vittata.

HOLOTHU'RIA, a genus of *Echinodermata* (q. v.), the former limits of which are now those of a family, *Holothuridæ*, divided into numerous genera. SEA-SLUG and SEA-CUCUMBER are popular names of some of the animals of this family. The *Holothuridæ* have not the covering of calcareous plates characteristic of the more typical *Echinodermata*, but a soft leathery muscular integument, very irritable, and capable of great distention and contraction. Some of them are almost globose, some so much elongated as to be almost worm-like; but the same individual is often capable of extending itself to several times the length which it has in a state of repose. In locomotion, the body is extended and contracted as by the annelides, but the principal organs of locomotion, as in star-fishes and sea-urchins, are suckers or *Ambulacra* (q. v.), of which there are usually five double rows, whilst sometimes they are distributed over the whole surface of the body; but some of the species have the suckers developed only on a disc, and the body then presents an upper and an under surface. The radiate structure is most apparent in the mouth, which is surrounded with tentacles, in number always a multiple of five, exhibiting great variety of beautiful forms, and capable of being completely retracted. Little is known of the food of the *Holothuridæ*, which, however, probably consists of small marine animals. Within the opening of the mouth there is a circle of teeth. There is no proper stomach. The intestine is often very complicated. The respiratory organs are near the anus, and consist of branching tubes. The organs of both sexes are found in each individual. The young pass through several stages or transformations, in which they are very unlike their parents; in their first stage, after leaving the egg, they swim vigorously by means of membranous expansions of the body. The *Holothuridæ* are capable of the most extraordinary reproduction of parts, even of the most important organs. They are found in all seas, but particularly abound in the Red Sea, and between the south of Asia and Australia. The largest European species, *H.* (*Cucumaria*) *frondosa*, occasionally found in the British seas, is about a foot in length, and capable of extending itself to three feet. Most of the British species are small, and they are not of a pleasing appearance as they usually come under observation, although the expanded tentacles give them beauty in their proper abodes. But many of the tropical species exhibit splendid colours, and are among the creatures which make the bottom of the sea, particularly among coral reefs and islands, gay and lovely as a garden.

The *Bêche-de-mer* (q. v.), or Trepang, so much esteemed as a delicacy by the Chinese, belongs to this family.

HO'LSTEIN, formerly a duchy belonging to Denmark, and at the same time a member of the Germanic Confederation, was annexed in 1866 to Prussia. It is separated from Slesvig on the N. by the river Eyder and the Slesvig-Holstein Canal; is bounded on the E. by the Baltic Sea, the territory of Lübeck, and the duchy of Lauenburg; on the S. by the Hamburg territory and the river Elbe, which separates it from Hanover; and on the W. by the North Sea. Area, 3270 square miles; pop. 554,510. The principal rivers, besides the Elbe and the Eyder, are the Stör and the Trave. Of the surface of the land, one-eighth consists of marshes. The central districts of the province are occupied by an undulating plain, varied by low hills, and traversed from north to south by a heathy and sandy ridge, from which the land falls away gradually on the east—where the surface is varied by lakes and fertile well-wooded valleys—and on the west. The soil, with the exception of several tracts of sand and heath, is very fruitful, and is most luxuriant in the marshes. The climate and natural productions closely resemble those of similar districts in the north of Germany. Salt and lime are the only minerals found. Amber is obtained on the eastern coast, and the interior abounds in peat. The manufactures of H. are inconsiderable; agriculture and the rearing of cattle are the chief employments of the people. The history of H. and its political relations are noticed in the article SLESVIG.

HO'LSTERS, cases for pistols affixed to the pommel of a saddle. They are frequently covered with wool or fur, to prevent injury to the rider in the event of his being thrown forward upon them.

HOLY ALLIANCE, a league formed after the fall of Napoleon by the sovereigns of Russia, Austria, and Prussia, nominally to regulate the relations of the states of Christendom by the principles of Christian charity, but really to preserve the power and influence of the existing dynasties. Most of the other European rulers acceded to it, and the treaty was formally made public in the *Frankfurt Journal*, February 2, 1816. It was in virtue of this league that Austria, in 1821, crushed the revolutions in Naples and Piedmont, and that France, in 1823, restored absolutism in Spain. Subsequently, both France and England seceded, after which it became a mere *nominis umbra*. A special article of the treaty excluded for ever the members of the Bonaparte family from any European throne!

HOLY COAT, a relic preserved with the greatest reverence in the cathedral of Treves, of which city it is esteemed the greatest treasure. It is alleged to be the seamless coat of our Saviour, and to have been discovered in the 4th c. by the Empress Helena, in her memorable visit to Palestine, and by her deposited at Treves. The Treves relics were concealed from the Normans in the 9th c. in crypts; but the Holy Coat was rediscovered in 1196, and then solemnly exhibited to the public gaze, which did not take place again till 1512, when multitudes flocking to see and venerate it, Leo X. appointed it to be exhibited every seven years. The Reformation and wars prevented the regular observance of this great religious festival; but it was celebrated in 1810, and was attended by a concourse of no fewer than 227,000 persons; and in 1844 by still greater multitudes, whilst miraculous cures were confidently asserted to be performed by the precious relic. The exhibition of the Holy Coat in 1844 is otherwise memorable for the reaction which it produced, leading to the secession of Rongé and the German Catholics from the Church of Rome.—For further information see *The Book of Days*, published by W. & R. Chambers.

The Holy Coat of Treves.

HOLY FAMILY, the name given, in the language of art, to every representation of the infant Saviour and his attendants. In the early part of the middle ages, when the object in view was to excite devotion, the Virgin and Child were usually the only persons represented. At a later period, Joseph, Elizabeth, St Anna (the mother of the Virgin), and John the Baptist, were included. Some of the old German painters have added the twelve apostles as children and playfellows of the infant Christ, as well as their mothers, as stated in the legends. The Italian school, with its fine feeling for composition, was the first to recognise of how many figures the group must consist, if the interest is to remain undivided, and be concentrated on one figure, whether that figure be the Madonna or the Child. Two masters are pre-eminent in this species of representation—Leonardo da Vinci and Raphael.

HOLY GHOST, or **HOLY SPIRIT**, in Orthodox Theology, the third person of the Trinity (q. v.), proceeding from the Father and the Son, yet of one substance, majesty, and glory with the Father and the Son, very and eternal God. His distinct personality is believed to be attested by a multitude of passages in Scripture, which it is unnecessary to quote. One may suffice: 'But when the Comforter is come, whom I will send unto you from the Father, even the Spirit of truth, which proceedeth from the Father, he shall testify of me' (John xv. 26). The 'Procession' (q. v.) of the Spirit is the subject of one of the chief differences between the Eastern and the Western or Latin Churches. He is essentially a spirit of holiness, and his grand function is to apply to the hearts of men the benefits of Christ's death, to work in them, first, a belief of the truth as it is in Jesus, and then to sanctify them by that truth.

HOLY GRASS (*Hierochloe borealis*), a grass about a foot high, with a brownish glossy lax panicle. It is found in the most northern parts of Britain, and in the north of Europe. It has a sweet smell, like that of vernal grass; and in Iceland, where it is plentiful, it is used for scenting apartments and clothes. In some countries, it is strewed on the floors of places of worship on festival-days, whence its name.

HOLY ISLAND, or **LINDISFA'RNE**, a small island of England, belonging to the county of Northumberland, and situated about ten miles south-east of Berwick-on-Tweed. It is about four miles long, and two miles broad, and is connected with the mainland by sands three miles in extent, which can be traversed at low-water by vehicles of all kinds. Pop. of parish (1871) 876; but, including the chapelries of Kyloe and Ancroft (which are both in the ancient parish), and called *Islandshire*, 3764. On the south coast is the village of Holy Island, finely situated, and now much resorted to by summer visitors. On the island are several ruins, the chief of which are the extensive and sombre-looking remains of the famous Abbey of Lindisfarne, originally a Saxon edifice; there is also an ancient castle, now fortified and occupied by a party of artillery. In former times, H. I. was the seat of a bishopric.

HOLY LAND. See PALESTINE.

HOLY PHIAL, or SAINTE AMPOULE, ORDER OF, the name of an order of knighthood which formerly existed in France, and was composed of four persons, usually the first in point of rank, family, and fortune in the province of Champagne, and styled *Barons de la Sainte Ampoule.* At the coronation of the French kings, they were delivered to the Dean, Priors, and Chapter of Rheims, as hostages for the fulfilment of the engagements entered into by the great officers of the crown to return the holy phial in which the coronation oil was kept, and which, according to the legend, was brought from heaven by the Holy Ghost under the form of a dove, and put into the hands of St Remy at the coronation of Clovis—an enormous crowd having prevented the messenger from bringing in time that which had already been prepared. The peculiarity of this order was that the knights were only knights for a day. Their badge was a cross of gold enamelled white, cantoned with four fleur-de-lis, and on the cross a dove descending with a phial in its beak, and a right hand receiving it.

HOLY PLACES, HOLY SEPULCHRE. Under the head JERUSALEM (q. v.) are enumerated many localities which, from the memories associated with them, must be full of solemn interest for every religious mind; but the name Holy Places of Jerusalem more strictly designates the group of sacred places of which the Church of the Holy Sepulchre is the centre, and which are supposed to comprise the sites of the chief events of our Lord's passion, death, and burial: Gethsemane, the Supper-room, the Church of the Ascension, the Tomb of the Virgin, &c.

In the article JERUSALEM, the general topography of the ancient and modern city is briefly described. The so-called Church of the Holy Sepulchre stands within the modern city, on the north-western or Latin quarter. It is a Byzantine building, in the centre of a spacious enclosed court. Under the great dome of the church stands the Holy Sepulchre, which is of an oblong form, fifteen feet by ten, and is surmounted by a rich ceiling, decorated with gold, silver, and precious marble. A circular hall surrounds the space beneath the dome. Around this circular hall are oratories for the Syrians, Copts, and Maronites; and above it is a series of galleries, which are similarly appropriated. In the body of the church are the chapels of the Greek, Latin, and Armenian Christians, the church as a whole being maintained by the Ottoman authorities in the condition, as it were, of a common meeting-ground for all the Christian communions, as the rivalries of the several religious bodies constantly lead to angry controversy, and not unfrequently to sanguinary conflicts. Opposite the entrance of the enclosure is a somewhat elevated marble slab, which is called the Stone of Unction, and is shewn as the stone on which our Lord's body was anointed before entombment; and above is an elevation approached by steps, which is the traditionary Mount Calvary, and on which now stands a rich dome-shaped building, floored with rich marbles, in the crypt of which is the cavity supposed to have been formed by the erection of the cross. The street by which this site is approached, from the direction of the ruins of Herod's palace, on the north side of the city, is the principal street of the Latin quarter, and is called by the Turks *Harât-el-Albam,* and by the Christians the *Via Dolorosa,* as being the supposed route of our Lord from the hall of judgment to Calvary.

Such is the traditional view as to the locality, not only of these leading events of our Lord's history, but also of many others of minor importance, and less prominently noticeable. For a long course of ages, the Christian world unhesitatingly acquiesced in this view of the topography of the Holy Places; but since the beginning of last century, doubts have been entertained as to its correctness; and in late years, the question has been discussed with much learning, although with little positive, or at least conclusive result. About the year 1730, a German, named Korte, who had visited Jerusalem, and explored the locality, published a work, calling the authenticity of the received system of sacred topography into question. The doubts expressed by him have been repeated at intervals ever since his day, and especially by the celebrated American critic, Dr Robinson, author of *Biblical Researches in Palestine,* who may be said, in two successive investigations, to have exhausted the evidence, on one side of the question, at least so far as the remains of the ancient city had at that time been explored. Dr Robinson distinctly affirms the impossibility of reconciling the received sacred localities with the plain requirements of the gospel history; but he fails himself to point out a scheme of topography which may be substituted for that which has been traditionally received. More recent critics, and especially Mr James Ferguson, in an *Essay on the Ancient Topography of Jerusalem,* agreeing with Dr Robinson in rejecting the received topography, contends against him that the true site of the Holy Sepulchre can be accurately determined, and that it is no other than the Mosque of Omar, or, as the Mohammedans call it, the 'Dome of the Rock.' This he holds to be the identical church which Constantine erected over the rock which contained the tomb of our Lord. Dr Stanley, a late biblical traveller in Palestine, left the question undecided. We can here do nothing more than refer the reader to the chief authorities on each side of the controversy. It is one upon which future explorers may throw much light by skilful and judiciously conducted excavations. See, on the one side, Robinson's *Biblical Researches in Palestine;* Smith's *Dictionary of the Bible,* article 'Jerusalem' (Ferguson); *Essay on the Ancient Topography of Jerusalem,* by the same author. On the other, Williams's *Holy City;* Raumer's *Beiträge zur Bibl. Geographie;* Sepp's *Forschungen eines Deutschen Reisenden in Jerusalem;* Schaffter's *Aechte Lage des heiligen Grabes.* Under the auspices of the Palestine Exploration Fund, diligent researches are now being carried on at Jerusalem; several important discoveries were made in 1874.

HOLY SEPULCHRE, KNIGHTS OF THE, an order of knighthood instituted, probably by Pope Alexander VI., for the guardianship of the Holy Sepulchre, and the relief and protection of pilgrims. The pope was originally the grand-master, but he subsequently ceded his rights to the Guardian Father of the Holy Sepulchre. The knights must, by the rules of the order, be all of noble descent; they were bound to hear mass daily, to fight, to live, and to die for the Christian faith, &c. In return for these duties, the knights had the most unusual and extraordinary privileges conferred on them: they were exempt from taxation, could marry, and yet possess church property, legitimise bastards, and cut down and bury the bodies of criminals who had been hanged. On the recapture of Jerusalem by the Turks, the knights retired to Italy, and settled at Perugia. After a temporary union with the Hospitallers, the order was reconstructed in 1814 both in France and in Poland, and is still in existence within a very small circle of knights elected by the Guardian Father from the most respectable pilgrims who come to Jerusalem.

HOLY WATER, in the Roman Catholic, as also in the Greek, Russian, and Oriental churches, signifies water blessed by a priest or bishop for certain religious uses. Water is, almost of its own nature, a fitting symbol of purity; and accordingly, in most of the ancient religions, the use of lustral or purifying water not only formed part of the public worship, but also entered largely into the personal acts of sanctification prescribed to individuals. The Jewish law contained many provisions to the same effect; and our Lord, by establishing baptism with water as the necessary form of initiation into the religion instituted by him, gave his sanction to the use, which, from its universal acceptance among mankind, appears to be a relic of the primeval natural revelation. The usage of sprinkling the hands and face with water before entering the sanctuary, which was prescribed in the Jewish law, was retained, or at least very early adopted, in the Christian church. It is expressly mentioned by Tertullian in the end of the 2d century. And that the water so employed was blessed by the priests we learn, among others, from St Jerome, and from the apostolical constitutions. Although it is difficult to fix the precise time, it cannot be doubted that the practice of mingling salt with the water is of very ancient origin (see Canon 20, *De Consecr. Dist.* iii.). In the Western Church, there is a solemn blessing of water in the service of Holy Saturday, but the ceremonial is repeated by the priest whenever it may be necessary to replenish the fountain. Instructed Catholics regard the use of holy water chiefly as a means of suggesting to the mind the necessity of internal purity; and although it is supposed to derive from the blessing a special efficacy for this end, yet this efficacy is held to be mainly subjective and of a character entirely distinct from that ascribed to the sacramental rites of the church. In the reformed churches, the use of holy water is regarded as unscriptural and superstitious.

HOLY WEEK, the week immediately preceding Easter, and specially consecrated to the commemoration of the Passion of our Redeemer. In English use, it is also called 'Passion Week' (a name appropriated, in Roman use, to the week before Palm Sunday). This institution is of very early origin, and the name Holy Week is but one of many by which its sacred character has been described. It was also called the 'Great Week,' the 'Silent Week,' the 'Week of the Holy Passion,' the 'Vacant Week,' the 'Penitential Week.' In the Roman Catholic Church, the special characteristics of the celebration of the Holy Week are increased solemnity and gloom, penitential rigour, and mourning. If any of the ordinary church festivals fall therein, it is transferred till after Easter. All instrumental music is suspended in the churches, the altars are stripped of their ornaments, the pictures and statues are veiled from public sight; manual labour, although it is no longer entirely prohibited, is by many persons voluntarily suspended; the rigour of fasting is redoubled, and alms-deeds and other works of mercy sedulously enjoined and practised. All church services of the week, moreover, breathe the spirit of mourning, some of them being specially devoted to the commemoration of particular scenes in the Passion of our Lord. The days thus specially solemnised are Palm Sunday, Spy Wednesday, Holy (or Maundy) Thursday, Good Friday (q. v.), Holy Saturday. Holy Thursday (called also Maundy Thursday, from *Mandatum*, the first word in one of the church services of the day), in the Roman Catholic Church, is specially designed as a commemoration of the Last Supper, and of the institution of the Eucharist. But there are several other services annexed to the day, as the solemn consecration of the oil or chrism used in baptism, confirmation, orders, and extreme unction, the washing of pilgrims' feet, and the tenebræ. To Holy Saturday belongs the solemn blessing of fire and of the water of the baptismal font; and from the earliest times, it was set apart for the baptism of catechumens, and for the ordination of candidates for the ecclesiastical ministry. From the fire solemnly blessed on this day is lighted the Paschal Light, which is regarded as a symbol of Christ risen from the dead. This symbolical light is kept burning during the reading of the gospel at mass throughout the interval between Easter and Pentecost. See Wetser's *Kirchen-Lexicon*, art. 'Charwoche.' It must be added, however, that in many instances the primitive institution of the Holy Week was perverted, and that the suspension of labour, which was originally designed for purposes of devotion and recollection, was turned into an occasion of amusement not unfrequently of a very questionable character. Such abuses are now universally discountenanced by the ecclesiastical authorities.

In the Protestant communions, there is no special solemnisation of the Holy Week, with the exception of Good Friday (q. v.), which is observed in some of them.

HO'LYHEAD, a seaport, parliamentary borough, and market-town of North Wales, in the county of Anglesea, is situated on a small island of the same name, 24½ miles west-north-west of Bangor, and 272 miles north-west of London. Although recently much improved, it is still a primitive, irregularly built town. It is the station of the mail steam-packets to Dublin, from which it is distant about 69 miles. The harbour of H., which is almost dry at low tide, is formed by a pier about 1000 feet in length, running north-east from an islet called Salt Island, which is connected with the mainland by a swivel-bridge. Few manufactures are carried on here. Pop. (1871) 5916, who are employed in the coasting-trade, and in ship-building and rope-making. The fine harbour of refuge constructed at this town in 1862, encloses an area of about 316 acres, with a depth of upwards of six fathoms. H. unites with Amlwch, Beaumaris, and Llangefni in sending a member to the House of Commons.

HOLYHEAD ISLAND, a small island of North Wales, lies west of the island of Anglesea, and forms part of the county of that name. Its greatest length is seven and a half miles, and its greatest breadth about three and a half miles. Area, about 6000 sq. acres; pop. (1871) 8595. H. I. is separated from Anglesea by a narrow sandy strait crossed by the Holyhead Road and the Chester and Holyhead Railway, which are formed by embankments or causeways, arched in the centre, to admit of the passage of the water. The island, which comprises some good pasture-ground for sheep, as well as a proportion of arable land, is for the most part rocky and barren. On the north-west coast are two islets, the North and South Stacks, the latter with a light-house, the light of which is visible at twenty miles' distance. The South Stack is connected with the island of H. by a suspension-bridge. The Stacks and the north coast of the island of H. are hollowed out by the action of the sea into magnificent caves, which are the haunt of innumerable sea-fowl. Principal town, Holyhead (q. v.).

HOLYROOD. In the year 1128, King David I. of Scotland founded at Edinburgh an abbey of canons regular, of the order of St Augustine. It was dedicated in honour of the Holy Cross or Rood, which was brought to Scotland by St Margaret about the year 1070, and became one of the heirlooms of the kingdom. The BLACK ROOD OF SCOTLAND (q. v.), as it was called, fell into the hands of the English at the battle of Neville's Cross in 1346, and as its history passed from remembrance, a fable sprung up telling how King David was prevailed upon by his young nobles to go a hunting on the solemn festival, by which the church yearly commemorated the finding of the Holy Cross at Jerusalem; how the chase lay through the forest, which in those days encircled Arthur Seat, and stretched almost to the gates of Edinburgh; how the king, in pursuit of a wild hart, outrode all his companions; how at the foot of Salisbury Crags the hart turned to bay, and overthrew the king's horse; how as it rushed at the king, threatening him with instant death, a cross, as if from between its antlers, miraculously slid into the king's hands; how at the sight of it the hart fled and vanished; and how the king, warned by a vision in his sleep, resolved to build a monastery in honour of the Holy Rood on the spot where his life had been so preternaturally saved. When this legend was invented, apparently about the year 1420, it had been forgotten that the first site of the abbey was not at the foot of Salisbury Crags, but within the walls of the castle, whence it was not finally removed until after the year 1174, to the eastern extremity of the Canongate, as the little burgh came to be called, which the canons erected between their abbey and the king's burgh of Edinburgh. The abbey was burned by the English in 1385, in 1544, and in 1547. Before it could be restored after these last conflagrations, the Reformation arrived, when the ruins of the choir and transepts were taken down to repair the nave. This was used as the parish church of the Canongate from about 1560 till 1672, when it was turned into the chapel-royal. In 1687, King James VII., having built another parish church for the Canongate, set the nave of the abbey church apart for the Roman Catholic service, and had it fitted up with stalls for the Knights of the Thistle. It was plundered and burned by the mob at the Revolution in 1688, and remained in neglect until 1758. In that year it was repaired and roofed, but the roof was too heavy for the walls, and it fell in 1768, crushing the pillars of the north aisle, and otherwise injuring the building.

The abbey of H. early became the occasional abode of the Scottish kings. John Balliol held a parliament within its walls in 1295. James II. was born in it, crowned in it, married in it, buried in it. The foundations of a palace, apart from the abbey, were laid by James IV., whose splendid nuptials with the Princess Margaret of England were celebrated here in 1503. Edinburgh had now become the acknowledged capital of Scotland, and H. henceforth was the chief seat of the Scottish sovereigns. Queen Mary took up her abode in the palace when she returned from France in 1561. Here, in 1566, Rizzio was torn from her side, and murdered. Her son, King James VI., dwelt much in H. before his accession to the throne of England in 1603. He revisited it in 1617. It was garrisoned by Cromwell's troops after the battle of Dunbar in 1650, when the greater part of it was burned down. It was rebuilt by King Charles II., from the designs of Sir William Bruce of Kinross, between 1671 and 1679. In 1745 and 1746, it was occupied in succession by Prince Charles Edward, and by the Duke of Cumberland. It sheltered the Count d'Artois (afterwards King Charles X. of France) from 1795 to 1799, and again from 1831 to 1835. King George IV. held his court in it in 1822. Since that time much has been done to make it a suitable residence for the sovereign, and for a good many years the Queen has visited it almost every summer.

The oldest part of the palace is the north-west tower, founded by King James IV. about 1500, and completed by his son, King James V., who died in 1542. It was somewhat modernised in 1671—1679; and the roofs, if not the floors also, were renewed by King Charles I. (1625—1649), whose cipher they bear; but otherwise the disposition of the rooms seems to be much the same as in the days of Queen Mary. It need scarcely be added, that the furniture is much more recent, and that the articles shewn as relics of Mary and her court are wholly spurious.

The palace, with its precincts and park, is a sanctuary for debtors. In England, the same privilege extends to royal palaces to this extent, that no writ of legal process can be executed within their bounds; but this practically is only a protection to the servants of the palace; and no means exist for insolvent persons taking lodgings in a privileged place there or elsewhere, and avoiding imprisonment, in so systematic a way as is competent to residents within the precincts of Holyrood Palace, where there is ample accommodation. The precincts comprehend the adjoining park and the hills of Arthur's Seat and Salisbury Crags. Refugee debtors must procure a certificate of protection within twenty-four hours from the proper official within the bounds. Taking refuge within the sanctuary is considered disreputable, and from this cause, as well as from recent meliorations in the laws affecting debtors, the practice is greatly fallen off. It is to be added, that the sanctuary of Holyrood shelters debtors to the crown.

HO'LYWELL, a municipal and parliamentary borough, and market-town of North Wales, in the county of Flint, and 4½ miles north-west of the town of that name, is situated on an eminence on the line of the Holyhead and Chester Railway, and near the south-western shore of the estuary of the Dee. It is the centre of an immensely valuable mineral district, and is the seat of numerous establishments for lead and copper smelting, manufacturing shot, zinc, &c. There are also manufactures of cottons, flannels, and galloons, paper, and Roman cement; coal and lead mines, and limestone quarries, are worked. This borough unites with those of Flint, Mold, &c., in returning a member to parliament. Pop. (1871) 7961.

H. is now one of the most important and flourishing towns of North Wales. It owes its origin to the renowned Well of St Winifred, which is estimated to deliver twenty-one tons of water per minute, and is said to be the most copious spring in Britain. Its waters were at one time believed to be efficacious in curing diseases, and were visited by great numbers of pilgrims.

HO'MAGE is the service or show of respect due from a knight or vassal to his lord in feudal times. The word is derived from the form of expression used in doing the service, which was—*jeo devigne vostre home*—I become your man. Since the abolition of tenures, the word has no substantial legal meaning in the law of England, except in a limited sense as to copyholds, to denote the kind of acknowledgment made by a tenant to the lord of the manor. The homage jury consisted of the tenants who did homage, and their presence was necessary to attest some acts. *Homagium reddere* was the expression, now obsolete, signifying a solemn renunciation of homage or fealty to the lord, and a defiance of him. The word homage is not used in Scotch law, though the feudal system is not obsolete in Scotland in many other respects.

HOMALO'PTERA (Gr. level-winged), the name given by some entomologists to a small order of insects, which has been more generally regarded as a division of the order *Diptera*. The H. have also been called PUPIPARA, from the remarkable circumstance that the larvæ are hatched within the body of the mother, and remain there till they have passed into the pupa state. Some of the H. are wingless. Examples of this order are found in the Forest Fly (q. v.), and in those extraordinary parasites of bats called *Nycteribia*. All the H. are parasites.

HO'MBURG VOR DER HÖHE, a pleasant little town in the province of Hesse-Nassau, Germany, is situated at the foot of the Taunus Mountains, nine miles north-west of Frankfurt-on-the-Maine. It has beautiful environs, and is much frequented on account of its mineral waters and, until recently, of gambling-saloons. The waters are considered very effective in cases of disordered liver and stomach. They are five in number, and one of them, the *Elizabeth*, contains more carbonic acid than any saline spa known. About 400,000 bottles of the 'waters' of H. are annually sent away. Pop. (1871) 8626.

HOME, HENRY (LORD KAMES), an eminent Scottish lawyer and author, was born in 1696 at Kames, in Berwickshire. Destined by his friends for the law, he was apprenticed in 1712 to a writer to the signet; but he afterwards decided on adopting the highest branch of his profession, and qualified himself for it mainly by private reading and attendance at the courts. Entering the bar in 1723, he was raised to the bench in February 1752, assuming the title of Lord Kames, and was made one of the Lords of Justiciary in 1763. He died 27th December 1782. In 1728, he published *Remarkable Decisions of the Court of Session from* 1716 *to* 1728. The materials of this work were in 1741 embodied in his *Dictionary of the Decisions of the Court of Session* during its whole history, which, though now superseded, was of great use to lawyers at the time, and was thought worthy of being continued by Lord Woodhouselee. He is best known, however, by his *Essays on the Principles of Morality and Natural Religion* (1751), containing a solution of the question of human freedom, which brought on him the suspicion of infidelity, and raised considerable controversy in the courts of the church and through the press; his *Introduction to the Art of Thinking* (1761); and above all, his celebrated *Principles of Criticism*, the work on which his fame now chiefly rests. In 1773 appeared his *Sketches of the History of Man*, which may be found entertaining, but are now of very little scientific value. Though thus busily occupied with judicial and literary labours, he took a very active interest in agriculture and commerce, and wrote a useful tract on the former, entitled *The Gentleman Farmer, being an Attempt to improve Agriculture by subjecting it to the Test of Rational Principles*. His last work, *Loose Thoughts on Education* (1781), was written in his 85th year. See Lord Woodhouselee's *Memoirs of the Life and Writings of Home* (2 vols. 4to, Edin. 1807).

HOME, JOHN, a Scotch clergyman and dramatist, was born in 1722. He studied for the church, and was appointed to the parish of Athelstaneford, where he wrote his tragedy of *Douglas*, which was acted in Edinburgh, and received with the utmost enthusiasm. The production of this piece gave great offence to his clerical brethren, and he was finally compelled to retire from the ministry. He retired into England, where he obtained the protection of the Earl of Bute, and received a pension. His other dramatic works are *Agis*, *Aquileia*, *The Fatal Discovery*, and *Alonzo*, every line of which has departed from the memory of mankind. He died in 1808.

It is difficult now to understand the enthusiasm with which *Douglas* was first greeted. It was praised by men of all ranks, and Burns—who should have known better—talks of H. having

'Methodised wild Shakspeare into plan.'

This enthusiasm has departed long ago. Still *Douglas* contains pathos, and amid its florid declamation there may be found not a few natural touches, and it is on account of these that it still haunts the stage in a shadowy kind of way.

HO'MELYN (*Raia miraletus*, or *maculata*), a species of Ray (q. v.), common on the south coast of England, and plentiful in the London market, but comparatively rare on the east coast of Scotland. In form and appearance, it more nearly resembles the thornback than the skate. On some parts of the British coast, the H. is called Sand Ray. It is also known as the Spotted Ray.

Homelyn (*Raia maculata*).

HO'MER, the greatest name in the history of epic poetry, and who stands as high in that department as Shakspeare does in the drama, has come down to us in modern times unfortunately as little better than a name, and presents materials for biography as scanty as those which he offers for criticism are rich. We are not, however, forced to go to such lengths of doubt in his case as Aristotle did in the case of Orpheus, denying that such a man ever existed; for though the Germans, since the days of Heyne, Wolf, and Niebuhr, have indulged themselves in every variety of historical scepticism, and reduced H., as well as Cadmus and Hercules, to mere 'symbols,' the more sober genius of British criticism, with which the moderate views of the best later Germans coincide, has pronounced an almost unanimous verdict in favour of the historical reality of the author of the *Iliad* and the *Odyssey*. Not that any reliance is to be placed on the details of the old Greek lives of H., which are manifestly fictitious; but the internal evidence of the poems themselves leads to the belief in an authorship such as agrees substantially with the kernel from which these very ancient legendary traditions were developed. The central fact in which all these traditions agree is, that the author of these poems was an Asiatic Greek; and though other places are named, the greatest amount of legendary evidence clearly points to Smyrna as the city which had the honour of giving birth to the father of epic poetry. The dialect in which the *Iliad* and *Odyssey* are written—the Ionic—is the very variety of Greek which was afterwards used in the same region by Herodotus, the father of History, and by Hippocrates, the first and greatest of Greek physicians; and the allusions to natural phenomena, especially the frequent mention of the strong north-west wind blowing from Thrace, plainly indicate the west coast of Asia Minor as the familiar residence of the poet. The chronology of the Homeric poems, both as respects the great central event which they celebrate—the Trojan war—and the age of the poet himself, is much more doubtful; but it is quite certain that H. lived considerably before the recognition of a regularly received record of dates among the Greeks—that is, before the year 776 B.C., the commencement of the calculation by Olympiads. The date given by Herodotus for the age of H.—400 years before his own time, that is, about 850 B.C.—is probable enough; but considering the entire want of any reliable foundation for chronology in those early times, we must not seek an accuracy in this matter beyond that which was attained by the Greeks themselves, and allow a free margin of at least 200 years from the time of Solomon (1000 B.C.) downwards, during which the singer of the *Iliad* and *Odyssey* may have flourished. To throw him further back than the earliest of these dates would be inconsistent at once with the historical elements in the midst of which his poems move, and with the style of the language which he uses; for this exhibits a luxurious freedom, a rich polish, and an exquisite euphony, which removes it far from that roughness and clumsiness which is wont to characterise languages in their earliest stage of literary development. The Ionic dialect used by H. is, in fact, a highly cultivated shoot of the old Hellenic stock, and which was in the poet's hands so perfect for the highest poetical purposes as to have remained the model for the epic style during the whole period of the poetical literature of the Greeks.

In endeavouring to form a correct estimate of the position of H. as a poet, the primary fact from which we must start is, that he was not the epic poet of a literary age—like Virgil among the Romans, Tasso among the Italians, or Milton among ourselves—but he was decidedly and characteristically an *aoidos*, or *minstrel*, a character well known to us from our own medieval literature, both in other shapes, and specially as it has been presented to us by the kindred genius of Sir Walter Scott. That there is an essential and vital generic distinction between the popular minstrel of an age when books are either not known or little used, and the cultivated poet of an age which rejoices in all sorts of libraries, and possesses a special class of literary readers, admits of no doubt. The conditions of the work to be done being different, the work itself cannot possibly be the same. It is quite certain, however, that the great majority of the critics and translators of H. in this country have not recognised this distinction. The consequence is, that they strike an entirely false note, and blow the seraphic trump of Milton when they should be content to take a plain shepherd's pipe in their hands. These critics and translators are no doubt actuated by the very noble desire of redeeming the author of two such noble poems as the *Iliad* and the *Odyssey* from the vulgar fellowship of wandering minstrels and ballad-mongers; but however high the genius of H. unquestionably soared above the best of the medieval ballads to which the English ear is accustomed, it is quite certain both that the materials out of which his great poems were composed were nothing but such popular ballads and tales as delighted our forefathers before the invention of printing, and that the spirit and tone of the Homeric epos is distinguished from that of the literary epos or epos of culture precisely by those characteristics which distinguish our old ballads from the poetry of Wordsworth and Tennyson. Of modern poets, the one who possessed the greatest relationship to the genuine old minstrel poets was Sir Walter Scott; but even in his poetry, many peculiarities can be pointed out, which mark the literary writer of a later age, as distinguished from the popular singer of a people's boyhood and lusty youth. In order to understand H., therefore, we must look on him as the culmination of the minstrel or ballad poetry, in the shape of the minstrel epos; a grand combination of popular ballad materials and ballad tone, elevated to the highest pitch of which it is capable, with the architectural form and structure of the epos. To the recognition of this true character of the Homeric poems, the present age has been led mainly by the adventurous and suggestive criticism of the celebrated scholar, Frederick Augustus Wolf. This distinguished German, originally a professor in Halle, afterwards in Berlin, published in the year 1795 the *prolegomena* to a new recension of the text of H., in which he maintained the extreme sceptical view already alluded to, according to which the *Iliad* is no proper epic poem in the sense that the *Æneid* and *Paradise Lost* are so, but only a skilful compilation of popular ballads, originally separate, and of whose separate existence the sharp-eyed critic can now easily adduce satisfactory proof. Now, this theory, commonly called, after its author, the Wolfian theory, and which has found, and still finds, not a few most ingenious supporters in Germany, contains an important element of truth, which has too often been summarily rejected, along with the error which it promulgates. It is not credible that poems pervaded by such a wonderful unity of tone and plan as the *Iliad*, manifestly also inspired by a genius of the highest order, should be resolvable into the mere patchwork of skilful compilers; but it is an important truth to announce that the materials of H.'s poetry were not invented by himself, but taken up from the living traditions of the people to whom he belonged, and that even in the grand unity to which his genius has subjected them, their original popular tone and spirit is preserved in a fashion which characteristically distinguishes them from all epic poetry of the literary ages. There can be no doubt that the merits of Wolf in this regard will soon be as universally recognised in every other country as they have long been in Germany; but, in the meantime, it is to be lamented that of those who have written most largely on the subject, neither Colonel Mure nor Mr Gladstone has been able to exhibit to English readers the true golden mean in this matter between the extravagance of the ultra-Wolfians, and the falsetto of the anti-Wolfian critics and translators. Among the Germans, Welcker, Nitsch, and K. O. Müller, may be named as presenting the best models of judicious and well-balanced criticism in this slippery domain.

The characteristics of H.'s poetry, as the culmination of ballad poetry and the grand model of the minstrel epos, may be expressed in a very few words. In the first place, the materials are essentially national, and if not strictly historical in every detail of decoration, grow, like all ballad poetry, out of the real life of the people, and rest at least upon an honest historical substratum. In this view, the *Iliad* is as valuable for the earliest history of the Hellenic race, as Herodotus and Thucydides are for the later periods. But it is not for the Greeks alone that H. possesses an important historical value; he is for all ages an important record of the earliest stages of human society, second only to the books of Moses, and perhaps some of the very oldest of the Vedas. The first germs of almost all other arts and sciences afterwards cultivated by the Greeks and Romans are to be found in Homer. In this view, he was to the Greeks themselves an encyclopædia of their national culture; and, as embodying the grand features of their polytheistic faith, he is also constantly quoted by their great writers with all the deference due to a Bible.

The poems of H., as a great human inheritance, have naturally been incorporated, by translation, into all the languages of Europe. In Italian, the translations of Cesarotti and Monti—in French, that of Montbel—in German, that of Voss, are the most famous. In England, we have tried this great problem in the most various styles, and have produced specimens of brilliant success in certain partial aspects. The whole excellences of H. have not yet been exhibited in any one of the notable English translations, nor is such a combination perhaps possible. The grand flow, rapid march, and sonorous fulness of the original, are well given by Pope; the rough dramatic vigour of individual phrases and passages are best rendered by Chapman; while the unaffected truthfulness, and easy, unpretending grace, which so prominently mark the great Smyrnean minstrel, appear most clearly in Cowper. Of the recent attempts which have been made, and are making, to present H. in some new aspect to English readers, it is premature to speak. We may only say that the translation of the *Odyssey* in the Spenserian stanza, by Worsley (Blackwood, 1861), is the only one that has received some special marks of public approbation and applause.

Those who wish to enter more minutely into the various questions connected with H. and the Homeric poems, may consult the works on Greek literature by Colonel Mure and K. O. Müller; the special work on H. by Mr Gladstone; the article 'Homer' in Dr Smith's *Dictionary of Ancient Biography;* and the article 'Homer' in the *Encyclopædia Britannica.*

HO'MICIDAL MA'NIA. This is the *monomanie meurtrière* of the French. There is developed, under certain morbid conditions, a blind, irresistible tendency to destroy life. It is independent of hatred, or any appreciable incentive; and even acts in opposition to the general disposition, the interests, and the affections of the perpetrator. Dr Otto of Copenhagen has recorded a series of motiveless murders. Georget gives the case of M. N., who was silent and solitary, but reasonable, and confessed a desire to shed blood, and particularly that of his mother and sister by poniard. He deplored the dreadful tendency, for he loved them both tenderly. Yet the fit returned, and he cried out: 'Mother, save thyself, or I will cut your throat!' The victim selected is most frequently a child, a wife, a benefactor, or an object of love and respect. Hoffbaüer, in Germany; Esquirol, Marc, Foville, in France; and Conolly, in Britain, have all demonstrated, and in criminal courts have testified to the existence of this form of mental disease, and ground of irresponsibility; but no recognition has been obtained of the irresistible, motiveless homicidal tendency as a bar to trial or to punishment. The impulse, however, is manifested in a more complicated form. It may originate in delusions; and the act which first reveals the mental condition may be committed in supposed self-defence, or to secure the salvation, or prevent the suffering of the individual destroyed. Such manifestation may constitute the characteristic symptom of furious madness, where the excited maniac sacrifices all around, or all who resist his course, under the instigation of the predominating passion, or of melancholia and despondency. There occur periods when the tendency to shed blood becomes epidemic or imitative. There is in many natures an ill-defined satisfaction on hearing of slaughter, wars, and atrocities; and such details, or the sight of blood, are said to be suggestive of this tendency. Marc states that six cases of infanticide followed immediately upon the publication of the trial and history of Henriette Cornier, who cut off the head of her child. The puerperal condition, various hereditary tendencies, powerful moral impressions, and atmospherical influences, are conceived to induce this tendency. The proximate cause is generally found to consist in marked organic changes in the nervous system, such as are detectable in epilepsy; or in the more insidious and obscure structural alterations which are supposed to accompany perverted and depraved instincts; although homicidal mania may occur independently of either of these pathological conditions.

Esquirol, *Des Maladies Mentales*, t. ii. p. 115; Marc, *De la Folie*, &c., t. ii. p. 24; Yellowlees, *Homicidal Mania*, *Edinburgh Medical Journal*, August 1862.

HO'MICIDE, a term used in English Law to denote the mere killing of a human being without implying the attendant criminal responsibility. It is used with the word *justifiable*, to denote that the killing was done under lawful authority, as hanging a man or killing a prisoner to prevent him escaping, or killing one to prevent an atrocious crime being committed. *Excusable homicide* means killing in self-defence, or in defence of a wife, child, parent, or servant, or property, or by mere accident. *Felonious homicide* includes murder of one's self or of another; and *manslaughter* is killing without malice, but attended with negligence, hot blood, or in some unlawful way. In Scotland, excusable homicide is generally called culpable homicide.

HO'MILDON, BATTLE OF. In the autumn of 1402, a Scottish army of about ten thousand men invaded England, under the command of Sir Murdach Stewart of Kincleven, the eldest son of the Regent Albany, and of Archibald Earl of Douglas. They advanced to the gates of Newcastle without opposition, and were returning to Scotland laden with spoil, when they were encountered by an English force under the Earl of Northumberland, his son Hotspur, and the exiled Earl of March or Dunbar. The Scotch took up their position on Homildon Hill, near Wooler. On the 14th September, Hotspur was advancing to charge them, when he was stopped by the Earl of March, until the English archers should do their work. Their shafts were poured with such effect that, in the words of a contemporary chronicler, they bristled in the dense ranks of the Scottish army like quills upon a hedgehog. At length a gallant knight, Sir John Swinton, cried out: 'Brave fellow-countrymen! what has this day bewitched you that you stand here to be shot like deer in a park, instead of proving your courage, as of old, by meeting your foemen hand to hand? Let those who will, rush down with me, in the Lord's name, upon the enemy, and either save our lives, or fall with honour.' At these words, Adam of Gordon, who was at mortal feud with Swinton, sprang forward, and throwing himself on his knees, besought the honour of knighthood from the warrior, whom he must now look upon as the best knight in Britain. His request was granted; and the two knights, followed by about a hundred retainers, rushed upon the English ranks. They were slain to a man, but not before they had made such slaughter, that the English captains were said to have confessed, that if all the Scots had fought as well, the day would have had a different issue. As it was, the English had an easy victory, and the Scots were utterly routed. Their leaders were taken prisoners; five of their best knights, with many of their bravest esquires, were slain; and besides the numbers that were killed on the field by the English arrows, about five hundred were drowned in attempting to cross the Tweed.

HOMILE'TICS, that particular branch of sacred rhetoric which regards the composition of the familiar discourses known under the name of homily. The earliest writer on the subject of homiletics is St Augustine, whose book, *De Doctrina Christiana*, is in some sense an adaptation of profane rhetoric to sacred uses. Rabanus Maurus and Isidore of Seville also incidentally treat the subject; but the nearest approach to a systematic treatment of the subject in medieval literature is to be found in Hunibert, *De Eruditione Concionatorum*. St Carlo Borromeo's *Instructiones Pastorum* was a part of his general scheme for the improvement of clerical education; and in the ecclesiastical course, as well of Catholics as of Protestants, homiletics occupies an important place. The bare enumeration of the works of Schott, Marheineke, Theremin, Sailer, Gisbert, Brand, Laberenz, may shew the importance which is attached in both churches to this branch of sacred science.

HOMILIA'RIUM, a collection of homilies for the use of pastors. Such collections were in use from a very early period. Mabillon mentions a very ancient Gallican homiliarium (*De Lit. Gallican.*). The fifty homilies of Venerable Bede, too, were in familiar use among the clergy in all parts of the West, and we find in the letters of the early medieval time, traces of a busy interchange of sermons, original or otherwise, between bishops and clergy, even in distant countries. The supply, however, was imperfect and scanty, and one of the many reformatory measures of Charlemagne was a compilation of homilies under the title of homiliarium, which was made under his direction by the deacon Paul Warnefried. It was compiled in the end of the 8th c., and contains homilies for all the Sundays and festivals of the year. Many synods of that and subsequent periods directed the clergy to translate these sermons for their flocks, and the collection continued in use for this purpose down to the 16th century. It was printed at Speyer in 1482, and again at Cologne in 1557. A collection of homilies is also ascribed to Alcuin, but it seems more likely to have been but a modification of the homiliarium of Warnefried. A collection of English homilies turned into verse, that they might be more readily remembered by the people, appears to have been composed about the middle of the 13th century. This collection, affording a metrical sermon for every Sunday and festival-day in the year, exists in MS.; and a portion of it has recently been edited by Mr Small, librarian to the university of Edinburgh.

HOMILIES OF THE CHURCH OF ENGLAND, a collection of sermons, the first part of which was published in 1547, the first year of the reign of Edward VI., to be read in the churches, partly in order to supply the defect of sermons, but partly, also, to secure uniformity of doctrine, and to guard against the heterodoxies, old and new, which at that time threatened the unconsolidated church. The second part was published in 1562, at the same time with the articles, under Elizabeth. The 35th article declares that 'the Book of Homilies doth contain a godly and wholesome doctrine, and necessary for these times.' The titles are enumerated in the article, and are twenty-one in number. The homilies are not now read in churches; but there is no law to prevent their being so read, and they are frequently appealed to in controversies as to the doctrine of the Anglican Church on the points of which they treat. The precise degree of authority due to them is matter of doubt.

HO'MILY (Gr. *homilia*, converse) primitively signifies a discourse held with one or more individuals, but in ecclesiastical use it means a discourse held in the church, and addressed by the minister to the congregation. The practice of explaining in a popular form the lessons of Scripture read in the synagogues, had prevailed among the Jews, and appears to have been adopted in the Christian churches from the earliest times. The discourses employed for this purpose were of the most simple character; but with the exception of one ascribed to Hippolytus (q. v.), we have no sample of this form of composition earlier than the homilies of Origen in the 3d century. Taking these as a type, the early Christian homily may be described as a popular exposition of a portion of Scripture, accompanied by moral reflections and exhortations. It differs from the sermon (Gr. *logos*, Lat. *oratio*) in eschewing all oratorical display, and in following the order of the scriptural text or narrative, instead of being thrown into the form of a rhetorical discourse or a didactic essay. The schools of Alexandria and Antioch appear to have been the great centres of this class of sacred literature, and in the early centuries we find the names of Hippolytus, Metrodorus, Clement of Alexandria, Dionysius, and Gregory Thaumaturgus, as principally distinguished. But it was in the following centuries that the homily received its full development in the hands of the Oriental Fathers, Athanasius, the two Gregories, of Nyssa and of Nazianzum, Basil, the two Cyrils, of Jerusalem and of Alexandria, and above all, Chrysostom; and in the West, of Ambrose, Augustine, Peter Chrysologus, Leo, and Gregory the Great. In later centuries, Venerable Bede, the popes Sabinian, Leo II. and III., Adrian I., and the Spanish bishops, Isidore of Seville, and Ildefonsus, continued to use the homiletic form; and even in the modern church, many preachers have regarded it as the best medium of scriptural instruction; and two different forms of homily are distinguished, the higher and the lower. The former follows the order of matter, rather than of any scriptural passages assumed to be expounded; the latter is a purely exegetical and moral exposition of some lesson from the liturgy, or of some other extract from Holy Scripture.

It is right to add, however, that this strictly historical acceptation of the name homily is by no means uniformly observed in modern use. The name homily is very frequently used, almost as a synonym for sermon, and signifies nothing more than a plain, moral discourse, without ornament or rhetorical pretension, but also without any pretension of being moulded upon the ancient patristical model.

HO'MINE REPLEGIA'NDO, an old writ in English law, meaning to bail a man out of prison; now disused.

HOMŒO'PATHY, from two Greek words signifying 'similar suffering,' is a system of medicine introduced into practice about the close of last century, by a German physician of the name of Hahnemann (q. v.). It is founded upon the belief, that medicines have the power of curing morbid conditions similar to those which they have the power to excite; expressed in Latin by the phrase, *Similia similibus curantur*, and in English by 'Like cures like.' That diseases are cured by substances which produce in persons in health symptoms like those presented by a patient, has been from the earliest times a recognised fact, both by medical writers and by poets who have expressed the prevailing belief of the ages in which they lived. Among the former, we find the author of a treatise generally ascribed to Hippocrates, entitled *On the Places in Man*. This writer gives numerous examples of what may be called *homœopathic* cures; and recommends for the cure of mania this remarkable prescription: 'Give the patient a draught made from the root of mandrake, *in a smaller dose than sufficient to induce mania*.' The works of the poets abound with illustrations of this belief. Probably the oldest expression of it is in some lines ascribed by Athenæus to Antiphanes, who lived 404 B.C., which have been thus translated—

'Take the hair, it is well written,
Of the dog by which you're bitten;
Work off one wine by his brother,
And one labour with another;
* * * *
Cook with cook, and strife with strife,
Business with business, and wife with wife.'

Shakspeare, in *Romeo and Juliet*, thus expresses the same maxim—

'Tut, man! one fire burns out another's burning;
One pain is lessened by another's anguish.
* * * *
Take thou some new infection to the eye,
And the rank poison of the old will die.'

Milton, in the preface to *Samson Agonistes*, gives his version thus: 'In physic, things of melancholic hue and quality are used against melancholy, sour against sour, salt to remove salt humours,' &c. Thus, there has always been a vague tradition that medicines sometimes cured diseases similar to those they caused. But it was reserved for Hahnemann to propound the startling dogma, not only that medicines did occasionally produce such cures, but that true, direct, and radical cures could only be effected by recognising this principle as the guide for the selection of the right remedy in any given morbid condition of the system. He engaged his friends and disciples in the task of procuring accurate data on which to proceed in reducing his rule to practice. They took given quantities of the substance which was the subject of experiment, and each kept a record of the effects it produced. The various records thus obtained were submitted to Hahnemann, who compared them together, and with his own observations on himself, and out of the results thus obtained, compiled what goes by the name of 'a proving' of the medicine. Hahnemann lays it down as one of the fundamental propositions of homœopathy, that no medicine should be given to the sick which has not first been *proved* upon those in health. He devoted himself to this task, and has left ten volumes of such 'provings;' out of this work the various abridgments in popular use in this and other countries have been derived. The properties once determined, then it becomes possible to administer it in accordance with the principle of homœopathy. To do so, however, it requires that the medicine should be given by itself. Thus, the second proposition of Hahnemann's system is, 'that only one medicine should ever be given at once.'

To ascertain the effects of medicinal substances upon persons in health—from the knowledge thus obtained to select a remedy whose action corresponds with the symptoms of the patient under treatment—to give this remedy by itself alone, are three of the fundamental rules for the practice of homœopathy. The fourth is, that the dose of a homœopathic medicine should be so small as not to cause any general disturbance of the system, its action being limited to that portion of the body which is in a morbid condition. How small that is, can be ascertained only by experiment. When Hahnemann propounded his system, he pointed out that the amount of the effect of a medicinal substance depends upon two conditions: *first*, the mechanical form in which it is administered; and *second*, the state of the body of the person who takes it.

For example, a hard pill of belladonna of five grains, swallowed by a robust and healthy man, may be followed by only trifling symptoms; but let that pill be dissolved in a pound of water, and an ounce of the solution be given every hour, then we shall have well-marked symptoms of the poisonous action of the drug. But if, instead of administering it to a person in rude health, it be given to one who is suffering from such an inflammation of the tonsils as belladonna produces, then we shall find that the inflamed tonsils will be most acted upon by their specific irritant. Disease implies a preternatural sensitiveness. An inflamed eye cannot bear light, an inflamed stomach cannot bear food, and every diseased organ is powerfully affected by the particular substance which has, in its physiological operation, a close affinity with the character of the morbid condition in which it is at the time its specific medicine is administered.

To arrive at the degree to which it was desirable to reduce the dose, a series of experiments were necessary. It was a matter to which all *à-priori* reasoning was inapplicable. In an article published in *Hufeland's Journal* in the year 1801, Hahnemann observes: 'You ask me what effect $\frac{1}{1000000}$th of a grain of belladonna can have. The word *can* is apt to lead to misconceptions. Let us ask Nature what effect $\frac{1}{1000000}$th of a grain of belladonna *has*.' He then states the conditions of the experiment—viz., that this fraction of a grain should be administered to a patient suffering from a peculiar form of scarlet fever then prevalent in Germany, and presenting a combination of symptoms bearing a close resemblance to those produced by belladonna. Hahnemann maintained that this fraction of a grain was sufficient for the purposes of homœopathic cure.

Homœopathic doses are often expressed by fractions, thus: Suppose the medicine to be a vegetable substance; a strong tincture is made of it, and this is technically called the *mother tincture*. Two scales of dilution are now prepared from this, called respectively the *decimal* and the *centesimal*, which latter was that advocated by Hahnemann, while the former, though of recent introduction, is at present very largely employed. To prepare the *decimal* attenuations, 1 drop of mother tincture is added to 9 drops of alcohol, and it is labelled 1^x. The *second decimal dilution* (2^x) is formed by adding 9 drops of spirit to 1 drop of 1^x, and so on for the 3^x, &c. In preparing the *centesimals*, one drop of mother tincture is added to 99 drops of alcohol, so as to dilute it 99 times, and this preparation is called *the first dilution*, and marked 1. Again, a drop of number 1—that is, of the $\frac{1}{100}$th of a drop of the mother tincture—is mixed with other 99 drops of alcohol, and marked 2, or the second dilution.

This contains $\frac{1}{100}$th of a drop of $\frac{1}{100}$th of a drop of the mother tincture, or $\frac{1}{10000}$th of a drop of the mother tincture. This simple process of subdivision is continued, and each step is recorded in the same way: thus, number 3 means a millionth; number 6, a billionth; and number 30 (which is the highest recommended by Hahnemann), a decillionth. Insoluble substances, of course, cannot be thus treated; they are triturated with sugar of milk. One grain, say, of sulphur is triturated with 99 grains of sugar of milk, forming *the first trituration*, and marked number 1, and so on; but after advancing to the fifth or sixth, then it is presumed that all substances become soluble in this very minute proportion in alcohol, and alcoholic dilutions are made of them in the same way as of the vegetable tinctures. After making these alcoholic preparations, the homœopathic chemist saturates with them minute pellicles of sugar of milk, known technically by the name of *globules* or *pilules*.*

A system so revolutionary naturally encountered most determined opposition. In Germany, there were legal obstacles to its practice. In Austria, physicians were not allowed to dispense their own medicines, even gratuitously; all medicines administered to the sick were prepared by the apothecaries, and the fate of homœopathy could not be trusted to their hands, as their interests were deeply involved. Thus it happened that, from the year 1818 to the year 1836, homœopathy was only tolerated in Austria under exceptional circumstances. In 1836, cholera broke out for the second time in Vienna, and Dr Fleischmann, the physician to an institution in which homœopathy has been followed, was required by government to prepare the hospital for the reception of cholera patients. He undertook the charge, on the condition that he was to be allowed to employ homœopathy in their treatment. This was granted, homœopathy having been very successful in Vienna and different towns in Germany in cholera in 1830—1831. He treated 732 cases; of these, 488 recovered, and 244 died. The hospital was under daily inspection by the government, and the result of the treatment was made known to Count Kolourat, the home-minister. Shortly after, the emperor issued an ordinance granting to every duly qualified physician the right of practising homœopathy. The cholera mortality under homœopathic treatment was in this instance one in three, while the average mortality of the same epidemic at the same place was two in three.—Wilde's *Austria*.

When cholera was approaching Western Europe, Hahnemann was studying his 'provings,' to ascertain what substance resembled most nearly in its effects the symptoms of the disease. The medicine he found to be camphor; and before he had ever seen a case of cholera, guided by the details given by practitioners, he announced in the year 1831: 'Every one, the instant any of his friends is taken ill of cholera, must immediately give him camphor.' This bold prediction, that camphor was the antidote for the first stage of cholera, was soon tested in Hungary and Moravia, and camphor has since been accepted universally by homœopathists as the most efficient remedy against an invasion of cholera.

The reported success of the homœopathic treatment of cholera at Vienna had a powerful influence in directing public attention to the hospital where the new system was practised. Physicians from all parts of Europe and from America went thither to watch the treatment. In a Report published by Dr Fleischmann some years ago, it is stated that at that time he had treated 17,313 cases, chiefly of acute diseases. Among these were —of erysipelas, 514 cases, of which 510 recovered; of rheumatic fever, 1417, of which 1416 recovered; of intermittent fever, 1066, of which 1058 recovered; of inflammation of the lungs, 1052, of which 1004 recovered.

From Germany as a centre, where it is now extensively practised and taught, homœopathy spread over Europe and America. In America there are upwards of two thousand avowed practitioners of the system. In France, Italy, Spain, and other countries, it has numerous adherents, many of whom occupy influential positions of trust and authority. It was introduced into England in the year 1827 by Dr Quin, physician to the king of the Belgians; and there are now above 300 registered practitioners in Britain who have adopted it. In London, there is a hospital capable of containing upwards of 100 patients, where lectures are occasionally delivered by appointed teachers.

The number of physicians who *avowedly* practise homœopathy has not greatly increased of late; but its adherents claim that the *actual* practice of it has been greatly augmented. In proof of this they point to the more recent text-books in medicine, published by the teachers of the dominant school; and to the recognition of the value of small doses of aconite in inflammatory fevers, arsenic in gastritis, ipecacuanha (in one-drop doses) in vomiting, &c.

The objections entertained by physicians to the so-called 'homœopathic' practice of medicine are based, not upon any unwillingness to employ medicines whose action resembles more or less the features of the disease for which they are prescribed, but solely on the impossibility, according to the common view, of adopting this as a specific rule of practice, and especially as an exclusive and all-embracing law of therapeutics. The action of emetics in some kinds of indigestion, and of rhubarb in some kinds of diarrhœa, are familiar examples in daily use, shewing that ordinary practice is not regulated by any blind prejudice against what is called the homœopathic law of '*similia similibus curantur;*' but in these cases the physician does not in the least commit himself either in favour of or against the law, but rather sets it aside as a mere metaphysical abstraction, having nothing to do with the real principle of the cure, which is to be found in common sense and experience, applied to the facts of individual cases and groups of cases. The true physician is not a sectary; he disowns all artificial formulas of cure, exactly as he disowns homœopathy; and he especially disowns the nickname of *allopathist*, invented for him by Hahnemann. His belief in remedies is not founded on extreme generalisations, and he refuses to be limited in his practice by any other technical rules than those derived from a fair view of facts investigated on the ordinary principles of positive science. It is very certain that Hahnemann's alleged 'provings' have been rejected as in great part visionary by the great majority of those who have attempted to ascertain personally the effect of the same remedies; and it is equally certain that Hahnemann himself admits the general aggravation of diseases by homœopathic doses when administered in sensible quantities, and that the system of infinitesimal doses was with him simply a last refuge from the contradictory character of the results obtained under the earlier trials of remedies devised according to his assumed principle. The argument of physicians in general has been, that the principle was false, and that the infinitesimal doses are its *reductio ad absurdum*. They admit freely that homœopathy has in some instances done good, by illustrating the spontaneous cure of disease, and correcting a blind faith in heroic remedies; but although individual converts of some local credit have here and there been made, there is not the slightest appearance of a movement in the profession towards adopting homœopathy as a system, and its much-vaunted statistics are generally regarded as extremely fallacious.

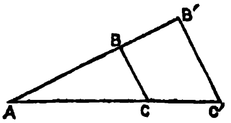
---

* It must, however, be borne in mind that small doses are not necessarily homœopathy, which consists in the administration of drugs according to the law of *similars*, the *dose* being a matter in which experience has guided to dilutions in many, though not in all cases.

HOMOGANGLIA'TA (Gr. *homos*, the same, and *ganglion*, a ganglion), the name given by Owen to the *Articulata* of Cuvier, in accordance with a belief in the great importance of the nervous system as a basis of zoological classification. Each segment in the lowest H. contains a pair of ganglia with nerves proceeding from them; all, however, communicating by nervous filaments, and constituting a continuous chain. In the higher forms, there is a greater concentration, and a more evident allotment of the ganglia of particular segments to particular functions.

HOMOLOGA'TION, a Scotch law-term, denoting an act or conduct which confirms or approves of something which otherwise might be invalid. Thus, an informal deed, though useless in itself, yet, if acted on by one or both parties, will be set up and made valid, as against the party homologating. To constitute homologation, a clear knowledge of what the party is doing is necessary. The term is not used in English law, but similar effects are produced, and bear other names, such as confirmation, estoppel, part performance.

HOMO'LOGOUS quantities or magnitudes in Geometry are such as correspond, or are like to one another. For example, in similar triangles, the homologous sides are those which are opposite to corresponding angles. In the triangles ABC, AB'C', which are similar, BC is homologous to B'C', AB to AB', and AC to AC'. See HOMOLOGY.



HOMO'LOGY, in Anatomy, is the term now used to indicate structural correspondence, while the term *analogy* is employed to indicate functional resemblance. Thus, by homologue, is implied 'the same organ in different animals, under every variety of form and function;' while by analogue we understand 'a part or organ in one animal which has the same functions as another part or organ in a different animal.' For example, the wings of an insect are the analogues of those of a bat or bird, but not the homologues; whilst the latter are homologues with the arms of man, the fore-legs of quadrupeds, and the pectoral fins of fishes. For further illustration, see Owen *On the Archetype and Homologues of the Skeleton*.

HOMOOU'SIAN (Gr. *homos*, the same, and *ousia*, substance), and **HOMOIOUSIAN** (Gr. *homoios*, like, and *ousia*, substance), two terms that long distracted the primitive church. The first was the shibboleth of orthodoxy in the Arian controversy, the decree of the council of Nice, which declared the Son to be *homoousian*, of the same substance with the Father. The rigid Arians, who resisted the decree of Nice, of course rejected the term. The semi-Arians, who held the subordination of the Son to the Father, were divided as to its use. Some of them rejected the word altogether, as directly conveying a false idea; others, while they did not absolutely reject the idea, regarded the word as objectionable, but rather as susceptible of misinterpretation, than as absolutely false. Both parties argued against its use from a decree of the council held at Antioch in the year 269, against Paul of Samosata, in which the name homoousian, as applied to the Son, was expressly condemned. They contended, therefore, that the Fathers of Nice had erred in applying it, and they proposed to substitute for it the term *Homoiousian* (of a like, i. e., a similar but not identical substance with the Father). Without entering into the doctrinal controversy, it will suffice to say, that the term, as used by the council of Antioch, bore a very different signification from that which the Fathers of Nice attached to it. In the controversy with Paul of Samosata, who, with the Sabellians, held that the Father and the Son have but one and the same person, the word *ousia* was employed to signify personality. Hence, when the council condemned the doctrine of Paul, that the Son is homoousian with the Father, it merely declared that the Father and the Son are not one and the same person. On the contrary, the council of Nice, in defining that the Father and Son are homoousian, understand *ousia* in the very different signification of substance or nature. See the historical treatises of Athanasius, Newman's translation.

HOMO'PTERA (Gr. *homos*, the same, uniform, *pteron*, a wing), according to some entomologists, an order of insects; according to others, one of the two great divisions of the order *Hemiptera* (q. v.), differing from the *Heteroptera* in having the first pair of wings of uniform substance throughout (whether perfectly membranous, or somewhat leathery, and so passing into elytra), and the rostrum or sucker originating from the inferior part of the head near the thorax, or even between the first pair of legs. The H. feed on the juices of plants, and some of them are very troublesome to farmers and gardeners. The females of many have an *ovipositor*, by means of which they pierce plants, in order to make a place for the reception of their eggs. The larvæ are active, and resemble the perfect insect, but are wingless. The pupæ are also active, and have rudimentary wings. Among the H. are Cicadas, the largest of the order, Lantern-flies, Froth-hoppers, Aphides, and the Coccus tribe.

HONA'N, one of the central provinces of China, having an area of 66,900 square miles, and a population of 29,069,771. Its capital, Kaifung-fu, is situated on the Yellow River, from which it has often suffered, the river-bed being here elevated above the adjacent country. It has been overflowed nineteen times. In the reign of Fuhi (2852 B. C.), it was the capital of China. It has suffered various vicissitudes. In the 12th c. of our era, it was six leagues in circumference. At present, the city is uninteresting to Europeans, save as the residence of the Jews of China, now dwindled to a few families.

HONAWA'R, a seaport on the Malabar or west coast of the peninsula of Hindustan, belongs to the presidency of Madras, which here extends from shore to shore. It is in lat. 14° 17' N., and long. 74° 30' E., being 340 miles to the south-east of Bombay. It stands on the north side of an inlet of the Arabian Sea, which receives the Gerseppa or Sharavatti from the Western Ghauts. Though both the harbour and the anchorage outside have a good bottom and a sufficient depth, yet, in the season of the south-west monsoon, the surf is a serious impediment to navigation. Pop. 12,000.

HONDU'RAS, a republican state of Central America, extending east and west from the Caribbean Sea to the Pacific Ocean, and separating Nicaragua on the south-east from Guatemala on the north-west. It stretches in N. lat. between 13° 10′ and 16°, and in W. long. between 83° and 89° 45′, containing about 47,068 square miles, including a portion of the Mosquito Territory, and 351,700 inhabitants, most of them, wholly or partly, of aboriginal blood. The country is generally mountainous, being traversed by the Cordilleras (q. v.), which connect the Andes on the south with the Sierra Madre on the north. The principal rivers are the Chamelicon, Ulna, Aguan, and Choluteca. An excellent agricultural country, H. abounds also in mineral wealth. The minerals are gold, silver, copper, iron, cinnabar, zinc, antimony, tin, platinum, opal, amethysts, asbestos, chalk, limestone, marble, and coal. The soil produces valuable timber, fruit-trees, cotton, sugar, coffee, tobacco, indigo, maize, wheat, potatoes, yams, plantains, bananas, and beans. The foreign trade is carried on chiefly with Great Britain, the United States, and Spain. The imports, amounting in 1868 to 750,000 dollars, or £149,000 sterling, consisted to the extent of more than one-half of cotton manufactures—the articles next in order, woollens, silks, and wines and spirits, having been almost precisely one-fifth part of the sum-total. This republic is for administrative purposes divided into the seven departments—Comayagua, Tejucigalpa, Choluteca, Santa Barbara, Gracias, Goro, and Olancho. The revenue for 1870 amounted to £97,000. The expenditure has, for several years, exceeded the revenue, while loans have been raised to construct an inter-oceanic railway from Port Cortez, on the Atlantic, to the Bay of Fonseca, on the Pacific Ocean. Of this railway only 62 miles on the Atlantic side were finished in 1872. The entire length is 225 miles.

HONDURAS, BAY OF, an inlet of the Caribbean Sea, extends between Yucatan and Guatemala on the west, and Honduras on the south. From the adjacent countries of British Honduras and Yucatan it receives a variety of streams, the chief of which is the Balise, and contains several islands. The shore is marked by reefs.

HONDURAS, BRITISH. See BALIZE.

HONES, or WHET-STONES, a particular class of stones used for the purpose of sharpening edge-tools, such as knives, scythes, &c. They are usually cut into pieces about a foot in length, and from an inch to two inches thick, and either left square or rounded, according to their intended uses. The finest kind of hones are those called oil-stones; these are hard, compact, and so very silicious, that they readily wear down the hardest steel; they are varieties of slate, derived from the argillaceous schists of the Palæozoic period. The best are those brought from Turkey; Bohemia is also celebrated for its hones; and excellent ones are found in Persia, in the Harz Mountains, in Styria, in America, Spain, Peru, and in Siberia. In Great Britain, several localities yield hone-stones of excellent quality, and none better than the celebrated Water-of-Ayr stone, which is much used for polishing copper-plates, as well as for hones. The Welsh oil-stone or Idwall stone, and the cutler's green-stone, are obtained from Snowdon in Wales; and in the neighbourhood of Tavistock, the Devonshire oil-stones are procured. Whatever part of the world they come from, they resemble each other very closely. The hones used for sharpening scythes and other large blades are usually made of some coarse-grained sandstone; these are manufactured in many localities.

HONESDALE, a new and flourishing borough in the north-east part of Pennsylvania, United States, America, 160 miles north-east from Harrisburg. It is situated at the confluence of the Lackawaxen and Dyberry Creeks, and connected by canal and railway with New York. It is the centre of a coal-district, from which anthracite is sent to the Atlantic cities. It contains nine churches, an academy, bank, foundry, tanneries, glass-works, mills, and three newspapers. The town has extended beyond the corporate borough. Pop. (1870) of borough, 2654.

HONESTY (*Lunaria*), a genus of plants of the natural order *Cruciferæ*, of which two species, natives of the south of Europe, *L. annua* or *biennis*, and *L. rediviva*, have long been cultivated in British flower-gardens, partly on account of the beauty of their flowers, and partly of the curious appearance of their large flat seed-pouches (*silicules*). They are 1—2½ feet high, with rather coarse foliage. The origin of the English name is doubtful. Some of the older English poets mention the plant as *Lunarie*. It was regarded, in the days of superstition, as possessing extraordinary virtues.

HONEY is secreted by the nectariferous glands of flowers, from whence it is collected by the working or neuter bees, which extract it by means of the proboscis, and pass it into the dilatation of the œsophagus, known as the crop or honey-bag. When the animal has arrived at the hive, it disgorges the honey, probably altered by admixture with the secretion of the crop, into the cells of the comb. It is used by the bees as food, but it is its general properties and its uses to man that here require notice.

The composition of honey varies somewhat according to the food of the bees, their age, the season, &c. Hybla, a mountain in Sicily, and Hymettus, a mountain in Attica, were in ancient times celebrated for their honey; doubtless in consequence of the wild thyme and other fragrant herbs growing on them. The honey of Narbonne and Chamouni is now held in high estimation for similar reasons; and in this country, honey obtained by bees having access to heather has, as is well known, a peculiarly agreeable taste. The substances which have been recognised in honey are sugar of two kinds—one crystallisable and analogous to Glucose (q. v.), and the other uncrystallisable, mannite (according to Guibourt); gummy, waxy, colouring and odorous matters; and pollen. The proportion of crystallisable sugar increases with the age of the honey, so as to give it in time a granular character. The best and newest honey is a clear fluid contained in a white comb, while older honey is of a yellowish, and even reddish tint.

From the remotest times, honey has been employed as an article of food; and to the ancients, who were unacquainted with sugar, it was of more importance than it now is. 'A land flowing with milk and honey' offered the highest conceivable advantages to the eastern mind. Taken in moderate quantity, honey is nutritive and laxative, but dyspeptic persons often find that it aggravates their symptoms. Its therapeutic action is probably not very great, but it is employed with advantage to flavour and give a demulcent character to various drinks or mixtures prescribed for allaying cough; and in the form of *oxymel*, which is usually prepared by mixing honey, acetic acid, and water, it is frequently added to gargles, or mixed with barley-water, so as to form an agreeable cooling drink in febrile and inflammatory affections, or given as an expectorant in coughs and colds.

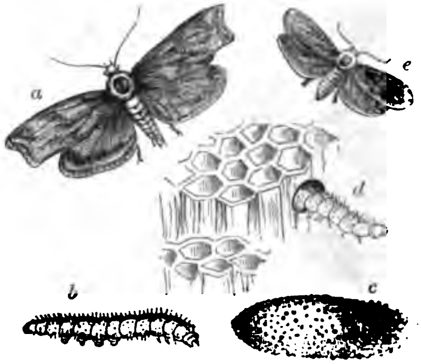
It should be mentioned that honey occasionally possesses very deleterious properties. Xenophon, in his history of the Retreat of the Ten Thousand (*Anabasis*, book iv.), describes the honey of Trebizond as having produced the effect of temporary madness, or rather drunkenness on the whole army who ate of it. Mr Abbot, writing from Trebizond in 1833 to the secretary of the Zoological Society, observes that he has himself witnessed that the effects of this honey are still precisely the same as those which Xenophon describes, and he adopts the views propounded by Tournefort in 1704, that the poisonous properties are consequent on the bees extracting the honey from the *Azalea Pontica.* Many other instances of poisonous honey are on record.

Honey, although not of so much importance commercially as it was before sugar became so large an importation, is nevertheless brought to this country from abroad in considerable quantities, which, in addition to the home produce, mentioned in the article Bee, shews that it is still largely in demand. Nearly fifty tons are annually imported from various parts of the world: North America, the West Indies, Portugal, France, and Greece, are the countries from which we receive most. The French is very fine, and is chiefly consumed for domestic and medicinal purposes; the Greek is the finest, and is only used as a table delicacy; most of the other kinds are inferior, and excepting some portion which is used by the tobacco manufacturers, to give a spurious sweetness to tobacco, it is difficult to account for the consumption of so large a quantity. Honey is often very much adulterated. One of the most common materials used for that purpose, is flour; samples of French honey have also been found largely adulterated with gelatine; the latter cannot so easily be detected, as there is always present naturally a portion of gelatine in honey. The quality of even the best depends upon its careful refinement or clarifying. If honey be slightly heated, the chief impurities rise to the surface, and can easily be removed by skimming; this is usually done, except in the case of virgin honey, which is generally sufficiently pure for most purposes.

HONEY BUZZARD, or **PERN** (*Pernis*), a genus of *Falconidæ*, allied to kites and buzzards, but differing from them, and from all other *Falconidæ*, in having the *lore*, or space between the eye and the bill, closely covered with feathers, which overlap one another like scales. The food of honey buzzards consists, not of honey, but chiefly of bees, wasps, and their young, in quest of which these birds dig up the ground, to get at the nests of the insects. They feed also partly on other insects, and less frequently on lizards, small birds, &c. One species (*P. apivorus*) is found in Britain, but is rare; it is rather larger than a common buzzard.

Honey Buzzard (*Pernis apivorus*).

HONEYCOMB MOTH, or **WAX MOTH** (*Galleria*), a genus of small moths of the same tribe with clothes' moths, of which some of the species are remarkable for infesting bee-hives. There they deposit their eggs; and the larvæ feed on the honeycomb, through which they make tunnels lined with silk, and in the midst of which they finally spin their cocoons and undergo their transformations. The cocoons are often united in little heaps. These moths, when numerous, are very injurious, and sometimes quite destructive to the bees, from the stings of which they seem to enjoy a perfect immunity.



Honeycomb Moth:
a, Galleria mellonella; *b*, larva; *c*, pupa; *d*, larva working its way through honeycomb; *e*, Galleria alvearia.

G. mellonella or *cereana*, perhaps the most destructive species, is about an inch in extent of wings; *G. alvearia* not much more than half an inch. Both have a satiny appearance, and are amongst the worst enemies the bee-keeper has to encounter.

HONEYCOMBS, in guns, are flaws resembling the cells made by bees, worked in the metal by the action of exploded gunpowder. They spread rapidly, and, with continuous firing, soon eat into the metal to such an extent as to render the further use of the gun dangerous.

HONEY-DEW, a viscid saccharine exudation which is often found in warm dry weather on the leaves and stems of plants, occurring both on trees and herbaceous plants. It is usually, but not always associated with the presence of *Aphides*, *Cocci*, and other insects which feed on the juices of plants, and its flow is ascribed to their punctures; but the rupture of the tissues from any other cause, such as the state of the weather, seems also to produce it, and warm dry weather seems to be necessary for the production in the sap of that superabundance of sugar which is thus thrown off. Aphides themselves exude by certain peculiar organs (see Aphis) drops of a fluid which is called honey-dew, which probably differs considerably from the direct exudation of the plants on which they feed, but mingles with it where they abound. Honey-dew is often so abundant as to fall in drops from one leaf to another on to the ground, sometimes falling from trees even as a copious shower. Different kinds of manna are the dried honey-dew or saccharine exudation of certain plants. See Manna. But very generally, this exudation, as it dries, coats the surface of leaves and branches with a clammy film, to which everything brought by the atmosphere adheres, and on which moulds and other small fungi soon grow, and thus the pores of the plant are clogged and its health is impaired. Gardeners are therefore careful to wash off honey-dew with the syringe. Orange and lemon plantations sometimes suffer great injury from the abundance of honey-dew; and it has proved a cause of very great loss in the coffee-plantations of Ceylon.

HONEY-EATER, or **HONEY-SUCKER**, a name sometimes given to some of the Sun-birds (q. v.), but also the common name of a large family of birds nearly allied to these and to humming-birds, and peculiar to Australia and the islands of that part of the world. This family, *Meliphagidæ*—of the order *Insessores*, and tribe *Tenuirostres*—has a long curved sharp bill, not so slender as in humming-birds and sun-birds; the tongue terminates in a pencil of delicate filaments, the better to adapt it for sucking honey from flowers, or juices from fruits. These are a principal part of the food of the honey-eaters, but they also devour insects in great numbers. They are birds of elegant form, and generally of gay plumage. Most of them have a long and broad tail. They may be observed fluttering and darting among trees and shrubs when in blossom, and are very abundant in all parts of Australia. They are extremely vivacious and active, and keep up a continual chattering. One of the most splendid species, *Meliphaga* or *Ptiloris paradiseus*, is called the Rifleman or Rifle Bird by the Australian colonists. Another species, *Myzantha melanophrys*, is called the Bell Bird, because its voice much resembles the tinkling of a little bell. To this family is referred the Poe Bird, Parson Bird, or Tui-tui (*Prosthemodera Novæ-Zeelandiæ*) of New Zealand, a bird larger than a blackbird, and of a deep metallic green colour, becoming bronze and black in certain lights, with snow-white tufts of downy curling feathers on the sides of the neck. Unlike most of the *Meliphagidæ*, it is a bird of fine song. It has also great powers as a mocking-bird, readily learns to speak many words, and becomes very familiar in domestication.

New Holland Honey Eater (*Meliphaga Nova Hollandia*).

HONEY-GUIDE, **INDICATOR**, or **MOROC** (*Indicator*), a genus of birds ranked in the Cuckoo family, but differing from the true cuckoos in characters which shew an approach to woodpeckers, and also, in some respects, to creepers. They are all natives of Africa, and are found in almost all parts of it. They have acquired their name from guiding men to honey; a curious instinct prompting them to flutter near the traveller with frequent repetitions of a cry which resembles the syllable *cherr;* and it is said, that if followed, they almost always lead to a place where a bees' nest may be found.

HONEY LOCUST TREE (*Gleditschia triacanthos*)—also known as the SWEET LOCUST and BLACK LOCUST, and in Britain as the THREE-THORNED ACACIA—a lofty and beautiful tree of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*, a native of the valleys of the Alleghanies, and of the basin of the Mississippi. It is not found wild on the Atlantic coast of North America, although often planted for ornament in the vicinity of habitations. The flowers—which are small, greenish, and in spikes—have, when perfect, six stamens and one pistil, but are very generally unisexual. The leaves are twice pinnate, without terminal leaflets, the numerous small leaflets giving a peculiar gracefulness to the foliage, which is of a light shining green. The tree is furnished with numerous sharp triple spines. The pods are long, flat, pendulous, often twisted; the seeds large, brown, and enveloped in a pulp, which, when the pod is ripe, is very sweet. Sugar has been made from it, and when fermented, it yields an intoxicating beverage, in use among the American Indians. The honey locust attains a height of 70 or 80 feet. Trees of large size are to be seen in some parts of Britain. The wood resembles that of the American Locust Tree (q. v.), or False Acacia (*Robinia pseudacacia*), but is more coarse-grained.

HONEY-STONE, or **MELLITE**, a mineral of remarkable characters and composition, found in connection with coal and sulphur in several places in Germany. It occurs in square octahedrons, looks like a honey-yellow resin, and may be cut with a knife. It is a mellate of alumina, consisting of mellic acid, alumina, and water.

HO'NEYSUCKLE (*Lonicĕra*, or, according to some botanists, *Caprifolium*, which others make a sub-genus of *L.*), a genus of plants of the natural order *Caprifoliaceæ*. They are shrubs, often twining, and have the flowers either in whorls or in pairs. The calyx is short and 5-toothed; the corolla tubular-funnel-shaped, 5-cleft, generally two-lipped; the fruit a 3-celled and many-seeded berry.—The COMMON H., or WOODBINE (*L. periclymĕnum*), is very abundant in woods and thickets in most parts of Britain. On account of its beautiful cream-coloured whorls of flowers and their delicious fragrance, it is often planted in shrubberies, and trained against walls. It is said to be the 'twisted eglantine' of Milton. The phenomena observed in its growth have been adduced in proof of a *perceptive power* in plants: the branches shooting out till they become unable to bear their own weight; and then, on their meeting with any other branch, twining around it, from right to left; but if they meet only with one another, twining in different directions, one to the right, and another to the left.—Very similar to this is the PERFOLIATE H. (*L. caprifolium*), with paler whorls of flowers, and remarkable for having the upper leaves united so that an opposite pair form one leaf, through the middle of which the stem passes. This peculiarity is confined to the flower-bearing shoots, and does not occur on the young runners; it is also most perfect nearest the flower. This species is a native of the south of Europe, but now naturalised in many parts of Britain, and much planted, as although less powerfully fragrant than the Common H., it flowers earlier.—There are numerous other species, natives of Europe, Siberia, and North America.—The FLY H. (*L. Xylosteum*) is an erect shrub, a native of Europe and Asia, scarcely indigenous in Britain, but common in shrubberies. Its branches are not unfrequently used in some parts of Europe for tubes of tobacco-pipes; and it is said to make good hedges in dry soils. Other erect species are not unfrequently planted in shrubberies.—The TRUMPET H. (*L. sempervirens*), called in America the CORAL H., is a native of the southern states of North America, often planted in Britain on account of its beautiful flowers, red on the outside, and scarlet within, which, however, have no fragrance. It is a twining evergreen shrub.—The berries of the honeysuckles are nauseous.—The name H. is also given to shrubs very different from this genus, but of which the flowers abound in honey, as to species of *Banksia* in Australia. *Azalea viscosa* is called Swamp H. in North America.

HONEYSUCKLE, FRENCH. See FRENCH HONEYSUCKLE.

HONEYSUCKLE ORNAMENT, a form characteristic of eastern art. It is used in Assyrian, Persian, and Hindu architecture, and wherever used indicates an eastern origin. The Greeks borrowed it from the Persians, and, by refining and improving it, made it one of the most beautiful ornaments of their architecture. It is chiefly used in the Ionic Style (q. v.). See also GRECIAN ARCHITECTURE.

HONFLEUR, a small town and seaport of France, in the department of Calvados, is situated on the southern shore of the estuary of the Seine, opposite to, and seven miles distant from the port of Havre. Its situation, backed by wooded heights, is exceedingly pleasing; but it is badly built, dirty, and uninteresting. The commerce of H., once of some importance, has been absorbed in great measure by Havre; many vessels, however, engaged in the fisheries, are still owned here, and there is a considerable trade in the export of eggs and fruit to England, and in timber. The principal manufactures are hosiery, chemical products, hardware, and refined sugar. There are also rope-walks and ship-building yards. The harbour is furnished with two light-houses. Pop. (1872) 8420.

HONG-KONG ('Fragrant Streams'), a British island off the south-east coast of China, is situated in the estuary of the Chu-Kiang, about 100 miles south-east of Canton. It is nine miles long, from two to six broad, and has an area of about 29 square miles. The capital, Victoria, is situated in lat. 22° 16¼′ N., long. 114° 8¼′ E. Pop. (1872) 121,985; 115,564 of whom were Chinese, 4931 Europeans and Americans; the remainder, 1490, were Manila-men and others of mixed blood. The total public income in 1871 was £175,962; the expenditure, £186,675.

The island is covered to the shore with mountains, the peaks ranging from 1000 to nearly 2000 feet high. The mountains consist chiefly of granite, syenite, serpentine, and trap; granite quarries are skilfully worked by the Chinese. In the early years of the colony, when the ground was being broken up for building purposes, European settlers suffered much from febrile and other diseases, and an unenviable reputation for unhealthiness was justly earned. Now, however, in this respect H. may compare favourably with any other British possession in the east. For about six months, from May to October, the heat is oppressive in the extreme, being accompanied with much rain and damp. During four of the winter months, the weather is cool, dry, bracing, sometimes even cold; but the change from the high and moist temperature of summer to a dry cold is apt to produce dangerous diseases, more especially of the kidneys. The temperature in summer ranges from 83° to 90°, and in winter from 40° to 75°. On the mainland, opposite the northern shore of the island, and separated from it by the harbour, which varies from half a mile to four miles in width, is the Kow-loong Peninsula, a strip of coast territory and portion of the township of the same name, which was ceded to the British government by the convention of Pekin, October 24, 1861. Victoria, the capital, is situated on the northern shore of the island, on a small bay surrounded by mountains. It is laid out in magnificent streets and terraces, and has an abundant supply of good water from a large reservoir on the southern side of the island. The harbour is commodious and safe; the roadstead has a depth of from 3 to 7 fathoms, and affords good anchorage. At Aberdeen, on the south side of the island, and at Kow-loong, there are docks capable of taking in the largest steamers. Between Victoria and Canton and Macao, communication by steam is maintained daily, and since the opening of the Suez Canal the same may almost be said of Shanghai, Yokohama, Bombay, Calcutta, and Singapore, so that the magnificent harbour presents a most stirring appearance. In 1871, the total tonnage of vessels entered and cleared amounted to 3,235,701 tons. Here mercantile houses centralise their operations and conduct their money transactions; yet H. occupies only a secondary rank in the commerce of China. The bulk of the merchandise from Europe goes direct to the place of its destination, without touching this port; in the same manner, teas and silks pass through H. only when it is a port of call for the steamers carrying them. The import trade of H. is chiefly in opium, in English cotton and woollen goods, and in metals, in repairing vessels, and in the transfer of passengers. One of the most flourishing of British colonies, H. is destined to further extension and importance, and will rise with the gradual increase of the commerce of Eastern Asia. A small species of deer is found on the island. Among reptiles there are several species of non-poisonous snakes, one species of the boa which reaches a length of eight or nine feet, and the cobra. Lizards also abound.

In 1843 this island was ceded in perpetuity to Her Britannic Majesty by the treaty of Nankin, having been occupied as a preliminary measure in 1841. Its affairs are ruled by a governor and legislative council.

HO'NITON, a small market-town and municipal borough of England, in the county of Devon, is beautifully situated in a graceful and highly cultivated valley, near the left bank of the Otter, 16 miles north-east of Exeter. The old church contains a light and elegant oak-screen, erected in 1482 by Courtenay, bishop of Exeter. H. has long been famous for the lace, called from the town in which it is the chief branch of manufacture, 'Honiton Lace.' This lace is made by hand on a *pillow;* its manufacture was introduced into England by the Lollards during the reign of Elizabeth. The vale of Honiton is famous for its butter. Pop. (1871) 3464. H. was formerly a parliamentary borough, and returned two members to the House of Commons, but it was disfranchised in 1868.

HONOLU'LU, a seaport in lat. 21° 18′ N., and long. 157° 55′ W., on the south-western or leeward coast of Oahu, one of the Sandwich Islands (q. v.), is perhaps the only spot in Polynesia that can fairly claim to be reckoned as an integral part of the world of commerce and civilisation. Being the seat of government, as well as the centre of trade, it is, in every sense, the metropolis of its own group, which is at once the largest and the most important of all the kindred clusters. But beyond this, its intrinsic advantages, and the absence, or at least the distance, of rivals along the surrounding waters, in any direction, have combined to render it an entrepôt between the opposite shores of the Pacific. Besides attracting numbers of whalers for repairs and supplies, H. occupies a most convenient position on each of the three great thoroughfares of its own giant ocean.

Though Ooahu, in common with the rest of the chain, is evidently of volcanic formation, yet the reef, which forms the breakwater of the harbour of H., is of coral formation. The temperature of the town ranges between 67°·9 in January, and 83°·2 in August; so that, roughly computed, the annual mean is 75°·55, with a divergence in either direction of only 7°·65. The tropical heat is modified by periodical north-easters. The population, numbering fully 20,000, consists chiefly of natives, the foreign element of it counting about a tenth, and of these a good many are naturalised subjects from the United States of America. H. is visited annually by about 300 vessels of various sizes, many of them being whalers. This mart of traffic has, for seventy years, maintained the unity, and, through the unity, the peace of the once independent and hostile tribes of the Hawaiian Archipelago. In H. are to be found consuls from the United States, Chili, Denmark, France, Great Britain, Germany, Russia, Sweden, Italy, Belgium, the Netherlands, Austria, and Peru.

HONORA'RIUM, a term sometimes used to denote the fees payable to counsel or physicians, because they were presumed to be given as a present, and paid beforehand, and not on the vulgar theory of payment for services rendered. The legal effect which followed was, that neither counsel nor physicians, if not paid their fees beforehand, could bring an action against the client to recover them. This is still the case in the United Kingdom as to counsel, but not as to registered physicians, who can now recover their fees by action. The law as to how far a counsel can validly make a special agreement for a fixed sum, and sue for it, has been fully discussed in England in the case of Kennedy *v.* Brown, but has not yet been decided.

HONO'RIUS, FLAVIUS, second son of Theodosius the Great, was born, according to the best authorities, 9th September 384 A.D. On the death of his father, the empire was divided into two parts, H. receiving the western half, with Rome as his capital; but being only ten years old, was put under the guardianship of Stilicho (q. v.), who was all his life the *de facto* ruler of the Western Empire. H. first took up his residence at Milan, where, in 398 A.D., he married Maria, the daughter of Stilicho. The most important events of H.'s reign were the various treaties concluded with the German tribes who dwelt on the Rhine and Upper Danube; the rigorous persecution of paganism in 399; and the devastation of Northern Italy by Alaric and his Visigoths in 400—403. Stilicho was then in Germany; but on his return, he speedily cleared the country of the invaders, after totally defeating them at Pollentia (March 403). Another irruption of barbarians, under Rhadagaisus, took place in 405—406, which was again repelled by the powerful arm of Stilicho. Nevertheless, this brave soldier and able minister lost the favour of his weak and worthless master, and was treacherously slain at Ravenna, 408 A.D. Alaric was not slow to take advantage of the opportunity afforded him. In 408 A.D., he invaded Italy, and besieged Rome, which only escaped on payment of a heavy ransom; and in the following year he again besieged and took it, raising Attalus to the imperial purple. The death of the invader in 410 A.D., after having a third time besieged Rome, again freed Italy. A new champion of the falling empire arose in the person of Constantius, who suppressed the rebellions of Constantine, Jovinus, and Sallustius in the northern provinces, and of Heraclian in Africa. He was now appointed the colleague of H. in the consulship, and received in marriage the hand of Placidia, sister to H., along with a share in the empire, which he did not long enjoy, as his death took place a few months after. The Gothic and German tribes had for some time been slowly but steadily encroaching upon the Western Empire, and H.'s reign saw Spain, Gaul, and Pannonia, some of the finest provinces, snatched from its grasp. He died 27th August 423. H.'s character presents few salient points. He was weak and foolish, and when excited by fear or jealousy, cruel and treacherous, a trait well brought out in his treatment of Stilicho and Constantine.

HONORIUS, the name of four popes.—HONORIUS I. has been the subject of much controversy, not alone between Catholics and Protestants, but also between the Gallican and Ultramontane schools of Catholics themselves. He was born of a consular family in Campania. Of his early history, little is known, except that he took an active part in bringing to a close the disputes which arose in Northern Italy about the controversy of the Three Chapters (q. v.). On the death of Boniface V., in 625, he was elected Bishop of Rome. His general administration of church affairs has been favourably judged by historians; and his name is especially connected with the history of the paschal controversy in Ireland, and with that of the early Anglo-Saxon Church. But his pontificate is particularly memorable on account of the Monothelistic heresy. See MONOTHELISM. H. is connected therewith rather negatively, than by any positive participation, in the dissemination of the Monothelite doctrine. While the controversy was yet new in the West, Sergius, Patriarch of Constantinople, wrote to H., to explain the Monothelistic doctrines in the most favourable light, and to suggest that it would be most desirable to impose silence on both parties, in a dispute which really did not affect the substance of the Catholic doctrine. H., misled it is alleged by this statement of Sergius, consented, and even expressed himself in language which would appear to condemn the doctrine of two wills in Christ. The Catholic historians, however, maintain that in thus disclaiming the belief of two wills in Christ, H. merely denied the existence in Christ of two discordant or conflicting wills, that is, of a *corrupt and sinful human* will opposed to the divine will. It is not easy, perhaps, to reconcile this with the decree of the sixth general council, in which H. is anathematised in company with many others, of whose heterodoxy there can be no doubt. But the defenders of H. reply, that although the sixth council certainly does include H. in one common condemnation with a group of heretical teachers, yet the explanation appended to the condemnation of the former, viz., that 'he had not by the exercise of his apostolic authority extinguished the rising flame of heresy, but by neglecting it, favoured its progress,' clearly alludes to the error of judgment described above, by which, although himself personally orthodox, he enjoined silence on the controversy at a time when a more far-sighted ruler would have felt it his duty to interfere by a clear and explicit declaration. On the whole, they maintain that, however H. may by his imprudent silence have compromised the interests of orthodoxy, he did not put forth any such dogmatic declaration as can fairly be regarded, whether by Protestants or by Gallicans, as irreconcilable with the strict ultramontane doctrine of infallibility, inasmuch as that doctrine contemplates the pope as 'speaking from the apostolic chair.' H. died in 638. Some letters of his are preserved in Labbe's *Coll. Conciliorum*, vol. iii.

HONOUR, ACCEPTANCE FOR, a phrase used in the law of bills of exchange, to denote that a stranger volunteers to accept a bill out of respect to a foreign party issuing the bill to persons in this country, who refuse to accept, in which case the stranger accepting, incurs certain responsibilities.

HONOURABLE, RIGHT HONOURABLE, AND MOST HONOURABLE; titles given in the United Kingdom to Peers, their families, and persons holding certain public situations. A Marquis or Marchioness is styled Most Honourable, a Peer (temporal) or Peeress of a lower grade, whether by right or by courtesy, is Right Honourable. The title Right Honourable is also bestowed on the younger sons of Dukes and Marquises, and their wives; and on all the daughters of Dukes, Marquises, and Earls; and Honourable on the younger sons of Earls, and all the children of Viscounts and Barons. Privy Councillors, the Lords Mayor of London, York, and Dublin, the Lord Advocate of Scotland, and the Lord Provost of Edinburgh, are also entitled to the prefix Right Honourable; and Maids of Honour, Lords of Session, the Supreme Judges of England and Ireland, to that of Honourable. Members of the House of Commons, though Honourable is not prefixed to their names, are distinguished as the 'Honourable member for ——,' and the East India Company has been held entitled to the same prefix. In America, the characteristic love of title has been shewn in the practice of attaching Honourable to the names of governors of states, judges, members of congress, and other public functionaries.

HONOURABLE ORDINARIES, in Heraldry. See ORDINARIES.

HONOURS, MILITARY AND NAVAL. See SALUTES.

HONOURS OF WAR, the term used to express the privileges allowed to a garrison surrendering, either in consideration of a brave defence, or from some other cause. Many degrees of honour may be paid to a vanquished enemy, according to the generosity or judgment of the victorious commander-in-chief. In some cases, the garrison is allowed to march out with all its arms, drums beating, colours flying, &c.; at another time, the conquered force will only be permitted to advance silently to the front of their works, there to ground or pile arms, and then, facing about, to return to their lines as prisoners of war. Occasionally, the capitulation will provide that the garrison shall deposit their arms and warlike stores at some specified spot, and then march on to their own territory on parole of not serving during the existing war against the victors or their allies.

HONTHEIM, JOHN NICHOLAS VON, was born at Treves in 1701. He was educated in the Jesuit school of his native city, studied canon law at Louvain under the celebrated Van Espen, and afterwards taught it for ten years at Treves, of which see he became coadjutor in 1748, with the title of bishop *in partibus infidelium*. He is the author of two voluminous works on the history of Treves, *Historia Trevirensis Diplomatica* (3 vols. fol., 1750), and *Prodromus Hist. Trevirensis* (2 vols. fol., 1757). But his literary career is chiefly memorable for a theological essay, which, although with very mean pretensions to learning, by the novelty and boldness of its views, created an immense sensation in the theological world. The title of this work, which was in Latin, and dedicated to Pope Clement XIII., is 'On the State of the Church and on the Legitimate Authority of the Roman Pontiff,' a work composed with a view to the reunion of Christian sects. The name of the author was for a long time unknown, the work being published under the *nom de plume* of Justinus Febronius (a name said to be taken from that of H.'s niece, who was called Justina Febronia), whence the system of church government which the work propounds has been called Febronianism (q. v.). His scheme may be described as a very exaggerated form of Gallicanism, with the democratic element of congregationalism superadded. The work immediately after its appearance was condemned by Clement XIII., as well as by many individual bishops. It drew forth a number of replies, the most important of which are those of Zaccaria (1767) and Ballerini (1768). Pius VI., in 1778, required from H. a retractation of these doctrines. This retractation, however, was modified by a subsequent *Commentary*, published at Frankfurt in 1781, to which, at the desire of the pope, Cardinal Gerdil replied. H. eventually made full submission to the church. He died in his 90th year, at Montquinten in Luxemburg, September 2, 1790.—See Menzel's *Neuere Geschichte der Deutschen*, xi. 456, and foll.

HONVÉD (Land-defenders), the name given in Hungary under the earlier kings to the national champions. With the disappearance of these, the word too disappeared; but in the summer of 1848 it was revived, and applied first to those Hungarian volunteers despatched to the south against the Servians, and subsequently, when the war with Austria really commenced, to the whole patriotic army. Still, in common parlance, the term Honvéd is used only with reference to the Hungarian infantry.

HOO'BLY, a town of Dharwar (q.v.), in the presidency of Bombay, stands in lat. 15° 20′ N., and long. 75° 13′ E. It contains (1871) 50,000 inhabitants, and is one of the principal cotton-marts in that section of India. A good road has been constructed to the Malabar coast, by which the raw cotton of the neighbourhood is easily and cheaply transported for shipment.

HOOD, ROBIN, the hero of several old ballads and traditionary stories, which generally represent him as an outlaw and a robber, but of a gallant and generous nature, haunting the depths of Sherwood Forest, Nottinghamshire, and of Barnsdale Forest, Yorkshire, in an early era of English history, which it has hitherto been customary to fix in the 12th century. The earliest authentic notice of him is in the *Vision of Piers Ploughman*, a poem dating from between 1355 and 1365: 'rhymes of Robin Hood and Randolph Earl of Chester' are there alluded to. About 1495, Wynkyn de Worde printed a poem of considerable length, entitled *The Lytel Geste of Robyn Hood*—apparently a series of rude popular ballads strung together, being probably a modification of the 'rhymes' spoken of in Piers Ploughman. Thus we see evidence for a considerable antiquity to the ballads commemorating Robin H., a collection of which filled two little volumes printed by Ritson in 1795. It is also certain that, in the early part of the 16th c., there was a wide-spread celebration of annual rustic sports and masqueradings, under the name of the *Robin Hood Games*, in which the deeds of the hero, and of his companions, Little John, Friar Tuck, &c., and of his sylvan mistress, Maid Marian, were represented. These even extended to Scotland, where the Reformers had some difficulty in putting them down. In the ballads and the games alike, Robin was always exhibited as a valiant man out of suits with fortune, giving to the poor much of what he took from the rich, most skilful with the long bow and the quarter-staff, and almost unfailingly victorious in personal encounters with whatsoever opponent.

In addition to these evidences of the existence of such a hero, we must remark that his grave has for ages been pointed to in Kirklees Park, Yorkshire, marked by a flat stone on which was carved a flowery cross.

While there could be little doubt that some such predatory outlaw as Robin H. once existed, and that he was of a character to excite, generally speaking, the affections rather than the reprobation of the people, there was a sad want of documentary evidence regarding him, until the publication of a tract by the Rev. Joseph Hunter in 1852. In this *brochure*, it is, first, shewn that one of the ballads represents Robin as going, by the invitation of 'Edward our comely king,' to meet him at Nottingham; as there accepting service with his majesty; and as accompanying him to court; where, however, becoming sick almost to death with that kind of life, he did not remain above 15 months; after which he retired, and resumed his wonted free and jovial life in the forest. Mr Hunter then proceeds to shew that King Edward II. in 1323 made a progress through the western and midland counties, in the course of which he came (November 9) to Nottingham; that in the exchequer accounts between March and November of the ensuing year, among the names of 24 'porteurs' of the king, to whom wages were paid, occur those of 'Robyn and Symon Hod;' and that finally, at the latter date occurs an entry—'Robyn Hod, heretofore one of the porteurs, because he could no longer work, received as a gift, by command, 5s.;' the name from this time appearing no more. Mr Hunter likewise ascertained that, at a date six years antecedent to the royal progress above mentioned, the name of 'Robertus Hood' is found in the court-rolls of the manor of Wakefield, as that of defender in a suit regarding a small piece of land. The probability therefore is, that Robin H. lived and acted as the ballads represent him only a few years before the era of Piers Ploughman, and really passed from wild forest life into the royal service for a brief space—an adventure which might appear as the most incredible attributed to him, if we did not know something of the whimsical and puerile character of Edward II., which was such that he did not disdain occasionally to seek amusement in playing at chuck-farthing with his servants. Mr Hunter further deemed it likely that H. was one of the yeomen who joined the discontented barons under the Earl of Lancaster, and were ruined by the failure of their enterprise. If so, his life in the forest might be rather a sort of guerrilla warfare than a practice of simple rapine; and hence it might, in some measure, arise that the 'gests' of Robin H. became the subject of so much romantic and affectionate sentiment on the part of the community.

HOOD, THOMAS, was born in London in 1798, and after leaving school was placed in the counting-house of a Russian merchant, but his health failing, he was sent to Dundee. At the age of 17, he returned to London, and engaged himself to learn the art of engraving with his uncle. In 1821, he was offered the post of sub-editor of the *London Magazine*, which he accepted, and at once entered upon its duties and an extensive literary acquaintance. His first separate publication was entitled *Odes and Addresses to Great People*. He published *Whims and Oddities* in 1826, of which a second and third series appeared during the two following years. In 1829, he commenced *The Comic Annual*, and continued it for nine years. He edited *The Gem* for one year, contributing to its pages his striking poem entitled *Eugene Aram's Dream*. In 1831, he went to reside at Wanstead in Essex, where he wrote his novel of *Tylney Hall;* but pecuniary difficulties supervening, he returned to London in 1835. In 1838, he commenced the publication of *Hood's Own*, to which his portrait was attached. Health failing about this time, he went to reside on the continent, and remained six years. In 1839, he published *Up the Rhine*, the idea of which was taken from *Humphry Clinker*. On his return to England, he became the editor of *The New Monthly Magazine*, and on his withdrawal from its management in 1843, he published *Whimsicalities*, consisting chiefly of his contributions to that serial. In 1844, he started *Hood's Magazine*, and contributed to its pages till within a month of his death. During his last illness, Sir Robert Peel conferred on him a pension of £100 a year, which was transferred to his wife. He died on the 3d May 1845, and was buried in Kensall Green Cemetery. Compare *Memorials of Thomas Hood, Collected, Arranged, and Edited by his Daughter, with a Preface and Notes by his Son* (2 vols. 1860).

H. takes a high place both as a humorist and as a serious poet. He is great at once in comedy and pathos, and he sometimes curiously mingles and combines both. As a punster, he was supreme: he connects far-separated words and ideas by the most subtle analogies, and sends them loose. Much of his comedy, however, is verbal and shallow, and will be soon forgotten. It is as a poet that H. will be remembered. His *Eugene Aram's Dream*, *Song of the Shirt*, and *Bridge of Sighs*, are among the most perfect poems of their kind in the English language.

HOOD, VISCOUNT (SAMUEL HOOD), English admiral, was eldest son of the Rev. S. Hood, vicar of Thorncombe, Devonshire, at which place he was born, 1724. At 16, he entered the royal navy, was made lieutenant in 1746, and post-captain in 1756. In 1759, being in command of the *Vestal*, 32 guns, he engaged a French 50-gun ship, which he took after a desperate action of four hours. In 1777, he was made commissioner of Portsmouth dockyard, and next year received a baronetcy. He was then made rear-admiral, was sent to the West Indies to reinforce Rodney, and commanded a division in the engagement with the Count de Grasse, April 12, 1782. He was made a peer of Ireland by the title of Baron Hood. In 1793, he was made commander-in-chief of the Mediterranean fleet, and took possession of the port of Toulon; but the French Republican army, in great force, compelled him to evacuate it, after destroying or carrying away the principal part of the shipping, firing the arsenal and public stores. He then sailed for Corsica, which, after a campaign, he annexed to the crown of Great Britain. In 1796, he was advanced to the rank of a viscount of Great Britain, and made governor of Greenwich Hospital. He died at Bath, January 27, 1816. —His younger brother, ALEXANDER HOOD, served as rear-admiral under Lord Howe, was second in command at Lord Howe's victory of the 1st June 1794, obtained a victory over the French fleet in 1795, and was made, in 1796, Baron, and in 1801, Viscount Bridport. He died in 1814.

HOOD-MOULDING. See DRIPSTONE.

HOOFS. (See HORNY TISSUES.) The healthy soundness of the horse's foot is mainly preserved by permitting it to grow uninjured by the rasp and knife (see HORSE-SHOEING), whilst its toughness is secured, and undue dryness and evaporation prevented, by smearing daily the crust, sole, and frog with a little glycerine, or a mixture made by melting together a quarter of a pound each of tar, honey, bees'-wax, and glycerine, with a pound of lard. Softness and brittleness of the hoof, which are fruitful sources of cracks and Corns (q. v.), may be remedied by the regular use of such dressings, by placing the feet for several hours daily in thick woollen swabs, kept cool and moist by frequent applications of cold water, and by encouraging a more healthy growth of horn by occasional mild blisters round the coronary band. Cracks, or sand-cracks, as they are termed, mostly occur amongst horses much upon the road, cause lameness, and constitute unsoundness. When serious and recent, poulticing, thinning away of the crust about the crack, and perfect rest, are essential. After the earlier heat and tenderness are removed, a hot iron should be drawn at right angles to the crack, both above and below, so as to separate the diseased from the sound horn. Waxed thread or fine wire should be wound round the hoof, and a sound growth of horn stimulated by a blister round the coronet. The horse's hoofs are too hard and coarse to be employed for the making of the better class of combs and buttons, for which purpose the hoofs of cattle, to the value of nearly £5000, are annually imported. They are, however, largely used by manufacturers of prussiate of potash and artificial manures.

HOOFT, Pieter, a Dutch historian and poet, was born at Amsterdam, 16th March 1581, studied at Leyden, and travelled in France, Germany, and Italy. He died at the Hague, May 21, 1647. The chief historical works of H. are *Het Leven van Koning Hendrik IV.* (Amst. 1626—1652), and *Nederlandsche Historien* (2 vols. Amst. 1642—1654; most recent edition, 1820—1823). The latter of these is still of the greatest value, and is considered one of the classics of Dutch literature. H. also translated Tacitus into Dutch. As a poet, his *Minnedigte* have not been surpassed, if even equalled, as specimens of the light Anacreontic muse. His *Letters* were published by Huydecooper in 1738. H. has exercised an important influence on the development of the Dutch language.

HOO'GHLY, a river of Bengal Proper, is formed, in lat. 23° 25′ N., and long. 88° 22′ E., by the junction of the first two offsets of the Ganges, the Bhagrutti and the Jellinghi. From the point in question, the stream, strictly so called, is 125 miles long; the estuary, as far as Saugor Roads, measuring 35 miles more. Of all the channels by which the Ganges reaches the sea, the H. is the most available for navigation. In the dry season, the tide is felt nearly up to Chandernagore, 17 miles above Calcutta. During the south-west monsoon, the H. is subject to the phenomenon known as 'The Bore' (q. v.). Up to Calcutta, the draught is seldom less than 17 feet; but the bottom is said to be silting up. At its entrance, too, the H. is much encumbered with shoals.

HOOGHLY, a city of Bengal Proper, stands on the right or western bank of the river Hooghly, 27 miles north of Calcutta, in lat. 22° 54′ N., and long. 88° 22′ E. It is estimated to contain (1871), along with Chinsura (q. v.), 34,761 inhabitants. Here is a college for English and Asiatic literature, which owes its existence mainly to the munificence of a native; it has several schools allied with it. The district of Hooghly, with Howrah, contains 1424 square miles, and a pop. (1871) of 1,488,556.

HOOK, Theodore Edward, a celebrated novelist and dramatic writer, was born in London, September 22, 1788, and educated at Harrow. In 1805, at the age of 17, he produced an operatic farce called the *Soldier's Return*, which was very successful; and between that year and 1811, he wrote twelve other operatic pieces and farces, all of which were popular at the time. His ready wit, sparkling humour, and wonderful powers of improvisation, made him the delight of society; and having pleased the Prince Regent by his feats of mimicry, he was appointed (1813) accountant-general and treasurer of the Mauritius, with a salary and allowances amounting to nearly £2000 a year. These offices he held till 1818, when the discovery of a considerable deficiency in the military chest caused him to be arrested and sent to England, and his effects seized and sold. The peculation, it afterwards appeared, had been committed by his deputy, who destroyed himself. On obtaining his liberty, H. supported himself by writing for the newspapers and magazines, and on the establishment of the *John Bull*, weekly Tory newspaper, in 1820, he was appointed its editor. From his connection with this bold, clever, and, at that time, virulent print, he derived, during its prosperous state, fully £2000 a year. In August 1823, for his debt to the government, amounting to about £12,000, he was arrested under an Exchequer writ, and his property sold. He remained within the Rules of the King's Bench till May 1825, when he was released from custody. In 1824 appeared, in 3 vols. 8vo, the first series of his *Sayings and Doings*, which yielded him £2000. A second series followed in 1825, and a third in 1828, for each of which he received 1000 guineas. Several other three-volumed novels were published by him in rapid succession, such as *Maxwell*, 1830; *Love and Pride*, 1833; *Gilbert Gurney*, which contains a sort of autobiography of himself, 1835; *Jack Brag*, 1837; *Births, Deaths, and Marriages*, 1839; *Gurney Married*, 1839; &c. He died August 24, 1841.

HOOK, Rev. Walter Farquhar, D.D., son of the Rev. James Hook, Dean of Worcester, was born at Worcester about the beginning of the century, and educated at Christ-Church, Oxford, where he graduated in 1821. After holding some minor preferments in the church, he was appointed Vicar of Leeds in 1837, and in 1859, Dean of Chichester. In 1856, the Bishop of Ripon, on taking leave of the clergy of his diocese, stated that 20 churches had been built in Leeds through the exertions of Dr H., while school-rooms had been provided for more than 10,000 children. Among his works are *An Ecclesiastical Biography, containing the Lives of Ancient Fathers and Modern Divines* (8 vols. Lond. 1845—1852), *A Church Dictionary* (8th ed. 1859), *Sermons Suggested by the Miracles of our Lord and Saviour Jesus Christ* (2 vols. 1847), *On the Means of Rendering more Effectual the Education of the People* (10th ed. 1851), and *Lives of the Archbishops of Canterbury*, on which he was working to the last, the eleventh volume, containing the lives of Laud and Juxon, appearing immediately after his death, which took place in Oct. 1875. He was elected a Fellow of the Royal Society in 1862.

HOO'KAH. See Pipe.

HOOKE, Robert, an English natural philosopher, born at Freshwater, Isle of Wight, July 18, 1635, was educated at Westminster school, and at Christ-Church, Oxford. In 1662 he was appointed curator of experiments to the Royal Society, and in 1677 became its secretary; in 1664, professor of geometry in Gresham College, London; and in 1666, surveyor for the city of London, a most lucrative appointment. He died at Gresham College, March 3, 1703. H. was a man of extraordinary inventive genius, and has justly been considered as the greatest of philosophical mechanics; the wonderful sagacity, nay, almost intuition, he shewed in deducing correct general laws from meagre premises, has never before or since been equalled. There was no important invention by any philosopher of that time which was not in part anticipated by Hooke. His theory of gravitation subsequently formed part of Newton's; he anticipated the invention of the steam-engine, and the discovery of the laws of the constrained motions of planets. Among his own completed discoveries are, the law of the extension and compression of elastic bodies, '*ut tensio sic vis;*' the simplest theory of the arch; the balance-spring of watches and the anchor-escapement clocks; the permanency of the temperature of boiling water. The quadrant, telescope, and microscope are also materially indebted to him.

HOOKER, Richard, author of the Books of Ecclesiastical Polity, and one of the most illustrious of English theologians, was born in the city of Exeter, or its neighbourhood, about the year 1554. He was early distinguished for his 'quick apprehension of many perplext parts of learning,' and attracted the notice of Jewell, Bishop of Salisbury, through whose influence he was sent to Oxford about his 15th year. He was placed at Corpus Christi College. He was advanced first to the dignity of scholar, and then of fellow of his college. After about three years' residence in his college as fellow, he entered into sacred orders, and ere long was appointed to preach at St Paul's Cross. Hither all the power and eloquence of the church found their way in the 16th century. To H., however, the trial of such a public appearance was evidently considerable, according to Walton's account; and the more as the weather proved very unfavourable for his journey; 'but a warm bed and rest, and drink proper for a cold, given him by Mrs Churchman, and her diligent attendance added unto it, enabled him to perform the office of the day, which was on or about the year 1581.' Mrs Churchman's kindness proved too much for the simple-minded theologian. He was led, evidently without due consideration, into a marriage with her daughter. This marriage of H., as is known to all, was far from proving a source of happiness—a result that could scarcely have been expected from its commencement. Walton's description of the visit of his two old pupils, Edwin Sandys and George Cranmer, and 'Richard called to rock the cradle' from their company, is among the most characteristic sketches of this fine old writer. The visit was made to Drayton-Beauchamp, in Buckinghamshire, where H. had settled in 1584, as a country priest, after his marriage. He was transferred ere long to the mastership of the Temple, by the patronage of Archbishop Whitgift; and here he was plunged into the controversy with Puritanism, out of which his great work arose. Travers, one of the most zealous of the Elizabethan Puritans, was his colleague in the Temple. Travers was the more attractive and popular orator, if the less profound thinker. The union was not a happy one. The congregation 'ebbed in the forenoon,' Fuller tells us, 'and flowed in the afternoon.' 'Pure Canterbury' was in the ascendant in the morning, 'Geneva' in the afternoon. H. soon tired of the contention in the congregation, and the indifference of the majority to his ministry. He accordingly applied to the archbishop, who presented him, in the year 1591, to the rectory of Boscum, in the diocese of Salisbury, and six miles from that city. Here he remained for four years, busily employed with his great work, which his experience in the Temple probably prompted. The first four books of the Ecclesiastical Polity appeared in 1594. In the same year, he was transferred to the living of Bishopshorne, near Canterbury, where he spent the few remaining years of his life, and gave to the world the fifth book of the Polity. The remaining three books were posthumous. About the year 1600, in the 46th year of his age, he caught cold in his passage from London to Gravesend, and gradually sunk under the weakness which followed.

H. will always be esteemed one of the most illustrious thinkers and writers, not only in English theology, but in English literature. He is alike comprehensive and profound, tranquil and eloquent. He is speculative without mysticism, and earnest without declamation. He searches all the depths and rises to all the heights of his subject, without ever forgetting the simplicity of the Christian or breaking the charm of catholic association that binds all its parts together. More than anything, he is wise and *judicious* in the highest sense of that word; and it is the light of lofty and calm wisdom, shining through his pages, that continues to make them a delightful and excellent study, when most of the contemporary theological works are forgotten.

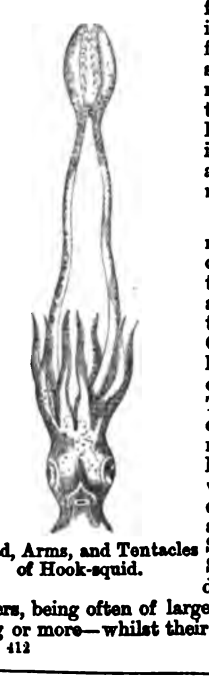
HOOKER, Sir William Jackson, F.R.S., a celebrated English botanist, was born at Norwich in 1785. His first work was a *Journal of a Tour in Iceland* in 1811, which attained such popularity that a second edition was called for in 1813. From that time to his death in 1865, he was almost incessantly engaged in the publication of botanical works. His investigations on the British Jungermanniæ and Mosses led to his appointment to the chair of botany in the university of Glasgow, where he lectured with great success till 1841, when he resigned his professorship on being chosen director of the Royal Gardens at Kew, an office which he filled in a most efficient manner. His name was enrolled in the lists of all the scientific societies at home and abroad; and he was knighted in 1836, on account of his high scientific acquirements. The following are some of the most important of his works: 1. *Monograph of the British Jungermanniæ* (1812—1816); 2. *Muscologia Britannica*, containing the mosses of Great Britain and Ireland (1818); 3. *Icones Filicum* (in association with Dr Greville), (2 vols. fol. 1826—1837); 4. *The British Flora* (1830), a work that has gone through seven editions; 5. *A Century of Orchidaceous Plants* (4to, 1848); 6. *The Victoria Regia;* 7. *Icones Plantarum* (10 vols. 1837—1860); 8. *British Ferns* (1862); 9. *Garden Ferns* (1862).

HOOKER, Joseph Dalton, M.D., C.B., F.R.S., was born at Glasgow in 1816, and is the only surviving son of Sir W. J. Hooker (q. v.). He was educated for the medical profession, and graduated as M.D. at Glasgow in 1839. He immediately thereafter renounced the pursuit of medicine for that of botany, and joined the antarctic expedition of the *Erebus* and *Terror*. When he returned in 1843, he brought with him 5340 species of plants, which, with the discoveries of Captain Cook and other voyages, were published in six quarto volumes, under the title of *Botany of the Antarctic Voyage* (1847—1860). This great work gave him at once an eminent position in science. In 1847, he undertook an expedition to the Himalayas, which occupied him for three years. The large collections made at this time were joined to those of his friend, Dr Thomas Thomson of the Botanic Gardens, Calcutta, and numbered in the aggregate nearly 7000 species. His *Himalayan Journals* (2 vols. 8vo, 1854) contain the narrative of this expedition, and the *Rhododendrons of the Sikkim-Himalaya* (1849—1851) illustrate the most remarkable additions which he made to the ornamental plants of our gardens on this occasion. With Dr Thomson he undertook a *Flora Indica* (vol. i., 8vo, 1855), the first volume of which, containing only a few orders of plants, remains a fragment. The half of the volume is occupied with a valuable dissertation on botanical geography, a department of the science which has received special attention from Dr H. in his various works. He afterwards again undertook a flora of British India, which was completed in 1874. In 1871, he made an expedition to Morocco, ascended the Great Atlas, the summit of which had never before been reached by a European, and brought back a valuable collection of plants.

Dr H. was appointed Assistant-Director at Kew Gardens in 1855, and on the death of his father in 1865, he succeeded him as director. He was president of the British Association in 1868, was appointed Companion of the Bath in 1869, and elected president of the Royal Society in 1873.

In the list of scientific memoirs published by the Royal Society, he is recorded as the author of 58 independent memoirs, and the joint author of 18 more. He has prepared a valuable *Students' Flora of the British Islands*, chiefly characterised by the record of the geographical distribution of the species. His great work, which he has undertaken in conjunction with his friend George Bentham, is a *Genera Plantarum*, the first part of which appeared in 1862; and the first part of the second volume, bringing down the work to the *Compositæ*, was published in 1873.

HOOKS AND EYES. These small articles are largely used in millinery for dress-fasteners, and are of great utility. Formerly, they were made by hand, the wire of which they are formed being bent into the proper shape with pliers; now, however, they are entirely made by machines of great simplicity and beauty. With a pair of them it is possible to make 200 hooks, and the same number of eyes, in one minute. The operations of the machines are, first, to draw the wire forward from the supplying reel, then cut off the length required for hook or eye, as the case may be; a sinker then descends and forces it into a slot, by which it is bent, and two projecting cams, acting at the same time on the two ends, bend them over so as to form the lateral loops used for sewing the hook or eye to the garment; then, in the case of the hook, it is passed under another sinker, which forces the doubled wire into another slot, and forms the hook part; one side of the slot, being movable, is made to strike the bent portion of the hook sufficiently to flatten it. It is then complete, and drops out, to make room for another.



Head, Arms, and Tentacles of Hook-squid.

HOOK-SQUID, the name commonly given to cephalopod molluscs of the genera *Onychoteuthis* and *Enoploteuthis*, allied to the common squids or Calamaries (q. v.), but having the eyes destitute of any covering of skin. The arms have two rows of suckers; the tentacles much exceed them in length, and are furnished with hooks at their extremities. Hook-squids are found in the Sargasso Sea, in the Polynesian Seas, &c. They are much dreaded by swimmers and divers, being often of large size—sometimes six feet long or more—whilst their hooks, their many arms, their very numerous suckers, and their strong, sharp mandibles, entitle them to a place among the most formidable monsters of the deep.

HOOP ASH. See NETTLE-TREE.

HOOPER, JOHN, an English prelate and martyr, was born in Somersetshire about 1495, and educated at Oxford. By the study of the works of the German Reformers, and of the Scriptures, he was converted to Protestantism, and about 1540 he went to the continent, and spent some time in Switzerland. At the accession of Edward VI., in 1547, he returned to England, and became a preacher in London. In 1550, he was appointed Bishop of Gloucester, but his objections to wearing the Episcopal vestments caused some delay in his consecration. In 1552, he received the bishopric of Worcester *in commendam*. On the commencement of Mary's reign, in 1553, he was committed to the Fleet, where he remained for 18 months, being frequently examined before the council; but continuing firm in the Protestant faith, he was condemned as a heretic, and burned at the stake at Gloucester, February 9, 1555. He was the author of numerous sermons and controversial treatises.

HOOPING-COUGH, or PERTUSSIS, is an infectious, and sometimes epidemic disease, mostly attacking children, especially in the spring and autumn. Its earliest symptoms, which usually appear five or six days after exposure to infection, are those of a common cold, as hoarseness, a watery discharge from the eyes and nose, oppression of the chest, a short dry cough, and more or less feverishness. This stage, which is called the *catarrhal*, lasts a week or ten days, when the fever remits, and the cough begins to be followed by the peculiar whoop which characterises the disease, and which is caused by the inspiration of air through the contracted cleft of the glottis. See LARYNX. The disorder may now be regarded as fully developed, and consists of paroxysms of severe coughing, which usually terminate in the expectoration of glairy mucus, or in vomiting. During the fit of coughing, the face becomes red or livid, the eyes project, and the child seizes some person or object near him for support. These paroxysms occur at uncertain intervals, but usually about every two hours, and between them the child returns to his play, takes his food with good appetite, and exhibits little or no sign of illness. The disease reaches its height at about the end of the fourth week, after which the paroxysms diminish in frequency, and the patient shews signs of improvement. The second stage may last from two to eight weeks, and is succeeded by what may be termed the convalescent stage, the duration of which is very variable.

This is one of those diseases which seldom occur more than once in a lifetime; and hence it probably is that, as few children escape it, it is comparatively rarely noticed in adults. Morbid anatomy has failed to throw any direct light upon its special seat. The proportion of deaths to recoveries in cases of hooping-cough has not been satisfactorily determined, but when there is a severe epidemic, the mortality due to this disease is often very great; the deaths, however, in the great majority of cases, occur amongst the poorer classes. This mortality is, in reality, due rather to the bronchitis and pneumonia (or inflammation of the lungs), which are frequent complications of hooping-cough, than to the disease itself.

The treatment of hooping-cough, as long as it is uncomplicated or simple, should not be meddlesome. Nothing that can be prescribed in the early stages will check its natural course, and the object of the physician should be to ward off complications, and to conduct the disease safely to its natural termination. The diet should consist of milk and unstimulating farinaceous matters. The bowels should be kept moderately open. If the weather is cold, the child should be kept in the house with the temperature of the room at about 60°. A grain, or a grain and a half of ipecacuanha may be given three or four times a day. Slight counter-irritants may also be applied to the surface of the chest; Roche's Embrocation, which consists of olive oil, with half its quantity of the oils of cloves and amber, is extensively used for this purpose. Nothing is so serviceable in the last or convalescent stage as change of air, often even when from a pure to a comparatively impure atmosphere; and next to this, the internal use of a solution of binoxide of hydrogen (see HYDROGEN, BINOXIDE OF) seems most worthy of trial.

HOO'POE (*Upupa*), a genus of birds of the order *Insessores*, tribe *Tenuirostres*, and family *Upupidæ*. To this family are referred also the genera *Promerops*, *Epimachus* (Plume-birds), &c., natives of warm parts of Asia and its islands, Australia, and Africa, some of which are remarkable for magnificence of plumage. In the whole family, the bill is long and slender, the wings of moderate size or short, the legs short, the toes long, and the claws strong and curved. There are among them, however, great diversities, which have led some to divide them into two families, *Upupidæ* and *Promeropidæ*. The genus Promerops and its nearer allies have a close relation to the *Meliphagidæ*, which they resemble in partly feeding on the sweet juices of plants, in order to which the tongue is extensile and divided at the tip. The hoopoes, on the other hand, exhibit many points of resemblance to the crow family, with which they are connected by the choughs, and some points of resemblance even to hornbills. The tongue is short, and not extensile.

Hoopoe (*Upupa epops*).

The COMMON H. (*U. epops*) is an African bird, a summer visitant of most parts of Europe, found also in some parts of Asia; not of frequent occurrence in Britain, although sometimes seen in autumn, very seldom breeding in any part of the island. It is about the size of a missel-thrush; its plumage exhibits a fine mixture of white, buff, and black; and it has a large crest of two parallel rows of feathers. The H. derives its name from its very frequent utterance of a low soft sound resembling the syllable *hoop*.

HOOPS. See CRINOLINE.

HOORN, a decaying town and seaport of the Netherlands, in the province of North Holland, is agreeably situated on a bay of the Zuider Zee, 20 miles north-north-east of Amsterdam. It was at one time one of the most flourishing towns of its province; but, like all the towns of North Holland situated on the Zuider Zee, it has greatly fallen off in trade and prosperity. There are at H. extensive markets for butter and cheese, and fishing and commerce are carried on to some extent. Here the large nets for herring-fishing were invented. Pop. 10,000.

HOP (*Humulus lupulus*), a perennial diœcious plant of the natural order *Cannabinaceæ* (q. v.), the only species of its genus. It has long rough twining stems, and stalked 3—5-lobed rough leaves, and is a plant of luxuriant growth and abundant foliage. The male flowers grow in loose branching axillary panicles, and consist of five stamens surrounded by a 5-lobed perianth. The female flowers are in *strobiles*, or cones, with large persistent, concave, entire scales, which enlarge as the fruit ripens. The part of the hop so much used in brewing, and sold under the name of *hops* (q. v.), is the ripened cone of the female plant. Female plants alone, therefore, are cultivated to any considerable extent, it being enough if a few male plants are scattered over a field.

Hop (*Humulus lupulus*).

The oil of hops is sedative, anodyne, and narcotic; and hence the value of pillows stuffed with hops in cases of mania, sleeplessness, &c. The bitter principle is not narcotic, but it is tonic. The oil and bitter principle combine to make hops more useful than chamomile, gentian, or any other bitter, in the manufacture of beer; and hence the medicinal value of *extra-hopped* or *bitter* beer. The *tannic* acid contained in the strobiles also adds to the value of hops, and particularly as causing the precipitation of vegetable mucilage, and consequently the clearing of beer. The hop is first mentioned by Pliny as one of the garden plants of the Romans, who, it appears, ate the young shoots as we eat asparagus; and, in fact, many country people in England do the same at the present day. It is a native of Europe and of some parts of Asia, a doubtful native of Britain and of North America. It is more extensively cultivated in the south of

England than in any part of the world, but also to a considerable extent in Germany, France, Flanders, and Southern Russia, and now successfully in North America and in Australia and New Zealand.

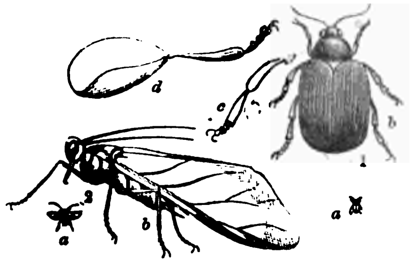
The cultivation of the hop was introduced into England from Flanders in the time of Henry VIII., but did not become sufficient for the supply of the kingdom till the end of the 17th century. For some time after hops began to be used in brewing, a strong prejudice existed against the innovation; and parliament was petitioned against hops, as 'a wicked weed, that would spoil the taste of the drink, and endanger the people.' Above 60,000 acres are now employed in the cultivation of hops, chiefly in the counties of Kent, Sussex, Worcester, and Hants; the two former counties producing the best hops in the world. Fields of hops are to be seen as far north as Nottinghamshire.

The hop requires a very rich soil, and its growth is promoted by the liberal application both of organic and mineral manures; although excessive manuring is prejudicial. It spreads rapidly underground by its roots, and is not easily extirpated where it has once been introduced. It is generally propagated by layers or cuttings, which usually grow for a year in a nursery before being planted out. In the plantations, they are generally placed in groups of three or four, at distances of from six to nine feet. Great care is necessary in fastening the stems to the poles when they begin to shoot, setting up any that may be blown down, &c. The stalks, or *bines*, are taken down from the poles after the hop-picking, and cut and removed, to be used as litter or as manure, for which purposes they are excellent. The fresh bines, which are cut to prevent undue luxuriance in summer, are dried for feeding cattle, and are as good as the best clover hay.

The fibre of the stems is employed to a considerable extent in Sweden in the manufacture of a coarse kind of cloth, which is strong, white, and durable; but the fibres are so difficult of separation, that the stems require to be steeped in water for a whole winter.

The hop-plant often suffers very much, and the prospects of the farmer are destroyed by the Hop Mildew, and by insect enemies, the worst of which are noticed in the following articles.

HOP FLEA (*Haltica concinna*), a very small coleopterous insect, not quite one-tenth of an inch in length, which often does much mischief in hop-plantations in spring, devouring the tender tops of the young shoots. It is of the same genus with the turnip-flea (sometimes called turnip-fly), so destructive to turnips.



1. Hop Flea (*Haltica concinna*): *a*, natural size; *b*, magnified; *c*, a fore-leg; *d*, a hind-leg.
2. Hop Fly (*Aphis Humuli*): *a*, natural size; *b*, magnified.

HOP FLY (*Aphis Humuli*), a species of *Aphis* (q. v.) or plant-louse, important on account of the injury which in some seasons it does to hop-plantations. It is, indeed, the principal cause of the great difference between the hop crop of one year and of another, causing the variations in price and the speculations for which the hop trade is notable.—The winged female is green, with a black head, and spots and bands of black on the body; the legs are long. A few winged females appear about the end of May, and wingless multitudes are sometimes to be seen by the middle of June, on the under side of the hop-leaves and on the stems. *The fly* is the great dread of hop cultivators, and no means have been found of arresting its ravages. Lady-birds and other insects render important service by devouring the aphides, and restraining their excessive multiplication. It is proposed, in Kirby and Spence's Entomology, that women and children should be employed to pick off the winged aphides on their first appearance.

HOPE, THOMAS, a distinguished author and patron of art, ancient and modern, was born in London about 1770. While still a youth, he travelled over a large portion of Europe, Asia, and Africa, and collected many drawings, chiefly of buildings and sculptures. In England, he first attracted attention by the splendid decorations which he bestowed on the interior of his mansion in Duchess Street, Portland Place, London, a description of which appeared in his book on *Household Furniture* in 1805, a work that completely revolutionised the taste of this country. In 1809, he published his *Costume of the Ancients*, the influence of which was undoubtedly very great. His essay on the *Architecture of Theatres*, belonging to the same year, also deserves mention. Three years afterwards appeared his *Modern Costumes*, and in 1819 his *Anastasius, or Memoirs of a Modern Greek at the close of the 18th Century*. This last work is his master-piece. It was published anonymously, and was said by many people to be a production of Lord Byron's, who was greatly flattered by the rumour. It is certainly a brilliant and erudite performance, but is tedious and obscure in many places. It wants the dramatic *vis* of a genuine work of genius, and is now hardly if ever read. The only other works of H. worth mentioning, are his essay *On the Origin and Prospects of Man*, a very heterodox but rather eloquent piece of writing; and a *Historical Essay on Architecture*, both of which were published posthumously. H. died February 3, 1831.

HÔPITAL, MICHEL DE L', was born at Aigueperse, in Auvergne, in 1505, studied law at Toulouse, and first made himself known as an advocate in the parliament of Paris, and after discharging various public functions, became chancellor in 1560, during the minority of Francis II. France at this time was torn by contending factions. The Guises, in particular, were powerful, ambitious, and intensely Catholic; and when one of the family, the Cardinal de Lorraine, wished to establish the Inquisition in the country, H. boldly and firmly opposed him, and may be said to have saved France from that detestable institution. He summoned the states-general, which had not met for 80 years, and, being supported by the mass of moderate Catholics, he forced the Guises to yield. His speech at the opening of the assembly was worthy of his wise and magnanimous spirit: 'Let us do away,' said he, 'with those diabolical words of Lutherans, Huguenots, and Papists—names of party and sedition; do not let us change the fair appellation of Christians.' He induced the assembly to pass an ordonnance abolishing arbitrary taxes, regulating the feudal authority of the nobles, and correcting the abuses of the judicial system. In the following year, he secured various benefits for the persecuted Huguenots;

but politico-religious passions were too fierce and vindictive in France in those days to be satisfied with anything but blood; and in spite of the most strenuous efforts which H. could make, the nation was plunged in the horrors of civil war, ending rather in the success of the Guises, the political *ultramontanes* of their day. The old patriot, who loved France too well to be either Huguenot or ultramontane, went into retirement, where he heard the news of the massacre of St Bartholomew, a crime against both the unity of France and the rights of conscience, which broke his heart. He died 15th March 1573.

HOPKINS, Samuel, D.D., an American clergyman, and founder of the Hopkinsian theology, was born at Waterbury, Connecticut, September 17, 1721. Having graduated at Yale College in 1741, he studied theology with Jonathan Edwards, and from 1743 to 1769 was settled as pastor of Housatonic, now called Great Barrington, Massachusetts. He then removed to Newport, where he died December 20, 1803. His writings consist of a life of President Edwards, sermons, addresses, a work on the millennium, and a system of theology, republished in Boston, 1852. He is said to be the hero of Mrs Beecher Stowe's *Minister's Wooing*. He was remarkable for his simplicity, earnestness, and persevering industry, and his peculiar theological doctrines have been a source of controversy for a century.—Hopkinsians, those who adopt the theological opinions of Dr Hopkins, are not a distinct sect, but are pretty numerous in America, in some of the Christian bodies of which the tenets are generally Calvinistic. They hold most of the Calvinistic doctrines, and even in their most extreme form, but they entirely reject the doctrine of imputation, both the imputation of Adam's sin and of Christ's righteousness. The fundamental doctrine of the Hopkinsian system, however, is, that all virtue and true holiness consist in *disinterested benevolence*, and that all sin is *selfishness*—the self-love which leads a man to give his first regard even to his own eternal interests being condemned as sinful.

HOPS. The produce of the hop-plant (see Hop). The fruit is a little nut, not larger than a grain of mustard-seed, and between its outer shell and the kernel there is a small quantity of a peculiar granular substance called *Lupuline*, which also exists as a sort of efflorescence on the surface of the scales themselves; much of the value of the hop depends upon the abundance of this substance. The *lupuline* is not a mere powder, but each grain is a little organised cellular body, of an oval or round form, and, when seen under the microscope, having a reticulated surface. These lupulinic grains have been analysed by many chemists. The following is the result of the investigations of Payen, Chevallier, and Pelletean:

Volatile oil (oil of hops), ...	2·00
Lupuline (the bitter principle), ...	10·30
Resin, ...	50 to 55·00
Lignin, ...	32·00
Fatty, astringent, and gummy matters; osmazome, malic, and carbonic acids, several salts (malate of lime, acetate of ammonia, chloride of potassium, sulphate of potash), &c. .	Traces.
	99·30

The first year the bines, or stalks, are weak, and have to be provided with poles. When the bines die down in autumn, they are cut off, and the sticks removed or stacked, and during the winter the ground is forked over and manured. The plants are in perfection the third year, when each requires a pole about 18 or 20 feet in height, to which the young bines are tied as they grow, with rushes or bast. They, however, soon begin to twine around the poles, and then require no more tying. In the English hop-grounds, the picking begins about the middle of September. This is done by women and children chiefly, some men being necessary to lower the poles and bring the hops within reach. As the hops are picked, they are taken to the *oast*, or hop-kiln, in which they are dried, usually on horizontal screens of hair-cloth, through which the heat of the kiln passes. This operation requires to be performed with great care, as the essential oil is very liable to be volatilised, especially as the hops are frequently kept from year to year. When fully dried, they are carried to the packing-house, and are there pressed into the bags or pockets, and sewed up ready for sale.

The best varieties of the hop are, the Hill Golding, the East Kent Golding, Golden Hops, Jones' Hops, Grape Hops, and Farnham White Bine.

The Goldings are the best and richest, and are used for the finest ales. The Jones' are most valued for their habit of short growth, which enables the grower to use shorter poles. The Colegates are very hardy, and can be grown on a poorer soil than the others. The grape hops are also very hardy, and will do on an indifferent soil; they are also very prolific.

We also receive them of excellent quality from Canada and the United States. Until the year 1862, hops paid an excise duty, and formed an important part of the revenue, although a very variable crop, owing to the serious check it is liable to from insects, fungi, diseases, and the weather. In 1873, the land under hops in England amounted to 63,278 acres, of which more than 40,000 were in Kent, and most of the remainder in Sussex, Hereford, and Hampshire. The annual exportation of hops is about 40,000 cwt., chiefly to the United States and Australia.

In a carefully conducted experiment, Dr Ives obtained 14 ounces of lupuline from 6 pounds of hops; and as he was sure that he had not removed it all from the scales and nuts, a fair conclusion was drawn that the lupuline constitutes a sixth of the whole weight of the best hops. Both the bitter taste and the preservative character of hops are supposed to depend entirely upon this material, whether in the form of fully developed lupuline grains, or diffused in an undeveloped state in the structure of the scales. It is, therefore, of the utmost importance not only to encourage the development of the lupuline by good cultivation, but it is equally desirable to make the best use of it when produced. In furtherance of this, many of the principal English brewers now use an ingenious machine made by Mr Handyside of Derby, which first shakes off and sifts out the lupuline grains, and then separates the nuts or seeds from the scales. The reason for this separation is this: Experience has shewn that much of the aromatic principle of the lupuline is dissipated at a boiling heat; therefore only the scales are so treated, whilst the free lupuline is mashed with lukewarm wort, and the nuts, after being crushed, are treated in the same manner, and all are added together when cold. By this means, the aroma is fully developed, and a smaller quantity of hops is found to answer fully.

There is a narcotic principle in hops as well as the bitter and tonic, all of which have led to their employment in medicine. Such use is, however, very limited. For the full details of their employment in the process of brewing, see Beer.

HORATIUS FLACCUS, Quintus, the renowned Roman satirist and lyrist, was born at Venusia, in Apulia—in the country now called the *Basilicata*, lately forming part of the kingdom of Naples—on the 8th December, 65 B.C. His father, who had been born a slave, but manumitted before the poet's birth, was a *coactor* (a collector of money for tax-gatherers and bankers), by which employment he had become a proprietor on a modest scale in his native district. Early seeing the genius and promise of his son, he resolved to devote his whole means to his education, and removing to Rome for the purpose, he gave him the culture usually bestowed on the children of the highest classes. Having finished his youthful studies at Rome, he was engaged on higher ones at Athens, when the assassination of Julius Cæsar threw the whole Roman world into confusion, and dragged H. himself—in his 21st year—into the civil war which followed. Brutus coming with Cassius to Greece, made H. a tribune, and he served with the republican leaders in that rank until the fatal field of Philippi put an end to their campaign. Brutus and Cassius destroyed themselves. H. made his submission, and returned to Rome. With what was left of his patrimony he bought the office of public scribe, and while living by this humble place, devoted his energy to literary creation. Thoroughly accomplished in Greek and Roman literature, he set himself to two great tasks—the naturalisation in Latin of the Greek lyric spirit, and the perfect development of the old Roman satire. It is his complete artistic success in both objects which has made him one of the most influential writers of the world, and which will secure his fame as long as order or culture exist upon the globe.

H.'s first known labours were satires and epodes—the epodes being imitations of the Greek satirist Archilochus. But it is probable that he early began to imitate the other great Greek lyrists; and it is certain that his first success was derived not from the public but the private circulation of his works. He made the friendship of Virgil, whose rise preceded his own, and of Varius; and Virgil and Varius introduced him to Mæcenas when he was about 26 years old. That great Etruscan noble and friend of Augustus became the good genius of the poet's life. He endowed him—at some period not exactly known, but before 33 B.C.—with a farm near Tivoli, in the Sabine country, established his independence, fostered his fame, sought his intimacy, loved, honoured, and encouraged him as much as one man could another. The friendship of Mæcenas led to that of Augustus, and H. enjoyed all his life (he died at 57) the consideration of the greatest persons of his time. He shews his gratitude for such favour in many passages of his poems, but he is never servile, and he compliments the emperor himself only on those features of his reign which have tended to secure him the gratitude, or, what was not less needed, the forgiveness, of posterity.

It is impossible, in our brief space, to discuss the vexed question of the chronology of H.'s poems, or to notice a fiftieth part of what has been written on it. But if we cannot be sure of the chronology of the poems, they give us themselves ample means for judging of the character of the poet. Even his personal appearance is familiarly known to us. He was a little, round, dark-eyed man, prematurely gray-haired, and inclined to corpulence; in dress somewhat slovenly, and apt to be abstracted in his gait and manner. He was kindly, friendly, and honourable—irascible, but easily appeased—of amorous and generally sensual temperament, yet fully sensible of both the dignity and the prudence of moderation. His philosophy was Epicurean, like that of most Roman men of the world of his age; but he had both an eye and a heart for the noble in history and in life, and his most discerning readers cannot but see that there was a latent fund of earnestness and even piety in his nature, to which his poetry never gave full expression. The real key to his genius, is to study him as essentially a philosophical wit and moralist, who had an exquisite faculty for lyrical creation, and was a finished artist by dint of practice in it, but who primarily belonged to the philosophical rather than to the poetic class of minds. Some strict modern critics have doubted his being a poet at all, which, since he could produce all the effects of poetry, is plainly nonsense. The latest criticism, however, decidedly tends to place his lyrical works—as imitations of the Greek, and echoes of the natural notes of an earlier and more poetic age—farther below his *Satires* and *Epistles* than it was once customary to rank them. Meanwhile, this neither robs the *Odes* of their value, nor of their charm, nor of their merit. Their value, as representing an older literature which only exists in fragments, is immeasurable. Their charm, as breathing now all the gaiety, now all the sadness, of the ancient pagan mind, is irresistible. And their merit, even as imitations, implies a delicacy of insight, a fineness of touch, a power of minute finish, which has been exhibited by very few writers in the whole history of art. They are, indeed, perpetual models of construction, equally valuable to poets of every school, and were not less carefully studied by Wordsworth than by Pope. Great, however, as is the merit of the *Odes*, that of the *Satires* and *Epistles* is still higher. The native Roman satire—an indigenous product of Italy, as Casaubon has irrefragably established—was developed by H. into a branch of composition peculiarly his own, and in his own species of which he has never had a rival. He ridicules the follies of the world from the point of view of a man of the world, playing round vice like a picador round a bull; and though his morality does not rise above the level of a prudential moderation abhorrent of extremes, he enforces this with so much soundness, dramatic liveliness, and gay vivacious humorous wit, that the pulpit has profited by him not less than the author's study, and he has been the favourite of ecclesiastical dignitaries and statesmen, while also being the pocket-companion of men of letters and epigrammatists. The *Epistles* contain the graver element of the *Satires* in still greater perfection, and with the addition of a fine vein of personal emotion and affection, tinged occasionally with the melancholy of advancing life, which, on the whole, makes them the most valuable of H.'s works.

The literature of H. in modern Europe is enormous, and can only be glanced at here in the briefest manner. The *Editio Princeps* appeared at Milan in 1470, in 4to, and was followed by a long line of editions. In modern times, Orelli has taken a leading place as Horatian editor, and since him, Dillenburger has been justly popular; while England has contributed to the subject, among many other works, the valuable *Horatius Restitutus* of Tate, and the sumptuous volume of Dean Milman. Among the English translators of H., in the whole or in part, are found Ben Jonson, Milton, Atterbury, Pope, Warren Hastings, and Cowper, while Pope's *Imitations* occupy a distinguished place of their own. The best known translation of the whole of H. in English, is that of Francis, but his day is fast going by. Excellent translations have been issued in our own time by Mr Martin, Mr Robinson, Lord Ravensworth, Lord Lytton, and Prof. Conington; and a curious, but powerful one by Prof. Newman, whose theory of translation, however, has led him into frequent oddities and singularities.

HO'RDEIN, a term that has been applied to a substance that can be extracted from barley, but which is merely a mixture of starch, cellulose, and a little nitrogenous matter of unknown composition.

HO'RDEUM. See BARLEY.

HO'REB. See SINAI.

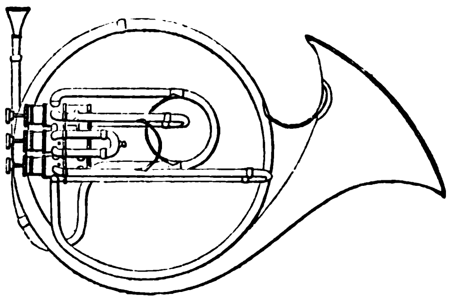
HO'REHOUND (*Marrubium*), a genus of plants of the natural order *Labiatæ*, having a tubular 10-ribbed calyx, with 5 or 10 spiny equal teeth, 4 stamens included in the corolla, the upper lip of the corolla erect, the lower lip 3-cleft. The species are mostly perennial, herbaceous plants, natives of the south of Europe and the East. One species, the COMMON or WHITE H. (*M. vulgare*), is a native of Britain, and is found generally throughout Europe, except in the more northern regions, growing in waste places, waysides, &c. It is about 1—1½ feet high, bushy, with roundish, ovate, crenate, wrinkled leaves, and almost globose whorls of white flowers. The whole plant has a whitish appearance, from the down with which its leaves are covered. It has an aromatic but not very agreeable smell. It is tonic, stimulant, and laxative, and is much used in coughs, being a popular remedy, and a very safe and efficacious one. It was formerly also employed in affections of the womb and of the liver. It is administered in the form of an infusion, or made into a syrup with sugar, and sometimes the syrup is candied. The name H. belongs also to another plant, a native of Britain, *Ballota nigra*, sometimes called Black H., a fetid plant, also of the order *Labiatæ*, and of a genus very closely allied to *Marrubium*. It closely resembles the White H. in taste, and possesses similar medicinal properties.—A third British plant, *Lycopus Europæus*, a diandrous plant of the same natural order, is sometimes called WATER HOREHOUND. It is also known as Gypsy-wort.

Horehound (*Marrubium vulgare*).

HORI'ZON, the circular line formed by the apparent meeting of the earth and sky; this, in astronomical phrase, is called the *sensible horizon*. The *rational horizon* is the circle formed by a plane passing through the centre of the earth, parallel to the sensible horizon, and produced to meet the heavens.

HORN, CAPE. See CAPE HORN, or HOORN.

HORN, a musical instrument; commonly called in this country the French Horn; in Italy, Corno; in France, Cor de Chasse. Its form is that of a long tube of brass, with a large bell-shaped ending. For greater convenience the tube is coiled up into four continuous circles, lying side by side, the coils being soldered together, to keep them in their position. It is sounded by means of a mouth-piece, in form like a little hollow cup. The thinner the sheet-brass is, of which the horn is made, the more easily can the sound be produced. The sounds obtained on the horn are the harmonics of the sound of its whole length, a fundamental sound which cannot be produced by the mouth. As those sounds form only a limited scale, the notes awanting are artificially made, by the hand being inserted into the bell, so as to flatten a higher note down to a lower one. These flattened notes are called stuffed notes, as the sound of them is muffled. The horn, in its natural state, can only be played in one key; but by means of crooks, which are added to increase the length of the tube, it can be transposed into any key. When at its greatest length, the horn measures, from the mouth-piece to the end of the bell, 16 feet. The music for the horn is always written in the key of C, with the key of the composition marked at the beginning of each movement; thus, Corno in D, &c., guides the performer as to the crooks he must use, in order to play the notes in the key indicated. The stuffed notes on the horn being very defective in quality of sound, in comparison with the great beauty of the open notes, many inventions have been, from time to time, tried to remedy them. The most successful invention is the valve-horn, which is constructed so that the performer can, by means of three valves, lengthen or shorten the tube, so as to produce any note in the chromatic scale, as a harmonic of the length of the tube, and consequently all of the notes are of the same quality of sound, and open notes. The valve-horn is now generally used as a solo instrument with greater effect than the common horn. As an orchestral instrument, the horn is of great importance. There are never less than two horns in an instrumental score, and in many great works four horns are absolutely necessary. The date of the invention of the horn is lost in antiquity.

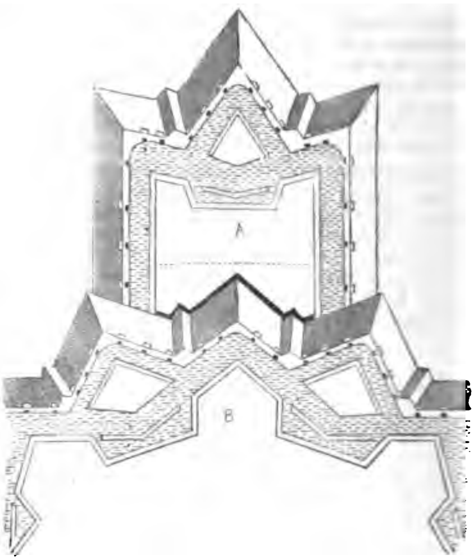


French Horn.

HORN MANUFACTURES. The horns of various animals are employed for useful and ornamental purposes. The principal are those of the ox, buffalo, and two or three species of deer, and of sheep and goats. Horn can be softened and split into thin laminæ, or pressed into moulds; and as it recovers its peculiar character of flexibility, toughness, and transparency, when cold, it is particularly adapted for a great variety of purposes. It can also be dyed various colours. Solution of gold in aqua regia, dyes it red; solution of nitrate of silver in nitric acid, black; a paste of red-lead, made with a solution of potash, colours it brown; so that, with a proper arrangement and application of these materials, the most admirable imitations of the much more costly tortoise-shell can be produced. The more common vegetable dye-stuffs, as logwood, Brazil-wood, bar-wood, saffron, indigo, &c., will also colour it, but neither so permanently nor so brightly as the metallic materials. By long-continued soaking, the horns of all the animals above mentioned, except the deer, can be softened, and those of the sheep and goat can be easily split into several layers when they have been soaked and boiled; and these layers can not only be flattened out by putting them between smooth iron plates heated and placed in a press, but if the edges of two or more are brought together between polished copper plates, and these tightly screwed together with a hand-vice, and plunged for some time in boiling water, and thence into cold water, the edges will be found firmly welded together, and the same property enables the horn-worker to use up the smallest cuttings with profit. Another valuable property of horn is, that when heated it can be pressed into a die, and not only takes a beautifully sharp impression, but if left in the die until cold, it retains it. In this way, then, it is employed in making handles for umbrellas, knives, forks, &c., and even ornamental boxes, and a variety of other articles. Combs are made out of the flattened sheets, and beautiful carvings are made out of the solid parts of the buffalo-horns brought in such vast numbers from the East Indies. Ox-horns, too, are sometimes of fine quality and colour, and are fashioned into drinking-cups, and other articles, often highly ornamental. Deer-horns, which, strictly speaking, are bone, have a very limited application; they are employed in this country for making knife-handles, called buck-horn, in much favour for pocket-knives; but on the continent the horns of the fallow-deer are extensively used in making the deer-horn articles of furniture peculiar to Germany. The deer-horns used in Great Britain are chiefly those of the Axis (*Axis maculata*), of which at least 100,000 are annually imported from the East Indies. From the same country are brought to Britain 800 tons of buffalo-horns, whilst from South America and other parts, the importation of ox and cow horns exceeds a million annually.

HORN-WORK, in Fortification, is a work having one front only, thrown out beyond the glacis of a fortress; with a view, 1. To strengthen a weak salient in the general outline; 2. To occupy a plateau in advance of the place, or to protect buildings, the including of which in the original enceinte would have extended it to an inconvenient degree; 3. To occupy a tongue of land protected on its sides; 4. To bar a defile; 5. To cover the head of a bridge; 6. To occupy rising ground, the possession of which would render the enemy more than necessarily dangerous. The front of a horn-work consists of two demi-bastions connected by a curtain, and usually defended in front, as in the fortress itself, by tenaille, ravelin, and covert-way. The flanks, protected by ditches, run straight upon the ravelin, bastion, or curtain of the main defences, so that the ditch may be swept by the fire of the latter. The flanks should not be too long for easy musketry range.

In most of the earlier works of this nature, the ditch of the horn-work was united with the ditch of the main works by being cut through the glacis and covert-way, but in modern works the horn-work is constructed entirely beyond the glacis, as the annexed figure shews. The masonry wall is shewn in the figure by a thick black line at the head of the horn-work and immediately beyond the glacis, but at times it is merely a straight wall thrown across, as in the dotted line.



A, Horn-work, covering a Bastion, B.

Occasionally, horn-works are very useful; but modern engineers generally prefer constructing detached and advanced works. A double horn-work becomes a *Crown-work* (q. v.).

HORNBEAM (*Carpinus*), a genus of the natural order *Cupuliferæ;* consisting of trees with compact, tough, hard wood; bark almost smooth and of a whitish-gray colour, deciduous leaves, and monœcious flowers. The male catkins are cylindrical and sessile, their flowers consist merely of a little scale-like bract and 12—24 stamens. The female flowers consist of a germen, crowned with the 4—8-toothed border of the perianth, and with two thread-like stigmas, and are placed in loose slender catkins, always two together, each at the base of a stalked bract, which is three-cleft or three-cornered, and

Hornbeam (*Carpinus Betulus*).

which, when the tree is in fruit, enlarges very much, becomes leafy, and covers the fully ripened nut on one side. The nut has a thick husk, and is small and striated. The COMMON H. (*C. Betulus*), very frequent in the woods of many parts of Europe, is a beautiful tree, attaining a height of 60—100 feet. It is seldom, indeed, now seen of such dimensions in Britain; but it seems to have formed a principal part of the ancient forests of some parts of the island. It has elongato-ovate, acuminate, almost triply serrate leaves. When in fruit, it has very large, deeply 3-partite bracts. It thrives best in a moderately moist and shady situation. Its root descends deep into the ground. The wood is white, very hard, uncommonly strong and tough, and therefore suitable for bearing heavy strains. It is much used by joiners, turners, and wheelwrights. It takes a very fine polish, and, when well stained, might readily be mistaken for ebony. In the earth, or where exposed to the changes of the weather, it is of no great durability. It burns like a candle, and it is one of the best kinds of firewood; it affords an excellent charcoal, and the ashes yield much potash. The young stems, by reason of the dense growth of their twigs, are very suitable for forming live-fences and bowers; and as it bears clipping very well, the H. was often employed to form those live-walls which were formerly so much the fashion in gardens.

HORNBILL, the name of a genus (*Buceros*) and of a family (*Bucerotidæ*) of birds, to which Cuvier assigned a place in the syndactylous division of the order *Insessores*, but which some naturalists rank with crows in the tribe *Conirostres*. Their anatomical structure has been found to indicate affinities both with crows and toucans, and the same inference may be drawn from their habits. The species are numerous; they are natives of Africa and the East Indies. They are mostly large birds, some nearly as large as a turkey, the smallest rather smaller than a magpie. They are remarkable for the enormous size of the bill, and for a large bony protuberance with which it is generally surmounted. The bill is curved, broad at the base, compressed towards the tip; the bony protuberance on the upper mandible assumes different forms in different species. They may be described as omnivorous.

Hornbill (*Buceros Rhinoceros*).

HO'RNBLENDE, a mineral allied to Augite (q. v.), and containing from 40 to 60 per cent. of silica, with variable quantities of alumina, lime, oxide of iron, soda, potash, and fluorine. H. is found in granite, syenite, and other igneous rocks which contain quartz or free silica. It is particularly abundant as a constituent of syenite. It is sometimes found in considerable masses, and even in beds of slaty structure (*H. slate*). The variety called COMMON H. is generally green or black, more rarely brown or gray. It contains a pretty large proportion of protoxide of iron; is generally massive, but sometimes crystallises in oblique four-sided, or in six-sided prisms. The crystallised H. is sometimes called *Black Schorl*, and is capable of being made into ornaments.

HO'RNCASTLE, a market-town of England, in the county of Lincoln, is situated in an agreeable district at the foot of the Wolds, 20 miles east of Lincoln. The parish church is the most interesting of the public buildings; portions of it were erected during the reign of Henry VII. There is a considerable trade here in corn and wool; and of the three annual fairs, that held in August lasts for ten days, and is one of the largest horse-fairs in Britain. There are at H. remains of a Roman fortification; coins and other antiquities are occasionally found in the neighbourhood. Pop. (1871) 4865.

HORNE, REV. THOMAS HARTWELL, D.D., an English biblical critic, born October 20, 1780, was educated at Christ's Hospital, and afterwards became clerk to a barrister. His leisure hours were devoted to the study of the Bible, and in 1818 he published his *Introduction to the Critical Study and Knowledge of the Holy Scriptures*, a work which procured for him admission into orders without the usual preliminaries. Subsequently, St John's College, Cambridge, granted him the degree of B.D., and two American colleges that of D.D. In 1833, he obtained the rectory of St Edmund the King and St Nicholas Acons, London. He was also made a prebendary of St Paul's Cathedral. In the course of a long life, H. published a great variety of works, but the one already mentioned is the principal. From the first moment of its appearance, it not only became popular, but attained the dignity of being considered the text-book on the subject in all or almost all the theological colleges of Great Britain and America. It has gone through eleven or twelve editions, and has been frequently improved, so that it still retains the high reputation which it originally bore. He died February 1862.

HORNET (*Vespa crabro*), the largest species of wasp found in Britain. It is not uncommon in some parts of England, but is not found in Scotland. The thorax is mostly black, the fore-part rufous; the abdomen is yellow, with three brown points on

Hornet (*Vespa crabro*).

each segment. The sting is very painful. The H. is a very voracious insect, seizing and devouring bees and other insects, and carrying them to its nest to feed its young. The nest is in a hollow tree, in an outhouse, or in some other sheltered place. The community is not supposed ever to contain more than about 200 individuals, all deriving their origin from a single female, which, having survived the winter in some sheltered hiding-place, lays the foundation of the nest in spring. The nest is a curious structure, of a substance resembling coarse paper, and, except as to size, pretty similar to that of the common wasp. The community consists of females, males, and neuters or workers, as in the case of bees, but there are numerous females. Most of the males and neuters perish on the approach of winter, some of the females alone surviving.

HORNING, Letters of, a writ in Scotch Law, which issues to compel a party to execute or carry out a judgment or decree of the court. The writ was formerly the only form of enforcing civil decrees by imprisonment, except in the case of small-debt decrees. But by recent improvements, the process is shortened, and other forms are more used.

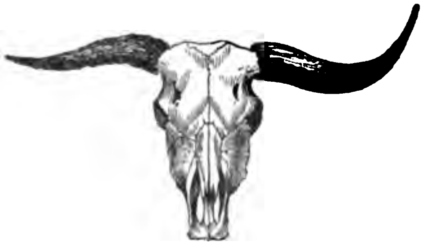
HORNITOS, or HORNOS (Span. *ovens*), the name given to the low oven-shaped hillocks which emit smoke and vapours, and which occur in great numbers on the sides and in the neighbourhood of the large volcanoes of South America.

HORNPIPE, a musical instrument, consisting of the common wooden pipe with the necessary holes for producing the notes, and with a horn on each end. The performer blows into one of the horns, and the sounds of the pipe proceed out of the other. In the north-west of England, where this instrument is mostly found, it is used to accompany a national dance which is also called the Hornpipe. The melody of this dance is always in triple time—that is, in $\frac{3}{2}$, or $\frac{3}{4}$, and sometimes in $\frac{3}{8}$ time—and it consists of two parts of four or eight bars each, with repeats. The movement of the dance is tolerably quick.

HORNS are appendages to the frontal bones of many of the extensive family of ruminants, and are obviously intended as weapons of defence. In the genus *Cervus* (deer), the horns (known also as antlers) are solid, uncovered by epidermis, bone-like in composition, and deciduous. In the genus *Camelopardalis* (the giraffes), we have the single example of solid persistent horns completely invested with a hairy integument. In the other horn-bearing ruminants—as the ox, sheep, goat, and antelope—the horns are hollow, uncovered by epidermis, are composed of a special tissue (Horny Tissues, q. v.) quite different from bone, and are persistent. In all these cases, the horns are attached to the cranial bones; and in all the hollow horns, excepting those of the antelope, the osseous axis is hollowed out into cells communicating with the frontal sinuses, and thus admitting the atmospheric air into the interior. The horn of the rhinoceros is quite distinct in character from the horns in any of the ruminants. It is a tegumentary, not an osseous appendage, and is usually described as if it were a mass of hairs which had coalesced. It consists, however, in reality, of an aggregation of tubes, round which the horny matter is arranged in concentric laminæ, as in the horny excrescences on the inner surface of the leg of the horse. The first and the third variety—viz., the antlers of the *Cervidæ* and the hollow horns of the ox, &c.—alone require special notice.

The deciduous horns of the *Cervidæ* at different ages, and their process of growth, are explained in the article Deer. To that description, it need only be added, that these horns are formed on two well-marked morphological types—one group possessing rounded antlers, such as occur in the roebuck and the red-deer, and the other having the antlers more or less flattened, as in the elk and fallow-deer. A remarkable sympathy exists between the generative organs and the horns; and the development of the latter may be arrested, and their periodical shedding may be prevented by castration. As a general rule, it is only in the male *Cervidæ* that horns are developed. In the reindeer, however, they are common both to the male and female.

In the hollow-horned ruminants, the bony protuberances or 'cores' arising from the frontal bones, and supporting the horns, instead of branching like antlers, form more or less solid cylindrical shafts, the surface being protected by ordinary Periosteum (q. v.), and by an extension of true skin, which becomes developed into a dense horny sheath. In the accompanying figure, the horny sheath is detached from the right horn, so as to shew the 'core' in the interior.

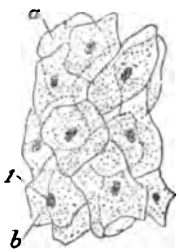


Front View of the Skull of the Ox, with the right Horny Sheath detached from the Core.

The horns of ruminants are almost invariably two in number, but exceptions occur in the case of the extinct Bramatherium and Sivatherium, and amongst living species, in the Four-horned Goat, the Many-horned Sheep, &c. In the Prong-horn Antelope there seems to be an approach to the cervine type, there being a prong of some length about half way up the horn, which may be regarded as analogous to the brow-antler.

HORNY TISSUES were formerly regarded as extremely simple in their structure, and as being only different forms of a substance to which the term *keratin* (from *kĕras*, a horn) was applied. Recent investigations, however, shew that the parts which consist of horny tissue—as, for example, the persistent horns of the ruminants, the epidermis, the nails, claws, and hoofs, whalebone, tortoise-shell, &c.—have a somewhat complicated, and, in some respects, a variable structure, although they are so far analogous to one another that they proceed from nucleated cells which are not morphologically developed like the cells of most other organs, but which, to a certain extent, dry up and are only agglutinated together by an intercellular substance. In a chemical point of view, they also closely resemble one another, for when compared with other tissues they all contain a large quantity of sulphur, in combination with a substance whose origin from, or affinity with the Proteine Bodies (q. v.), is sufficiently obvious from their behaviour towards certain re-agents (the caustic alkalies and the mineral and acetic acids, for example), and their percentage composition.

The accompanying figure represents a longitudinal section of cow's horn (magnified 410 diameters) taken perpendicularly to the surface, kept for four hours in concentrated potash solution, to which water was then added. If, however, a section of horn is examined in its natural state, it appears to consist of numberless bundles of fine threads lying side by side. After the addition of the potash solution, these bundles are seen to unfold into little plates, which gradually expand into the regular nucleated cells shewn in the figure.



Horny Tissues:
a, cell of the under layer; *b*, cell of the upper layer; l, nucleus of the latter.

The cellular structure of hoofs, whalebone, tortoise-shell, &c., may be exhibited in a similar manner. It is to the histo-chemical investigations of Mulder and Donders that we are mainly indebted for our knowledge of the structure of these tissues, who seem to have established that every horny tissue contains at least three different kinds of substances—viz., 1. The substance of the cell-membranes, which is exceedingly difficult of solution in alkalies, and which forms the principal part of the tissue; 2. The cell-contents, which dissolve more readily in alkalies; and 3. A connecting, or true intercellular substance.

These tissues have been submitted to ultimate analysis, after having been previously digested in water, alcohol, and ether. The analogy of their composition is shewn in the following tabular view:

	Hair.	Horse's Hoof.	Cow's Horn.	Nails.	Epidermis.	Whalebone.	Tortoise-shell.
Carbon,	50·65	51·41	51·03	51·09	50·28	51·86	54·89
Hydrogen,	6·36	6·96	6·80	6·82	6·76	6·87	6·56
Nitrogen,	17·14	17·46	16·24	16·90	17·21	15·70	16·77
Oxygen,	20·85	19·94	22·51	22·39	25·01	21·97	19·56
Sulphur,	5·00	4·23	3·42	2·80	0·74	3·60	2·22

These tissues differ slightly in the quantity of inorganic matter which they contain, but the difference does not vary much beyond 1 per cent.

Hair yields from 0·54 to 1·85 per cent. of ash, containing, amongst other ingredients, peroxide of iron and a little silica. In feathers, the quantity of silica is very considerable, and it is doubtless to this constituent that the shaft in a great measure owes its strength and hardness.

HORO'LOGY (Gr. *hora*, a defined portion of time) is that branch of applied science that has for its object the measurement of time. Although it is easy to look back on a period when time, according to the modern conception of it, as measured by hours, and minutes, and seconds, was unknown, yet we find progress early made in the measurement of larger periods of time, by observations of the heavenly bodies; and although, in the later progress of astronomy, it is found that the movements of the more conspicuous heavenly bodies do not afford accurate marks for the equable measurement of time, they were, for practical objects, sufficient, and afforded at least a better measure of time than any other phenomena which came under the observation of mankind. Thus, time was early divided into years, according to the motion of the sun among the constellations; into months, according to the motion of the moon relatively to the sun's place in the heavens; and into days, by the alternate light and darkness caused by the rising and setting of the sun. It was long, however, before any accurate measure was found for a division of the day itself. The earliest measure employed for this purpose that we can trace is the shadow of an upright object, which gave a rough measure of time by the variations in its length and position. This easily suggested the invention of Sun-dials (q. v.). Another means early adopted for the measurement of short periods of time was by the quantity of water discharged by dropping from one vessel into another. Instruments for the measurement of time on this principle were called Clepsydræ (q. v.). The running of fine sand from one vessel into another was found to afford a still more certain measure, and hence the invention of Hour-glasses (q. v.). King Alfred is said to have observed the lapse of time by noting the gradual shortening of a lighted candle. It is not very easy to trace to its source the history of the invention to which the modern clock owes its parentage; the earliest, however, of which we have a complete description, and perhaps the earliest which attained any distinct superiority to the rude machines already mentioned, was the clock of Henry Vic or De Wyck, a German, erected in the tower of the palace of Charles V., king of France, in 1379. A sketch of this clock, which is subjoined, will be useful not only from its historical interest, but also because, from its comparative simplicity, it will form a groundwork for further explanation of the mechanism of clocks and watches in their more complicated forms. It will be readily understood, from a glance at the annexed figure, that as the weight A tends to uncoil the cord and set in motion the cylinder B round its axis, the motion will be successively communicated to the various toothed wheels in the figure, and finally to the crown-wheel or escapement-wheel, I; the teeth of which so act on the two small levers or pallets, *i*, *h*, projecting from, and forming part of the suspended upright spindle or vertical axis, KM, on which is fixed the regulator or balance, LL, that an alternating or vibratory, instead of a circular, motion of the balance itself is the result. The hands of the clock are attached to the wheel N, also set in motion by the cylinder B. Now, unless there were some check upon the motion, it is manifest that the heavy weight A would go rapidly to the ground, causing the wheels to rotate, the balance to vibrate, and the hands to go round with increasing velocity. In order to prevent this rapid unwinding of the clock-work, and adjust it to the more deliberate measurement of time, the balance is, in De Wyck's clock, loaded with two weights, *m*, *m*; and the further these are removed from the axis or spindle, KM, the more heavily they will resist and counteract the escapement of the levers, and the rapidity of the rotation of the escapement-wheel, till the clock be brought to go neither too quick nor too slow.

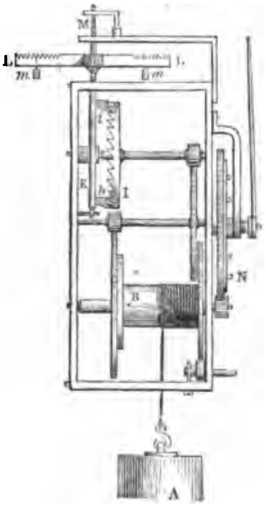


Fig. 1.—De Wyck's Clock.

The above construction is probably the basis of all the principal time-keeping machines in use in the 16th century. The great epoch in the history of horology is marked by the application to it of the Pendulum (q. v.) as a regulating power. This was effected by Huygens (q. v.) about 1657. This philosopher, in adapting the pendulum to the machinery previously invented, had little more to do than simply to add a new wheel to the movement, so as to enable him to place the crown-wheel and spindle in a horizontal instead of a perpendicular position, that the lower arm of the balance—then of course perpendicular, instead of horizontal, as in De Wyck's clock—might be extended, as it were, downwards, and thus, in fact, be converted into a pendulum.

The principle of construction adopted by Huygens, from the peculiar action of the levers and spindle, required a light pendulum and great arcs of oscillation; and although, to secure isochronous vibration in these large arcs, the ingenious device of constraining the motion in a cycloidal curve was resorted to, yet the consequence was, as has been remarked, that 'Huygens's clock governed the pendulum, whereas the pendulum ought to govern the clock.' About ten years afterwards, the celebrated Dr Hooke invented an escapement, which enabled a less maintaining power to carry a heavier pendulum. The pendulum, too, making smaller arcs of vibration, was less resisted by the air, and therefore performed its motion with greater regularity. This device is called the *crutch* or *anchor escapement.* It was brought by Hooke before the notice of the Royal Society in 1666; and was practically introduced into the art of clockmaking by Clement, a London clockmaker, in 1680. It is the form still most usually employed in ordinary clocks. It regulates the motion as follows: The pendulum is fixed at A, and hangs down behind the pallet-wheel (the last of the train of wheel-work), which revolves in the direction of BC, under the action of the weight; B and C are the pallets. When the pendulum swings to the left, AC rises, and a tooth escapes from C, while another falls on the outside of B, and, owing to the form of the pallet B, this latter recoils during the remainder of the swing. The same thing occurs on the pendulum's return; the arm AB rises, a tooth escapes from B, and another falls on the inside of C, and is pushed backwards by it during the remainder of the swing. The revolution of D is thus regularly retarded, one tooth being allowed to escape for every two oscillations—i. e., every two seconds—and as the wheel contains 30 teeth, it performs one revolution per minute (the seconds hand is fixed on the extremity of the axle of this wheel). During a portion of each contact between the pallets and teeth, the onward pressure of the wheel gives an additional impetus to the pendulum, so as to counteract the retarding effects of the resistance of the air and friction, which would otherwise bring it to a stand.

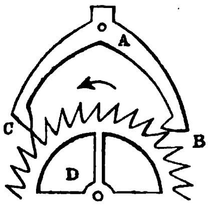


Fig. 2.

The only defect of this escapement is the recoil, and various modifications have been devised to obviate this. The first and most successful was made by George Graham, an English watchmaker in the beginning of the 18th c., and his improved form is called the *dead 'scapement* or *dead-beat escapement* (fig. 3). Here the outer surface of B and inner of C are arcs of circles, whose centre is A, and a little consideration will shew that there can be no recoil. This escapement is adopted in time-keepers when great accuracy is required. Other inventions, as the *detached escapement,* the *pin-wheel escapement* in various forms, and the *gravity escapement* (described below), though very efficient, have not come into general use.

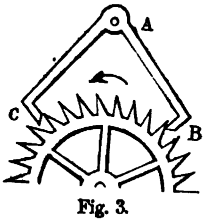


Fig. 3.

In the great clock in the new Houses of Parliament at Westminster, the pendulum is upwards of 13 feet long, to beat 2 seconds, and its bob weighs 6 cwts. The motion is kept up by a *remontoir* or *gravity escapement.* On each side of the pendulum-rod a small metallic hammer is hung upon a peg. 'The swinging of the pendulum first draws out a little bolt, that stopped the turning of a wheel; the wheel then goes round, under the influence of the weight, lifting one of the little hammers as it does so, until it is caught by another bolt. The hammer-head next falls by its own gravity, and strikes the pendulum-rod just as it is in the act of descending, communicating the force of its blow to quicken the movement; the same thing is afterwards repeated on the opposite side of the vibration, and then again on the same side; so going on alternately.' The push thus given is evidently unvarying. The wheel has three stops and cogs on it, and goes once round in three beats of the pendulum, or in six seconds. With this contrivance 'it is found that all the teeth of the several wheels may be rough, just as turned out from the casting, and the clock will nevertheless keep better time than it would have done with the most perfectly finished teeth under other arrangements.'

The gradual perfection of the clock required also improvements in the pendulum. No simple pendulum, however, can be depended on for an accurate timekeeper, for the isochronism of vibration of the pendulum depends on its being always the same length; now a cord contracts or expands with changes in the moisture of the atmosphere, and a rod with cold or heat. To overcome these defects in the pendulum, compensating pendulums were invented, of which Graham's *mercurial compensation pendulum,* invented in 1715, and Harrison's *gridiron pendulum,* in 1726, are the two principal forms (see PENDULUM).

The above improvements in the escapement and the pendulum bring the mechanical perfection of the clock, as a time-keeping instrument, to the point which it has attained at the present day. But the art of horology would be incomplete unless there were some standard, independent of individual mechanical contrivances, to which all may be referred, and by which the errors of each—which must exist in the most perfect human contrivances—may be corrected. The movements of the heavenly bodies are still, as of old, the only standard for a general measurement of time, affording as they do marks of unvarying certainty, to be read by all alike; and clocks and other mechanical contrivances are individual and imperfect measures of the intervals, to be trusted only until there is a new opportunity of comparing them with the certain and public signals of the heavens. These signals can, however, only be accurately read by persons furnished with the proper apparatus, and instructed sufficiently in its use. This is done in observatories, and there are in most parts of this country now sufficient opportunities of setting clocks by a communication more or less direct, with these establishments. When these are not to be had, the sun-dial may still be used with advantage, as a means of approximation to the correct time. The time which a clock ought to mark is *mean time,* the definition of which will be found in the article DAY (q. v.). The *mean time* at any *place* depends on the longitude. Supposing a clock to be set to Greenwich mean time, a clock keeping mean time of any place will be 4 minutes faster for every degree of longitude east of Greenwich, and 4 minutes slower for every degree west. Since the introduction of railways, clocks are usually set, within Great Britain, to Greenwich mean time.

The methods by which time is determined in observatories belong to the details of practical astronomy. For the more ready transmission of correct time to the public, there is at Greenwich Observatory, as well as some others, a ball which is dropped by means of electricity precisely at one o'clock. Within the last twenty years, however, there was invented a most ingenious device by which public clocks in a town can be kept at every instant in perfect agreement with the mean-time clock in the observatory. This is effected by an electric connection, and a modification of Bain's electric pendulum, invented by Mr R. L. Jones of Chester, on the suggestion of Mr Hartnup, the astronomer of the Liverpool Observatory. For a description, see Electric Clock. The first public application of it was to the town-hall clock in Liverpool, when for the first time was seen the curious spectacle of a great clock with works nearly 100 years old keeping time with astronomical accuracy. In the same way, a clock in the castle of Edinburgh, by whose mechanism a gun is fired precisely at one o'clock every day, is controlled by the mean-time clock in the observatory on the Calton Hill. To such perfection has the art of publication, as well as the keeping of correct time, been now brought.

It is not known when the alarm, or when the striking-mechanism of the clock was first applied. The alarm was adopted for the use of the priesthood, to arouse them to their morning devotions. The first striking-clock probably announced the hour by a single blow, as they still do, to avoid noise in churches. In De Wyck's clock, the wheel N, with its projecting pins, served to discharge the striking part (not represented in the figure). During the 17th c., there existed a great taste for striking-clocks, and hence a great variety of them. Several of Tompion's clocks not only struck the quarters on eight bells, but also the hour after each quarter; at twelve o'clock, 44 blows were struck; and between twelve and one, no less than 113! Many struck the hour twice, like that of St Clement Danes, in the Strand, London, first on a large bell, and then on a small one. Others, again, were invented so as to tell the hours with the least possible noise; also by the aid of two bells, each blow on the small one indicating five hours.

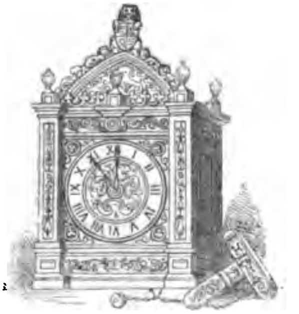


Fig. 4.—Horologe:
Presented by Henry VIII. to Anne Boleyn.

The striking part of a clock is rather a peculiar and intricate piece of mechanism. In ordinary clocks, the impelling power is a weight similar to that which moves the time-measuring mechanism itself; but the pressure of this weight on the striking-machinery is only permitted to come into play at stated periods in course of the workings of the time-keeping apparatus—viz., at the completion of every hour; when the minute-wheel, which revolves once in an hour, and carries the minute-hand of the clock along with it, brings it into action by the temporary release of a catch or detent, permitting the weight wound up on the cylinder of the striking-apparatus to run down for a little, in doing which, the hammer is forced into action, so as to strike the bell. Whether the strokes shall be one or many, is determined principally by two pieces of mechanism, one called a *snail*, from its form or outline, with twelve steps, and the other a *rack*, with twelve teeth; but the intricate action of the whole it would be in vain here to attempt to explain. Suffice it to say, that the time during which the striking-weight is *allowed* to descend, varies according to the turning of the twelve steps of the snail on its axis, and the position of the twelve teeth of the rack, at different hours of the day; being sometimes only long enough to permit one blow to be given by the hammer on the bell, and at another time long enough for twelve such blows.

The consideration of portable time-keepers (watches and chronometers) is reserved for the head Watch.

HO'ROSCOPE. See Astrology.

HORS DE COMBAT, a French term, literally meaning 'beyond the battle,' is used to signify a combatant, or body of combatants, so completely beaten either by physical force or strategy, as to be incapable of further action in the struggle actually under consideration.

HORSE (*Equus*), a genus of pachydermatous quadrupeds of the family *Equidæ* (q. v.), or *Solidungula*, generally regarded as including all the species of the family, although sometimes limited (see Ass), so as to contain only one species, the most important to man of all animals that are used as beasts of burden and of draught. The principal zoological characters are already given in the articles Equidæ and Ass, and a more particular description of the H. seems to be unnecessary. The native country of the H. is uncertain. Some contend for Asia, and some for Africa; some suppose that the H. was first domesticated in Egypt, and quote Scripture in support of their opinion, but to no better purpose than to shew that at a very early period it was in use as a domesticated and valued animal among the ancient Egyptians; whilst others adduce arguments not more conclusive to shew that it was originally domesticated in the north-east of Asia; some think it not improbable that Europe also, and even Britain, had indigenous horses. Whether certain wild races of Central Asia and the north of Africa are really indigenous to the regions in which they are found, or the offspring of animals which have escaped from domestication, like those of America; and whether the origin of the domestic H. is to be referred to one original form, or to several forms somewhat different, and belonging to different countries, are questions also uncertain; and the last of them is very similar to that which is so much agitated respecting the Dog (q. v.), although it must be admitted that the diversities are not so great as in that case.

The lips and teeth of the H. adapt it for cropping the short herbage of dry plains or hills, so that it finds abundance where an ox would be very insufficiently supplied. The feet are also adapted to dry rather than to soft or swampy ground. On soft ground, not only is the foot apt to sink, not being very broad, but the horny hoof is softened, and a diseased state of the feet is the result, as in the case of many of the great dray-horses of London, reared in the alluvial districts of the east of England. The H., however, requires a liberal supply of water; and during the dry season, in the hot plains of South America, great troops of wild horses often rush furiously to the rivers, and as they approach the drinking-place, trample one another under foot, vast numbers of skeletons remaining to bleach in the sun.

Wild horses are found on the plains of Central Asia. Some also inhabit mountainous or hilly districts both there and in the north of Africa. They abound still more in the grassy plains of North and South America, although they were first introduced into America by Europeans; and certain tribes of Indians, both in North and South America, have become at least as equestrian in their habits as any of the Tartars of the east. Wild horses are also found in the Falkland Islands, into which they were introduced by Europeans, and a peculiar breed has been found in a wild state in the island of Celebes.

The races or varieties of the H. have an evident relation to the climate of the countries in which they occur. Those of cold and stormy regions are comparatively small and rough-haired; those of more favoured climates, large and sleek. There are also differences, more evidently to be ascribed to domestication, according to which certain breeds are particularly adapted to certain kinds of work, some excelling in fleetness, some in endurance, some in mere strength for burden or draught. The slender form of the race-horse or hunter contrasts almost as strongly with the ponderous solidity of the dray-horse, as the great size of the latter does with the diminutiveness of the Shetland pony.

Wild horses congregate in troops, sometimes small, but sometimes of many hundreds. The males have fierce contests for the supremacy, and males that have contended unsuccessfully are often driven off to a solitary life. On the appearance of danger, the chief stallion of a small troop seems to direct the movements of all, and even the largest troops seem instinctively to move in a kind of concert, so that when they are assailed, the stronger animals oppose the enemy, and protect the younger and weaker. Wolves, even when in packs, attack with success only weakened stragglers, and even the jaguar is repelled. In fighting, horses either raise themselves on their hind-feet, and bring down the fore-feet with great force on the enemy, or wheeling about, kick violently with the hind-feet.

The *Tarpan* of Tartary is one of those races of wild H. which are sometimes regarded as original, and not descended from domesticated animals. It is of a reddish colour, with a black stripe along the back, and black mane and tail. The eye is small and vicious. Tarpans are sometimes caught by the Tartars, but are with great difficulty reduced to subjection. In some of the steppes of Central Asia are wild horses of a white or dappled-gray colour. —The wild horse of South America is there called the *Mustang*. It exhibits considerable diversity of colour, but bay-brown is the most prevalent. It is strong and active, and is often taken with the lasso, and employed in the service of man. A curious method is practised by some Indian tribes of promptly subduing its wild nature, and rendering it tractable, by blowing strongly with the mouth into its nostrils. By other tribes, it is subdued more rudely. It is thrown on the ground, and ere it can recover, a man gets upon its back, whom, when it rises, it cannot shake off, and who retains his seat until it is quite submissive.—The *Koomrah* of North Africa is regarded by Colonel Hamilton Smith as a distinct species (*E. hippagrus*). It has no forelock, but woolly hair on the forehead, is of a reddish bay colour without stripe on the back, or any white about the limbs, has limbs of a somewhat ass-like shape, and the tail covered with short hair for several inches at the root. It is an inhabitant of mountainous regions.

Of domestic varieties and breeds of the H., the number is very great, almost every country or considerable district having one or more of its own, and particular breeds being valued on account of their fitness for particular purposes. The breeds are also continually varied by crossing, and great improvements have thus been effected. The superior fleetness of the English race-horse and endurance of the hunter are ascribed to the crossing of the old English breed of light-limbed H. with the Arabian; and the English dray-horse, remarkable for its great size and strength, in like manner, owes much of its excellence to the crossing of the largest old English breed of draught-horse with the Flemish. A breed produced by crossing one of the lighter kinds of English draught-horse with the race-horse, is in the highest esteem for carriage-horses. North America has a breed of light-limbed horses, remarkable for fast trotting. The *Suffolk Punch* has been the origin of many of the most useful kinds of draught-horses employed in Britain for ordinary farm-work. The *Clydesdale H.* is also one of the best breeds of this class, and is an improvement on an older breed. Numerous breeds of smaller size, *ponies*, have long existed in different parts of Britain, and in almost all other countries. The *Shetland Pony*, which, compared with the dray-horse, is like a pocket edition of a book beside a great folio, is most prized when most diminutive, and sometimes does not much exceed a large dog in stature. A strong man has been seen to lift one with his arm, and again to ride on its back, whilst at the same time he walked with his feet on each side on the ground. The Shetland pony is, however, a very hardy animal, and remarkably strong.

The Arabian H. has long been the object of untiring care and attention, and to this very much of the excellence of the race is certainly to be ascribed. The regard of the Arab for his horse has long been famous. Very similar in some respects to the Arabian is the Barbary H., which was highly prized in Western Europe before the Arabian was known there, and from the name of which is derived the English word *barb*.

The H. has been used from the most remote ages both for riding and for drawing carriages, but rather for pomp or pleasure, the chase, and war, than for agricultural or other labours, for which oxen and other animals were for a long time more generally employed. The H. is an animal of no little intelligence, docility, and affectionateness; qualities of which the display would certainly be more general and perfect, if it were not for the cruel treatment so commonly practised in 'breaking' and otherwise. The H. has a very strong memory of places, and finds again very readily a road which it has once travelled before. Its caution in advancing on swampy ground has often excited admiration. It seems often to enter with a kind of enthusiasm into the work in which it is engaged: the war-horse evidently delights in the martial music and military movements to which he has been accustomed; the racer and the hunter seem to know the object of their exertions, and to be as keenly bent upon it as their riders; and the draught-horse often exhibits much acquired expertness in situations of considerable difficulty. Instances are also on record of the remarkable display of intelligence in such things as the opening of doors, corn-chests, &c.; and two instances are known of horses which have learned to turn the tap of a water-barrel in order to obtain water, one of which also ended by shutting it again.

A horse has been seen to procure a supply of apples in an orchard by throwing himself forcibly against the trees and shaking them.

The flesh of the H. is used as food in some countries. Its use has recently found advocates in France and some other parts of Europe. It is sold in London as food for dogs and cats. Mares' milk is much used by some of the tribes whose chief wealth consists in their horses: and the Kalmucks subject it to fermentation, and distil from it a kind of spirit. The hide of horses is made into leather, which is used for covering large office and board-room tables, &c. The long hair of the mane and tail is used for making haircloth, stuffing mattresses, &c.

Hybrids between the H. and the ass are noticed in the articles HINNY and MULE. Hybrids have also been produced between the H. and the zebra, and between the H. and the quagga, exhibiting, in some degree, the stripes so characteristic of these species; but they have been turned to no use.

Fossil Horse.—The remains of the horse have been long noticed associated with the mammoth, rhinoceros, and other extinct quadrupeds, in the drift formations and ossiferous caverns in the New World, as well as in the Old. Their occurrence in America is the more remarkable, from that continent being entirely without the horse when it was discovered by Columbus. Cuvier was unable, in the fragments that he examined, to see any difference from the similar portions of the existing species. Meyer and Kaup have pointed out distinctive characters, and Owen has shewn that the remains observed in this country belong probably to two different species. The largest (*Equus fossilis*) was about the height of a middle-sized domestic horse, and differed from this animal in possessing a proportionally larger head and jaws, resembling in this respect the wild horses of Asia described by Pallas, and in having the molar teeth, while equal in length, yet decidedly smaller. The second species (*Equus plicidens*) was about the size of a large ass, and differed from the other species, as well as from the living horse, in the more complex plications of the enamel of its molar teeth.

Horses, of whatever breed or description, should be of good size, shape, and style; for superior animals are fed and kept at the same cost as inferior sorts, are always able to perform their work easily and satisfactorily, and are at any time saleable at remunerative prices. To produce such animals, requires careful selection of sound, active, symmetrical, well-descended parents. The mare carries her colt eleven months, but occasionally exceeds her time by one or two weeks. Farmers prefer their mares to foal in May, from which time the age is generally calculated, but on the turf, ages date from January, and hence the earlier the racing foals are dropped the better. Parturition is usually performed easily and without any assistance, the foal soon getting on his legs, and sucking. Good grass, with a feed of oats daily, will insure an abundant supply of milk. Weaning may take place in five or six months; and the foal, when taken from its mother, must be supplied with a few oats and bran, some good hay, and comfortable shelter at night. At a year old, colts are generally castrated; and are gently broken in and lightly worked when about three years old; but, under good treatment, they continue to grow, and ought not to be put to severe work until they are five.

Oats and hay are the staple articles of food for hard-working horses. The oats should be sound, sweet, and heavy; and for hacks and hunters, are seldom sufficiently dry until they are a year old. Along with good hay, 10 pounds is a fair allowance. To insure thorough mastication and digestion, oats should be given either slightly bruised, or along with some chaff. For coaching or farm-work, a few beans or pease should be given; half a bushel, along with a bushel of oats and hay, is a usual weekly allowance for well-kept farm-horses. Clover and Rye-grass Hay (q. v.), such as is common throughout Scotland, is more palatable and nutritive than the meadow-hay in general use in England. Riding-horses, eating a fair allowance of oats, will consume daily 14 pounds of hay; but the heavier class of horses require more. Farmers use oat, pea, and bean straw for fodder during the winter months, and in most well-managed establishments, a considerable portion of the fodder is now given cut, which enables the hard-worked horse to fill himself more rapidly, and thus gives him more leisure for rest and repose. Cart-horses usually have an evening allowance of sliced Swedes or carrots; a daily pound of linseed-cake is now frequently added, to keep the coat glossy; whilst a weekly bran-mash is advisable, and should contain during winter an ounce of pounded nitre. Horses should be liberally supplied with water at least three times daily, nor is it ever necessary to restrict the supplies, except for a few hours before severe fast work, and when the animal is much overheated and fatigued. In some well-constructed boxes and stables (see STABLE), there is water constantly before the animal in a shallow vessel capable of holding about a quart, and which, as it is removed, is slowly replenished, and thus cannot be drunk either with undue rapidity or in injurious quantity. During summer, horses generally have such green food as grass, clover, or vetches; but if their work is severe or long continued, oats and hay ought still to form the principal articles of diet. In summer, farm-horses are often turned out to graze after their day's work is over; but it is generally more economical to bring their green food to the stable, or, better still, to commodious yards. It is seldom advisable to follow the old-fashioned plan of turning hacks or hunters out to grass, as they are apt to get kicked or otherwise injured, and lose besides their condition. If not required during the summer months, they are better and safer in a large yard or a commodious box, where they can have proper feeding and daily exercise. They will thus, at little extra expense, be kept in good condition, and fit for work, their legs free from blemishes, and their constitutions uninjured by violent diversities of feeding and management. The small stomach and natural habits of the horse indicate the necessity of his being fed at frequent moderate intervals of five or six hours. In most localities, farm-horses turn out at seven, returning to the stable at 11.30 or 12, being fed and rested for an hour and a half or two hours, and then returning to work for four or five hours. In the midland and southern counties of England, the straggling position of the fields, and their inconvenient distance from the stables, induce many farmers to keep their horses in the yoke from seven until two or three, when they finish for the day. This practice is, however, by no means commendable, unless the work is very light, and the horses have a feed, a few mouthfuls of water, and 10 or 15 minutes' rest about mid-day.

To insure health, horses must be kept in commodious, well-lighted, airy, properly-ventilated stables, which ought to be erected only in dry situations, should be thoroughly underdrained, and well paved, if possible without a loft overhead, white-washed annually, and always kept scrupulously clean and free from smell. This may be effected by the prompt removal of soiled or wet litter, and by strewing the floors daily with a little gypsum, or M'Dougal's disinfectant powder. Where there is room, loose boxes are preferable to stalls, especially for the lighter sort of horses, that spend much of their time indoors. With proper feeding, exercise, and grooming, with plenty of fresh air, and good stable management, horses are scarcely ever out of health, and require neither balls, cordials, nor any such messes. Without professional advice, no groom or carter should, under any pretence, be permitted to indulge his predilection for physicking or doctoring healthy horses.

HORSE, a miner's term, applied to any intruded material which is the apparent cause of a sudden interruption in the continuity of a mineral that is being quarried. With vein-miners, a detached mass of rock or spar which fills the vein receives this name, while colliers apply the term to the shale which occupies a natural but sudden thinning out of the coal-bed, as well as to such interruptions as seem to have been the channels of small streams, and which were subsequently filled up by the clay that formed the roof of the coal.

HORSE-CHE'SNUT (*Æsculus*), a genus of trees of the natural order *Sapindaceæ*, having large opposite digitate leaves, flowers with five spreading unequal petals, and a leathery 3-valved capsule covered with soft spines. The seeds, which are not more than three in each fruit, are large, and somewhat resemble chesnuts; but the habit of the trees, their leaves, and their flowers, are very unlike those of chesnuts, with which they have no botanical affinity.—The COMMON H. (*Æ. hippocastanum*) is a much esteemed ornamental tree, very frequently planted in Britain, and in all parts of Europe of which the climate is suitable, on account of its rich foliage, and its erect racemes of beautiful reddish white flowers, which are produced at the extremities of the branches, and contrast admirably with the dark green of the leaves. At St Petersburg, the H. is a greenhouse tree. It is supposed to be a native of Persia or some part of the East; but, strangely enough, its native country is still somewhat uncertain. It was introduced into Western Europe, from Constantinople, in the end of the 16th century. It attains a great size, sometimes rising to the height of 100 feet, and extending its branches very widely, whilst they often droop almost to the ground. The leaves have long stalks, and seven obovate-wedge-shaped leaflets. The wood is soft, not very strong, nor very durable in the open air; but is used for many ordinary purposes, and by carvers, turners, &c. The bark is bitter and astringent, containing a bitter principle called *Æsculine*; it has been used in tanning and dyeing; that taken from branches not very old has been extensively used on the continent of Europe as a substitute for Peruvian Bark. The rind of the seeds contains a colouring matter, which has been used in dyeing: the husks also have been used in dyeing. The seeds are unpleasantly bitter, and contain so much of the saponaceous substance prevalent in this natural order, that when reduced to powder, they may be used for washing. They contain, however, a large quantity of starch, which, when extracted and freed from bitterness by means of an alkaline solution, is pleasant and nutritious. It is prepared on a large scale and at a cheap rate in France. Horse-chesnuts have long been employed in various countries as food for oxen, sheep, swine, and horses, all of which are fond of them, and grow fat upon them. In Britain, however, they are still very generally allowed to rot beneath the trees. It is said that when the H. was first introduced into Britain, it did not perfectly ripen its seed, which it now does even in the northern parts of the island.—The other species of *Æsculus* are natives of North America. The foliage is very similar to that of the common horse-chesnut. Both the leaves and fruit, however, of the BUCK-EYE or AMERICAN H. (*Æ. Ohiotensis*) are very poisonous.—North America possesses also a number of species of a nearly allied genus, *Pavia*, with very similar foliage, smaller flowers, and smooth fruit. The seeds of *P. macrostachya* or *P. edulis*, the EDIBLE BUCK-EYE, are eaten, either boiled or roasted. This species is a shrub with long and beautiful racemes of fragrant white flowers, which have long projecting stamens. It is a native of the southern states, and seldom ripens its fruit in England. *P. Indica* is a lofty tree, growing at elevations of 8000—10,000 feet in the Himalaya, and producing seeds very similar to those of the H., which, although bitter, are eaten in times of scarcity.

Horse-Chesnut, Leaves, Flowers, and Fruit (*Æsculus hippocastanum*).

HORSE-FLY. See FOREST-FLY.

HORSE-GUARDS, the name applied to a large public office in Whitehall, appropriated to the departments under the general-commanding-in-chief. The word Horse-guards is used conventionally to signify the military authorities at the head of army affairs, in contradistinction to the civil chief, the Secretary of State for War.

HORSE-GUARDS, ROYAL, or OXFORD BLUES, is the third heavy cavalry regiment of the Household Brigade. The regiment was raised in 1661 from the remnants of the disbanded army of the late Commonwealth. It has ever proved a loyal corps, although it readily transferred its allegiance from James II. to William III. It took part in Marlborough's campaigns; served under the Duke of Wellington in the Peninsula and at Waterloo, and has always been considered one of the finest heavy cavalry corps in the world. The guards of state for the sovereign are taken either from its ranks or from those of the Life-Guards. The present uniform consists of a steel helmet, with plume, a steel cuirass over a blue coatee, leather breeches, and knee-boots; the horses are black. The establishment of the regiment consisted in 1872 of 1302 of all ranks, with 825 horses, exclusive of officers' chargers.

HORSEMANSHIP. Throughout history the art of managing the horse and riding on his back has ranked high among useful and graceful accomplishments. According to Cæsar and Livy, the Numidians and Mauritanians rode their horses without either bit or saddle, and guided them solely by using a small switch, which was applied to either side of the neck, according as they wished to turn. The Persians trained their horses to kneel to receive their riders, and were the first to introduce saddles. Saddles of a similar shape to those now in use were not known till the 14th c., and side-saddles were introduced about 1388. Stirrups were used in the 5th c., but were not common even in the 12th.

The two essentials for riding are a firm seat and a light hand, as without a combination of the two no one can become a good horseman. In every description of riding, the light delicate 'hand,' just feeling the mouth of the horse, and playing the bit in accordance with his movement, will insure success; and it is to this delicacy of wrist that we must attribute the ease and skill with which ladies often ride the most high-spirited animals, which, in rougher hands, would be unmanageable.

The first lesson in horsemanship is to learn to mount safely and easily; and the ordinary, and on the whole least objectionable way, is as follows: Stand at the shoulder of the horse, looking towards his tail, and taking the reins in the right hand, divide them by the middle-finger of the left till you feel the horse's mouth; then take hold with the left hand of a lock of the mane, lift the left foot into the stirrup, and using the mane as a slight hold, spring into the air, taking hold of the back of the saddle to assist in getting the right leg easily over the horse, steadying the fall of the body by the right hand on the pommel, and then arranging the stirrups. In dismounting, exactly the reverse of this process is followed, or both feet may be disengaged from the stirrups at once, and the rider may vault from the saddle to the ground with greater rapidity, and less risk of falling if the horse chance to move on.

There are four different styles of riding practised among modern civilised nations—viz., the military, road, hunting, and racing styles. The military style differs in many particulars from the others, as, owing to the long stirrups used, the soldier is obliged to sit well down in his saddle, with his body erect, the seat being preserved more by balance than by a tight hold by the leg or thigh.

In the seat for road-riding, the stirrups are arranged at such a length that when the feet are hanging loose, they shall just touch the ankle-bone, and the rider usually inserts the feet only as far as the 'ball' of the foot. In riding, have the horse well in hand, to assist in supporting him, in case of stumbling; the seat firm, to be secure in case of shying; and a knowledge of handling the bridle, to insure a quick and ready response. In hunting, a much firmer seat is necessary; the stirrup-leathers are about two holes shorter, the feet pressed 'home' in the stirrups, which otherwise would be apt to be lost in jumping; the leg from thigh to the knee well forward, and nearly at right angles to the upper part of the body as inclined forward; the legs perpendicular, the heel well down, and the toe pointing nearly straightforward. This 'seat' the hunter has in common with all equestrian nations, as the Arabs, Tartars, Persians, Egyptians, Cossacks, Magyars, and Circassians, the last-mentioned nation carrying it to such an extreme that the leg assumes the form of the letter V, with the knee for the apex. In riding at a fence, 'collect' the horse into the pace at which he goes with most ease to himself; keep him straight at the fence till he rises; 'ease' his mouth by leaning forward; take especial care not to confine it when he is making his effort, or you will pull him into the fence as he descends; lean well back in the saddle, and gently take hold of his mouth to support him on landing. Do not gallop with a loose rein (excepting down-hill, when the horse requires his head free), for the horse will go with a straggling pace, which is very undesirable. For racing, the essentials are a good and powerful seat, good 'hands,' a great knowledge of pace, and quickness to take advantage of any chances of success. The jockey's seat is peculiar, as his object is to give as much ease as possible to his horse. He rides very much forward, frequently standing in the stirrups, and regulating his pull at his horse according to his orders.

As the strongest part of a horse, and also the centre of action, is situated at a point just behind his shoulder-blades, the nearer we can ride to this the better, and riding rather forward in the saddle is a relief to the horse, while leaning back, as it bears upon his loins—his weakest part—is a cause of fatigue. The grip in riding should be obtained by the knee, the thighs and the calves slightly. The thigh is the most essential part of a good and strong seat. Few riders whose thighs are short and round, have a good seat; while, on the other hand, jockeys and tall thin men, whose thighs are long, and more or less hollowed on the under-side, are generally very firm.

No one can pretend to horsemanship without a knowledge of the proper action for emergencies. If a horse runs away, do not exhaust yourself by vain pulling, but guide him out of danger, and let him run till he is tired. A Bucephalus noseband is a great security against bolting. If a horse rears, loosen the reins, and lean forward; in hunting, the 'art of falling' consists in getting clear of your horse. In case of a horse kicking, keep his head up as much as possible, and sit firm in the saddle.

HORSE-POWER, a term used in expressing the force of a motive power. It is based upon the assumption that horses in general perform a certain constant amount of work in a specified time; an assumption which is evidently erroneous. The fundamental unit of work is the Foot-pound (q. v.); but in measuring the work of a horse by this unit, the estimates of the most celebrated engineers differ widely from each other: Boulton and Watt, basing their calculations upon the work of London dray-horses (working eight hours a day), estimated it at 33,000 foot-pounds per minute. D'Aubuisson, taking the work done by horses in whims at Freiberg, estimated the work at 16,440 foot-pounds, working eight hours a day; under similar circumstances, Desaguliers's estimate was 44,000; Smeaton's, 22,000; and Tredgold's, 27,500 foot-pounds; 17,400 is thought to be near the truth. It matters little, however, what number is assumed, provided the same be always used; and accordingly the original estimate of Watt is still counted a horse-power. In calculating the power of a steam-engine in terms of this unit, the general rule is to 'multiply together the pressure in pounds on a square inch of the piston, the area of the piston in inches, the length of the stroke in feet, and the number of strokes per minute, the result divided by 33,000, will give the horse-power;' but it is necessary to deduct about $\frac{1}{10}$th of the whole, as an allowance for friction.

HORSE-RACING dates from the times of the early Greeks and Romans, among whom it was a favourite sport. In England, Charles I., Cromwell, and Charles II., were more or less patrons of the turf; and the last-named monarch was a regular frequenter of Newmarket, which, partly from this reason, became the metropolis of racing. William III. and Queen Anne were also patrons of horse-racing. Flying Childers, bred in 1715 by the Duke of Devonshire, was long considered to have been the fleetest horse ever known; he carried nine stone at Newmarket, and ran 3¼ miles in 6 minutes 40 seconds; he was never beaten, and produced 497 winners, besides realising £200,000 in stakes. The celebrated horse Eclipse, the fleetest from the time of Childers, was bred in 1764 by the Duke of Cumberland. Commencing at five years old, this horse won eleven plates, was never beaten, and became the sire of innumerable winners. The modern race-horse is considerably taller and of earlier maturity than the original type, partly from judicious crossing, and also from early high-feeding and training; yet there has been a loss of stoutness of constitution, although, for speed, no pure bred Arab has a chance with a modern thorough-bred. The horses are entered as yearlings (a race-horse's age dates from the 1st of January in the year he is foaled); but of 240 entered in this way, rarely more than 25 come to the post two years afterwards, the majority being found practically useless for racing purposes, and the forfeits from these horses thus 'scratched' form by far the greater portion of the splendid prizes of the turf. (It has been calculated that there are 1500 thorough-bred brood-mares in England; that these produce annually about 1100 foals.) The value of a thorough-bred yearling depends entirely upon 'the fashion' of his blood: as much as 1800 guineas have been given, and 600 and 800 are by no means extravagant rates for promising colts. The training of the young racer commences in his second year, when he is placed under a trainer, in an establishment such as those at Newmarket, Middleham, Richmond, Malton, Ilsley, Epsom, &c., where the downs offer a wide expanse of open country for exercise. The trainer's charge is two guineas a week; and for this, each horse is personally attended to and ridden by a lad specially attached to him. A thorough preparation for a great race is a long and troublesome operation, consisting of several stages, during which the colt is gradually brought from a naturally loose condition to the greatest perfection possible: first, by steady and continuous walking exercise, then proceeding by gradual stages to gentle galloping and sweating, and finishing by testing the capacity of the colt against a competitor at a distance equal to the forthcoming race. It has been found that, practically, the speed of almost all horses can be equalised by addition or subtraction of weight to be carried when running; and so nicely is this adjusted, that the Handicaps (q. v.), arranged on this principle, provide some of the best races in the year. The Chester Cup, Doncaster Cup, Ascot Cup, Goodwood Cup, Liverpool Cup, Cezarewitch and Cambridgeshire stakes, are all run on these terms. For the great prizes of the turf, however, the 1000 and 2000 guineas, the Derby (about £6000), Oaks (about £4000), and St Leger (about £5000), for three-year-olds, the horses run upon an equality of age and weight.

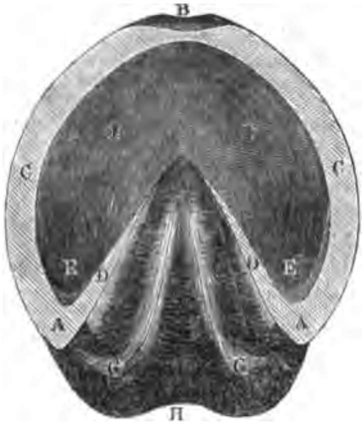
Enormously large as are the stakes run for—upwards of £200,000 annually—this is as nothing to the money which annually changes hands in betting. We may divide betting-men into two classes—those who back a single horse from judgment, or private information; and those who, without any knowledge, but from mere calculation, estimate the odds, and take the 'field' against 'any favourite.' The latter class are the professional betting-men ('the ring'), who devote themselves to the pursuit; the former is composed of the owners of horses and their friends, who trust to their knowledge and tact. Colossal fortunes have been made by the 'ring' in this way, and there are men perpetually attending the country races, and ready to lay against any horse and 'back' the 'field.' As no debts incurred by betting are recoverable by law, they become debts of honour; and any 'defaulter' is only amenable to the regulations of the turf, which have been devised to insure, as far as possible, honest dealings. The Jockey Club is the great tribunal of sport in England, and its regulations are adhered to all over the country: it is composed of 64 noblemen and gentlemen, who take an interest in the turf. Newmarket Heath, the great centre of racing, is in its possession, and by virtue of the position and authority of its members, it is enabled to exercise a great check upon dishonesty and fraud. The seven annual race-meetings at Newmarket are as follows: the Craven, first spring, second spring, July, first October, second October, and the 'Houghton.' The principal races are for the 1000 guineas, 2000 guineas, Cezarewitch, and Cambridgeshire. The Epsom meeting is the most popular, from its nearness to London, and from the interest attaching to the races for the Derby and Oaks. After Epsom, the Doncaster St Leger, for three-year-olds, claims the position of greatest interest; it is run for by the competitors in the previous Derby and Oaks, and is generally considered to be a test of the correctness of their results. Ascot is reckoned the most fashionable meeting in the year; it is held on Ascot Heath, in Berks, and here the best horses in England compete, at a more mature age than at other races. In the race for the Ascot cup in 1854, West Australian ran the 2½ miles in 4 minutes 27 seconds, the fastest race on record. Goodwood meeting, which is held in the Duke of Richmond's park, in Sussex, is also popular. There are upwards of 150 race-meetings held annually in the United Kingdom; upwards of 1600 horses run at these, and 160 jockeys are in constant employment. A good jockey is considered so valuable, that he is always retained by one or more masters, for a considerable sum, and these gentlemen have a call upon his services in a certain rotation. The regular pay of a jockey is £5 for a winning and £3 for a losing 'mount;' but there are so many gratuities, that this gives no indication of the income of a jockey, which is often very large: £1000 has frequently been given by a grateful owner. Racing has become popular in France, Russia, Austria, Prussia, Sardinia, and in the British colonies of India, Australia, the Cape, and Canada.

In addition to the flat-racing in England, there are a great number of steeple-chases, where horses contend over natural and artificial fences, ditches, &c. The sport is dangerous, on account of the immense speed arising from competition, so that horses get too distressed to jump, and broken backs and ribs are the consequence. In America, trotting-matches are very popular, and their horses excel all others in that description of racing.

HORSE-RADISH (*Armoracia*), a genus of plants of the natural order *Cruciferæ*, differing from scurvy-grass (*Cochlearia*) chiefly in having the valves of the seed-pouches destitute of prominent nerves. The species are perennial herbaceous plants, having erect stems and white flowers, and roots remarkable for their pungency, which is owing to a volatile oil, of very powerful odour, believed to be identical with the volatile oil of mustard. The COMMON H. (*A. rusticana*) has long cylindrical white roots, stems about two feet high, large, much-veined, oblong, crenate root-leaves on long stalks, and elongate-lanceolate stem-leaves. It grows in damp meadows in the middle and south of Europe, is naturalised in some places in Britain, and is cultivated for the sake of its roots, which are scraped or grated down and mixed in salads, or used as a condiment with roast-beef. H. root is used also in medicine as a stimulant, and is often useful in promoting digestion; it is also regarded as an antiscorbutic; and it is sometimes applied externally as a rubefacient instead of mustard. In cultivation, the H. is generally planted very deep. It is very difficult to eradicate from ground in which it has become established, as almost any portion of the root will grow.—Another species, *A. macrocarpa*, a native of Hungary and Transylvania, has much larger flowers, and a rather less pungent root.

HORSE-RADISH TREE (*Moringa pterygosperma*), a tree of the natural order *Moringaceæ*, a native of India and Arabia. It has bipinnate or tripinnate leaves, with roundish oblong leaflets, terminal panicles of white flowers, and a pod-like, 3-valved fruit, with roundish 3-winged seeds. The leaves, which are mildly pungent, are used in curries, and with vinegar: the roots, which are very pungent, are used for purposes like those for which the root of the horse-radish is used, from which they are not easily to be distinguished. The seeds yield the useful fixed oil called *Oil of Ben* (q. v.), and the bark a gum like tragacanth. *M. aptera*, another species of the same genus, also a native of the East Indies, is cultivated in Egypt, Syria, and Italy, for the sake of the oil of ben obtained from its seeds. For the sake both of the pungent roots and of the oil, these trees are now cultivated also in the West Indies.

HORSE-SHOEING. The ordinary system of horse-shoeing is rude and irrational, and is the main cause of most lamenesses and of the majority of falls in riding and driving. Chief amongst its faults are the attempts to fit the foot to the shoe, instead of the shoe to the foot, and the wholesale cutting and rasping, and consequent injury of the several parts of the foot. After the cautious removal of the old shoe, the crust on which it rested generally requires to be pared down with a drawing-knife, and its edge afterwards rounded with the rasp. Any ragged portions of the frog may also be taken off, and this includes the whole of the allowable paring or dressing of the horse's foot. The horny sole intended as a covering and protection of the sensitive parts beneath; the tough elastic frog, an insensible pad which obviates concussion, and preserves the foot wide and free from contraction; the bars, an involution of the crust, which help it to support weight, and give it lateral support, are all too valuable to be ruthlessly cut away, and in all ordinary cases must be scrupulously preserved from both knife and rasp. For sound healthy feet treated as advised, a plain shoe is preferable for saddle or harness horses; the web need not exceed three-fourths of an inch, must fit the crust closely and accurately all the way round to the heels, where its inner edge will rest upon the strong and uncut bars. Nowhere must there be any overlapping, which only renders the shoe more apt to cut the opposite limb, and be torn off in heavy ground. To lessen the chances of tripping, and make the shoe wear equally, it should for the fore-feet be turned up slightly, and its ground surface hollowed out a little at the toe, so as to present the appearance of an ordinary shoe which has been worn for a fortnight or three weeks; and which, as every one knows, is therefore rendered more safe and comfortable. By turning up at the toe, these advantages are secured at once. For saddle or light harness work three nails on the out, and two on the inside, will firmly secure any well-made, well-fitting shoe. The nail-holes should be countersunk, be nearly in the centre of the web, and pass straight through it, thus giving the nails a firmer hold of the stout unrasped crust. The points of the nails when driven home should be broken over and laid down with the hammer, but not touched with the rasp. The rasping of the crust, which smiths fondly regard as their finishing and polishing stroke, is very injurious, removes the unctuous protecting portion of the crust, and renders it weak, brittle, and liable to crack. Shoes should be replaced every three weeks, or a month at furthest. In shoeing the hind-feet the outside web is generally turned slightly down behind, whilst to give an equal bearing the inside heel is thickened. For heavy draught, both hind and fore shoes should have moderate tips and heels, which enable the horse to exert his full powers without so much risk of slipping. Instead of the five nails used for the lighter horses, seven or eight are requisite.



A sound Fore-foot prepared for the Shoe.

Copied from Stonehenge's *Horse in the Stable and the Field*.

A, A, the heels of the crust; B, the toe cut out to receive the clip; C, C, the quarters of the crust; D, D, the bars as they should be left, with the full frog between them; E, E, the angles between the heels and bars, where corns appear; F, F, the concave surface of the toe; G, G, the bulbous heels; H, the cleft.

Horses with weak, tender, or bruised soles may for a time require leather or waterproof pads, but as the sole grows, these should be discontinued, and are never required in healthy feet, where the sole, which is the best and most natural protection, is allowed to grow undisturbed by the knife. Horses with corns should have their shoes made with a wide inside web, which rests upon the bars, or have for a time a bar-shoe. The last nail on the inside should also be dispensed with, and the seat of the corn or bruise carefully pared out, but without injuring either the frog or bars. If, from constant cutting, the bars are unfit to aid the crust in carrying the shoe, it will be often advisable to shoe for a time with tips or half-shoes, keeping the horse as much as possible on soft ground, and waiting the healthy growth of the foot. In troublesome cases of thrush, such tips are also most serviceable, allowing the frog the natural healthy pressure for which it is intended, and with astringents and cleanliness, greatly expediting a cure. Groggy horses should have the toe shortened, and turned up, as already advised; the frog and sole must be untouched, and the shoes made light and nicely fitted. Over-reach, or cutting of the heel of the fore-foot with the shoe of the hind, is remedied by filing round the posterior edge of the offending toe, and keeping that shoe as far back as possible on the foot. For speedy cut, which is common in horses with in-turned knees, the shoe should be carefully fitted, and no projecting portions left; the clinches must also be well hammered down.—Further information may be found in Lieutenant-colonel Fitzwygram's *Notes on Shoeing Horses;* Mr Miles's pamphlet on *Horse-shoeing*, originally published in the Journal of the Royal Agricultural Society; Professor Dick's Manual; and other veterinary treatises.

HO'RSENS, a small but very old town and seaport on the east coast of Denmark, and one of the prettiest and most thriving in the country, is situated at the head of the fiord of the same name, 25 miles south-west of Aarhuus. It contains two churches, has four bridges, and carries on manufactures of tobacco, and a considerable general trade. Pop. (1870) 10,501.

HO'RSHAM, a parliamentary borough and market-town of England, in the county of Sussex, is situated on a tributary of the Arun, 28 miles north-east of Chichester, and 35 miles south-south-west of London. The Court-house, a Gothic edifice; St Mary's Church, in the Early English style; and the Grammar-school, with an endowment of £412 a year, are the principal institutions of the town. The trade and manufactures are inconsiderable. H. returns a member to parliament. Pop. of parl. borough in 1861, 6747; in 1871, 7831.

HORSLEY, Samuel, an English prelate, was the son of a clergyman of the Episcopal Church, and was born at St Martin's-in-the-Fields, London, in 1733. He was educated at Westminster School and Trinity Hall, Cambridge, where, though he studied hard, and laid in immense stores of knowledge, he took no degree in arts. In 1758, he became curate to his father, then rector of Newington, and shortly after succeeded to the rectory, a living which he held for thirty-four years, though he also enjoyed in the interval many other preferments. In 1767, H. was elected a Fellow of the Royal Society, of which he long continued an active member. In fact, the writings that first brought him into notice were scientific, and not theological. We may mention his *Remarks on the Observations made in the late Voyage towards the North Pole, for determining the Acceleration of the Pendulum, in lat.* 79° 51′ (1774). Two years afterwards, he issued proposals for a complete edition of the works of Sir Isaac Newton, which, however, did not make its appearance till 1785. But the grand event in his career was his controversy with Dr Priestley, which, considering the momentous nature of the subjects discussed, and the splendid talents of the combatants, may be safely pronounced to be the greatest theological contest of the 18th century. The impression at the time was, that so far as hard, merciless *hitting* goes, H. had decidedly the best of it. Rude in language, but panoplied in learning, contemptuous, defiant, dictatorial, his attitude reminds one of Goliath rather than of St Paul, and we cannot but feel that he is, at least, as much inspired by the ambition of the pugilist as by the ardour of the Christian. The work that excited the controversy was Dr Priestley's *History of the Corruptions of Christianity*, among which corruptions was included the orthodox doctrine of Christ's uncreated divinity. H. reviewed the work with great severity in his charge delivered to the clergy of the archdeaconry of St Albans, May 22, 1783. Priestley replied the same year in a publication entitled *Letters to Dr Horsley in Answer to his Animadversions*, &c. In 1784, H. retorted in seventeen *Letters from the Archdeacon of St Albans in reply to Dr Priestley*, &c. These were, in return, met by a new series from Priestley, who, waxing warm with the fight, describes his antagonist as 'the incorrigible dignitary.' After a silence of eighteen months, H. again replied in his *Remarks on Dr Priestley's Second Letters*, &c., and in 1789 collected and published the whole that he had written on the subject. His services were rewarded with the bishopric of St Davids in 1788, whence he was translated to the bishopric of St Asaph's in 1802. He died October 4, 1806. H.'s character as a writer has been already indicated; it remains to be added, that as a bishop he was liberal and humane both to the clergy and the poor of his diocese, although vigilant and even strict in the discharge of his episcopal duties. H.'s works, besides those already mentioned, consist of sermons and treatises on biblical criticism, on mathematics, and on classical subjects. A collected edition of his theological works was published by Longman (6 vols. 1845).

HORTICU'LTURAL SOCIETIES, associations for the encouragement of gardening, are now numerous in almost all civilised countries, but seem to derive their origin only from the beginning of the present century, when the *London Horticultural Society* was formed, chiefly through the exertions of Mr Knight, Mr Wedgewood, and Sir Joseph Banks. The society obtained a charter in 1808. The *Experimental Garden* of the society, the first of its kind, was established in 1817, and was removed to its present situation at Chiswick in 1822. The progress of the society was very rapid; and its usefulness has been very great. Societies of the same kind soon began to spring up in Germany and other parts of the continent of Europe, and horticultural societies now exist in almost all the towns and in many of the villages and rural districts of Britain. The *Prussian Gardening Society* perhaps ranks next in importance to the horticultural society of London; and the *Pomological Society of Altendorf* has been very useful in regard to the cultivation of fruits. The horticultural societies, now so common throughout Britain, have done much to promote not only horticulture, but habits of neatness and a taste for flowers among the humbler classes, of which the humanising effects have been very manifest and important. It is perhaps to be regretted that their attention has been so exclusively devoted to the cultivation of particular kinds of vegetables already in general use, and of those flowers known as florists' flowers.

HO'RTICULTURE. See Gardening.

HO'RUS, an Egyptian deity, whose name, *Har*, means 'the day,' or 'the sun's path,' and is generally written in hieroglyphics by the sparrow-hawk, which was sacred to him. The old derivation from the Hebrew *aur*, light, is now recognised as incorrect. Under the name of Horus were included several deities, as Haroeris, the Elder Horus (q. v.), and Harpocrates (q. v.), or the Younger Horus; *Har-sam-ta*, Horus, the uniter of the upper and lower world, who was the second son of Athor, resided in Annu, or Heliopolis, and emanated from the eye of the sun (Rosellini, *M. d. c.*, t. 47); and *Har-net-ta*, another form of the same god, represented as a boy wearing a triple crown, who existed from the commencement of things, a self-created being, and emanated from the Nu, or firmament; besides several others. But the principal Horus was H. the son of Isis (*Har-si-hesi*), represented as a naked child standing wearing a skullcap, or the crown of Upper and Lower Egypt. H. is first mentioned by Herodotus (ii. 144, n. 156) as the son of Isis and Osiris, and brother of Bubastis, the Egyptian Diana. Various accounts are given of his birth; he having been, according to one version, engendered of his father Osiris before the birth of Osiris and Isis; or, according to another account, begotten of Osiris after that god's destruction by Typhon. His birth was said to be premature, and he was consequently weak in his lower limbs. In order to avoid the persecution of Typhon, he was brought up by Leto on the floating island of Chemmis, or Buto, in secret. Having grown up, he became *Har-net-atf* (Horus the avenger of his father), and, along with Isis, avenged his father's death (see Osiris), according to the best received tradition, vanquishing Typhon and his associates in a great battle at a village near the city of Antæus, on the 26th of the month Thoth, on which occasion Osiris came from the nether world to his assistance in the shape of a wolf (Diodor. i. 21). According to the Egyptian ritual, he cut off their heads for the fowls of heaven, and their thighs for the wild beasts and fishes. Typhon is said to have been delivered bound in fetters to Isis, who released him, upon which H. tore the diadem off his mother's head, but Thoth replaced it by the head of a cow. H. was often confounded with the elder Horus by the Greeks, but the monuments represent him as the type of royalty, the antagonist of Set or Typhon, the avenger of his father Osiris, for whom he obtained the corn of Elysium and the waters of Elephantine, conquered the north and south, and shared Egypt with Set or Typhon, having held the government of the northern portion as Typhon of the south. After the death of Typhon, he became sole monarch, and as last king of the dynasty of gods, reigned, according to different versions, 100 or 25 years. Numerous esoteric explanations have been given of this god, as that he represents the Nile, as Typhon the desert, the fruitful air or dew which revives the earth, the moon, the sun in relation to the changes of the year, or the god who presided over the course of the sun. He also represented three planets, Jupiter (*Harapshta*), Saturn (*Harka*), and Mars (*Harteshr*). The sparrow-hawk was sacred to him; so were lions, which were placed at the side of his throne. There was a festival to celebrate his eyes on the 30th Epiphi, when the sun and moon, which they represented, were on the same right line with the earth. A movable feast, that of his coronation, is supposed to have been selected for the coronations of the kings of Egypt, who are described as sitting upon his throne. When adult, he is generally represented hawk-headed; as a child, he is seen carried in his mother's arms, wearing the pschent or atf, and seated on a lotus-flower with his finger on his lips. He had an especial local worship at Edfou or Hut, the ancient Apollinopolis Magna, where he was identified with Ra, or the sun. There were also Books of Horus and Isis, probably referring to his legend (Lucian, *De Somn. sive Gall.* s. 183). The magnet was called his bone; he was of fair complexion.—Birch, *Gall. of Antiq.* p. 35; Wilkinson, *Mann. and Cust.* vol. iv. p. 395; Tablonski, *Panth.* ii. 4, p. 222; Champollion, *Panth. Eg.;* Hincks, *Dubl. Uni. Mag.* xxviii. p. 187; Boeckh, *Manetho*, p. 61.

HORUS, a king of Egypt, named Haremhebi, who reigned at the close of the 18th dynasty. His reign has been placed at 1661, 1455, or 1446 B.C., but it probably fell about 1400 B.C. Although the lists of Manetho give him a reign of 36 or 38 years, no higher monumental date than his seventh year has been hitherto found. He restored the worship of Amen Ra, which had been overthrown by the disk or sun worshippers, and conquered the Barubaru, a tribe of the negroes of Kush or Æthiopia. The most southern point where his monuments have been found is Gebel-Addeh, the ancient Amen-Heri, between the Wady Halfa and Ibsamboul. He also embellished Luxor and other quarters of Thebes. Fine statues of this monarch exist at Turin, and others in the British Museum.—Brugsch, *Geographie des Alten Ægyptens;* Champollion-Figeac, *L'Egypte*, p. 319.

HORVÁT, István (Stephen), the Hungarian Varro, was born at Stuhlweissenburg, in 1784. From early youth to his death in 1846, H. consecrated all his rare abilities to historical research, with the double object of settling the question as to the origin of the Magyars, and of consolidating Hungarian nationality through the scientific development of the Hungarian language. Among H.'s published works, the chief merit belongs to his *Magyarország Tögyökeres Régi Nemzetségeiről* (Primitive Families of the Hungarians, Pesth, 1820), an 8vo volume of moderate size, but the materials for it have been gathered from innumerable rare manuscripts, and other documents, partly foreign, partly domestic. It is a monumental work in genealogy, connecting some of the living Hungarian families with the chieftains who came with Arpád at the end of the 8th century. In 1814, appeared at Pesth, *Defence of the Kings Lewis the Great and Mathias Corvinus;* in 1821, two volumes of *Answers to the Questions on Philology, put by the National Museum at Pesth;* in 1825, *Sketches from the Oldest History of the Hungarian Nation;* in 1828 and 1829, *Researches on Biblical Expressions*, &c. H. was for many years editor of, and later, chief contributor to the *Tudom ányr Gyüj temény*, or Scientific Magazine.

HOSE'A, the third (in the order of time) of the twelve minor prophets of the Old Testament, delivered his prophetical message, according to the inscription of his book, during the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah, and of Jeroboam II., king of Israel. Reckoning even from the last year of Jeroboam's reign (about 785 B.C.) merely to the first of Hezekiah's (about 725 B.C.), his career must thus have extended over nearly 60 years; but most—especially of modern scholars—seem inclined to regard this period as improbably long, though some calculations (e.g., Horsley's) make it even longer. Whether H. belonged to Judah or Israel, cannot be determined with certainty; but the greatest critics, with the exception of Maurer, maintain him to have been an Israelite. His prophecies, which are mainly directed against Israel, give a frightful picture of shameless idolatry, licentiousness, intemperance, falsehood, and eager inclination towards disadvantageous and demoralising foreign alliances, and they may be regarded as appropriate to the period of anarchy and vice which followed the luxurious reign of Jeroboam II.

HOSHUNGABA'D, a town in Central India, stands on the left or south bank of the Nerbudda, in lat. 22° 44′ N., and long. 77° 44′ E. Pop. (1866) 13,070. Its district of the same name is a subdivision of the Jubbulpore division in the chief-commissionership of the Central Provinces. It has an area of 4222 square miles, with a population, in 1866, of 440,433. Besides being so fertile as to be styled the garden of the country, it possesses abundance of excellent coal.

HO'SIERY, in its most limited sense, refers to the manufacture of stockings (hose); but in its more general application, it comprises all knitted goods, whether made by hand or by machinery. The use of stockings originated in the cold countries of the north, and probably the first were made of skins, and subsequently of cloth; they were also, until a comparatively late period, made all in one piece with the trousers, constituting the trunk-hose of our ancestors; but these garments were separated; and the art of knitting was invented, it is supposed in Scotland, about the commencement of the 16th century. Certain it is that knitted stockings found their way to France from Scotland, and led to the establishment of a guild of stocking-knitters, who chose for their patron saint St Fiacre of Scotland. In 1589, William Lee, of Woodbridge, Nottinghamshire, entirely altered the hosiery trade, by inventing the knitting-frame; and although he did not live to enjoy much benefit himself from it, it soon became a very important aid to the commerce of this country. During the Protectorate, the stocking-frame knitters obtained a charter, and extended their operations through the provinces of England, but with all the disadvantages of a monopoly, which eventually led to legal proceedings, by which the charter was set aside in 1753. Since that time, many improvements have been made in the stocking-frames, and it may be fairly said that four-fifths of the stockings now worn through the world are made by the manufacturers of Great Britain. The ingenious contrivances by which this vast work is produced, will be described under Stocking-frame.

Stockings are made of cotton, of worsted, or of cotton and worsted mixed, called Angola, and of silk. They are each made of two distinct kinds. The best are made in a flat web, which has to be sewn at the back as well as the foot, and it is so made that when the two edges are brought together at the back, they give the form of the calf. The common or *racked* stockings are woven in a circular frame, and form a cylindrical web of equal width from top to bottom; these have to be stretched on boards to give them the shape, and are ironed with hot irons whilst on the board, to make them retain the shape of the board. The foot is formed by cutting the web and adding a small piece for the sole. Nottinghamshire, which gave birth to the inventor of the stocking-frame, is still the centre of the hosiery trade in Great Britain. At Belper, in Derbyshire, stockings of very fine quality are produced; but the cheaper sorts of stockings, gloves, singlets, &c., are made in Nottingham or its immediate neighbourhood.

HOSMER, Harriet, an American artist, was born at Watertown, Massachusetts, in 1831. As she had a feeble constitution, her father, a physician, encouraged her to strengthen it by out-door exercises, and she became an adept in shooting, riding, rowing, skating, and swimming. She also shewed a talent for sculpture by modelling figures in clay. To prepare herself for her chosen career, she studied anatomy, first with her father, and afterwards at the medical college at St Louis. Returning to her home in 1851, she modelled her first work, 'Hesper,' which had so decided a success that she was sent to Rome, where she became the pupil of Gibson. In his studio, she has modelled busts of 'Daphne' and 'Medusa,' and a statue of 'Œnone' for a gentleman of St Louis; and the much admired statue of 'Beatrice Cenci' for the Mercantile Library of that city. Her statue of 'Puck,' of which there are now about 30 copies, was honoured by orders for copies from the Prince of Wales and the Duke of Hamilton. Her most ambitious work, finished in 1859, was a colossal statue of 'Zenobia in Chains.'

HO'SPICE, the name given to the pious establishments kept up by the monks on some of the Alpine passes, for the purpose of affording assistance and shelter to travellers. The oldest of these is that on the Great St Bernard (see Bernard, Great St), which the priests of the canton of Valais gained possession of in 1825, and afterwards fitted up in a comfortable manner.. A hospice likewise existed on St Gothard as early as the 13th century. At present, however, it is inhabited not by monks, but by a hospitaller, who entertains travellers gratis, and accepts no remuneration beyond a present. Similar establishments are found on Mont Cenis, the Simplon, and the Little St Bernard.

HOSPITAL, in Law, is used in England to denote an eleemosynary corporation founded for the purpose of supporting certain descriptions of persons; whereas, in Scotland, it more frequently signifies a mortification or endowment for the education as well as support of children. In both countries, it is also used, popularly, to denote an institution for dispensing medical assistance to the poor gratuitously.

HOSPITAL, Dames of the. See Sisters of Charity.

HOSPITALLERS, charitable brotherhoods founded at various times and in different countries, for the care of the sick in hospitals. The vow to devote themselves to this work of mercy is, in all these brotherhoods, superadded to the ordinary vows of poverty, chastity, and obedience, which are common to all the religious orders in the Church of Rome. One of the earliest recorded instances of a hospital served by such a brotherhood is that of Constance in the 13th century.

The Knights of St John of Jerusalem (q.v.), as also the Teutonic Knights (q. v.), were originally hospitallers. The hospitallers of Our Lady of Christian Charity were founded near Chalons in the end of the 13th c., by Guy de Joinville; a similar body at Paris in 1294; and the hospitallers of Our Lady Della Scala about the same time at Siena. The history of the Brethren of Mercy, founded by St John of God, will be found under that name. There are many other local institutes or congregations, all of which, however, recognise the same general rules, and follow the same general organisation.

HOSPITALS are so called from the medieval *hospitia*, or more properly the class of hospitals established very generally for the reception and relief of lepers, whose malady was one of the scourges of Europe. These leper hospitals were very commonly in England and in Scotland called 'Spitals;' hence the frequency of such names of places as Spital, Spitalfields, &c. The leper hospitals, and other kinds of the old hospitia, disappeared with the improvement of society, and substitutes for them on a broader scale began to be established in the modern form of hospitals. Of public establishments under this general designation, there are now, as is commonly known, three distinct classes—hospitals for the reception and treatment of the sick and hurt, hospitals for the board and education of children, and hospitals for the reception and permanent board of poor old persons of both sexes. Hospitals of these several classes are numerous and on a munificent scale in Great Britain, where they take the position of leading charities in the country. As, in the present work, the more remarkable hospitals receive some notice under their respective heads, we need here only offer a few general observations.

Hospitals for the sick and hurt are in some parts of England and Scotland termed Infirmaries. Under whatever designation, institutions of this kind are now established in all parts of the civilised world, supported, as in England, on a principle of charity, or, as in France, chiefly from the funds of the state or the civic municipalities. The primary or more important object of all such institutions is to mitigate bodily suffering, whether that arises from natural or accidental causes, in which respect they are indispensable as a refuge to all who are unable to pay for private medical or surgical aid, or as a convenient means of succour on emergencies to persons of every rank and degree of opulence.

While such is the main object of these benevolent institutions, they are in numerous instances serviceable as schools for medicine and surgery; as such, no university, at which these and kindred branches of learning are taught, can be said to be complete without the adjunct of a well-organised hospital, where professors can practically educate their pupils by pointing out varieties of disease and injuries, and exemplifying methods of treatment. Hence, the best specimens of hospitals are found in university towns—as in London, Paris, Edinburgh, and some other cities famed as schools of medicine and surgery. The older of the London hospitals are, St Thomas's, 1553; St Bartholomew's, 1546; and Bethlehem, 1547. A considerable accession to the number took place in the reign of George II., when society became alive to the value of such institutions. It was at this period that the Royal Infirmary of Edinburgh was established (1736). The antiquity of British hospitals sinks into insignificance in comparison with that of some institutions of this kind on the continent. The Hôtel Dieu in Paris, which is alleged to be the most ancient hospital in Europe, was founded in the 7th c., and long known as the Maison Dieu, received the benefactions of successive sovereigns. It is now conducted on a stupendous scale. Houses of this kind in France usually receive valuable aid from a religious sisterhood, renowned for its practical benevolence, the Sisters of Mercy. A striking example of these women's unselfish and useful labours is furnished at the great hospital for the sick and hurt at Lyons, where the entire establishment—cooking, nursing, dispensing medicine, &c.—is gratuitously conducted by them.

In London, Paris, and other large seats of population, the pressure for admission by patients, and likewise the necessity for classifying and properly attending to large numbers, have led to the establishment of hospitals for special departments of medical practice. Thus, besides the general hospitals, there are now lying-in hospitals, ophthalmic hospitals, consumptive hospitals, children's hospitals, &c.—each with its peculiar accommodation, and its appropriate staff of officials. Independently of these, there are hospitals for the treatment of mental maladies, of which Bethlehem and St Luke's in London, and the establishments in Paris, known as Hospices, are examples. To this class of institutions belong Lunatic Asylums (q. v.), also asylums for the reception and treatment of naturally imbecile children; these last, though in operation for some time in France and Switzerland, being but of recent establishment in Great Britain. To all these institutions under civil administration, are to be added those hospitals which are maintained by the English, French, and other governments for the military and naval services.

No part of the social economy of European countries is so perfect in its organisation, so purely humane, and so unobjectionable on the score of promiscuous charity, as the institution of public hospitals or infirmaries. As means of relief and schools of medicine, they appear to be absolutely essential to every dense community; not the least of their valuable qualities being that, by their prompt and liberal action, they interpose to stem contagious distempers which, if unchecked on their outbreak, might visit and decimate families who are far removed above the need of gratuitous medical attendance. On this latter ground, as well as from sentiments of benevolence, the hospitals or infirmaries of England, Scotland, and Ireland are the objects of much solicitude to the general community; it being customary for wealthy individuals to bequeath sums towards their support, and for public subscriptions and church collections to be made for them annually. In some cases, besides the infirmaries so miscellaneously sustained, hospitals are erected and maintained wholly by endowment.

A leading peculiarity of medical hospitals is their good order and cleanliness. They are mostly large edifices, and though, in a sanitary point of view, best placed in airy situations, they are for the sake of convenience usually situated in the neighbourhoods where they are particularly required. Internally, they are arranged in wards, each under its own nurses, with general superintendents, and a suitable body of servants. Being open night and day to receive pressing cases, there is a resident surgeon with assistants constantly in attendance. Scrupulous cleanliness, quiet, decorous conduct, exclusion of intoxicants and of miscellaneous visitors, are among the points principally attended to by the managers.

The Middlesex Hospital, parish of Marylebone, may be taken as a fair specimen of a general hospital in England. It is a large building, disposed in the form of the letter H, which admits of thorough ventilation in all the passages. It comprehends 310 beds, of which 120 are for medical; and 190 for surgical cases. Three wards are set apart for the reception of 26 poor women affected with cancer, a class of cases when seemingly incurable not usually admitted into general hospitals. The staff consists of three physicians, who take charge of the medical cases in the wards; a physician-accoucheur, who devotes himself to the diseases peculiar to women and infants, and who superintends the working of the maternity department; four surgeons, who take charge of the surgical patients; and assistant-physicians and surgeons, who take care of out-patients. Resident house-surgeons and an apothecary with assistants, attend to all emergencies in the absence of physicians and surgeons, and summon them if necessary. Attached to the hospital are a chaplain and secretary. The physicians and surgeons, who give their services gratuitously, act as professors in the medical college. The management is conducted by governors, and a medical and weekly committee. In and out door patients are admitted by letters of recommendation from governors or subscribers to the funds, but in cases of cancer and diseases of the eye, and in cases of emergency, the recommendation is dispensed with. The annual number of patients received into the hospital is about 2100, and 18,000 receive attendance at their own homes. No lying-in patients are now admitted into the hospital, but about 800 poor women are yearly delivered at their own dwellings, by pupils and midwives, under the direction of the physician-accoucheur. The total expense incurred is less than £11,000, of which more than a half is from endowment, and the remainder from subscriptions, donations, legacies, and miscellaneous collections. A separate fund is provided to assist poor patients leaving the hospital, who may be deficient in clothing or other necessaries.

As in some degree allied or auxiliary to hospitals, there are two kinds of establishments deserving notice. The first to be mentioned are public *Dispensaries*, where, at stated hours, medical advice and medicines are given gratis to applicants; and though like other forms of charity liable to abuse, it is allowed that these institutions are of much value in the midst of poor communities, and also, like hospitals, are a means of staying the course of contagious distempers. The other institutions to be noticed are those called in France *Maisons de Santé*. These establishments are private hospitals for the reception and treatment of patients who are able and disposed to pay a small sum for board and medical or surgical attendance. A common charge is from three to five francs a day. Under the name of *Sanatorium*, an attempt has been made to introduce this kind of institution into England, where, however, from various circumstances, including the generally good home-accommodation of the middle and sub-middle classes, the institution has not become so popular as it is in Paris.

Hospitals for the board and education of the young are more varied in character and more numerous in Great Britain than in any country in the world. Consisting for the most part of large and handsome buildings, placed in salubrious situations in the environs of cities, some are specially adapted for boys, some for girls, and less frequently they are for both; some are maintained by endowments from deceased benefactors, some by funds connected with trade incorporations, and some by casual donations and subscriptions. The oldest, and those on the most munificent scale, are of the class first mentioned; as, for example, Christ's Hospital, London, and Heriot's Hospital, Edinburgh. Donaldson's Hospital, Edinburgh, belongs to this class; and so likewise does the Girard College, Philadelphia, which costing for construction nearly two millions of dollars, and giving accommodation to upwards of 300 orphans, is not excelled in point of architectural grandeur, or in munificence of private endowment, by any European hospital for children. In the whole of this class of institutions in Great Britain there is a similarity of arrangements. The inmates are assumed to be orphans, or the children of parents in reduced circumstances; they are admitted at about six or seven years of age, and kept till about fourteen; they receive gratuitous board and education within the establishment; and they wear a uniform according to the fancy of the directors—the dress being in some instances in England antiquated and ridiculous. There is ordinarily a keen competition among parents and guardians to procure the admission of children into these hospitals, for the benefit to be secured is deemed equal to a gift of £200 to £500. Hence, as may be supposed, the charity, to call it so, is frequently abused. As residence within such establishments for a period of six or seven years, interrupted only by holidays, involves a withdrawal to that extent from the family circle, serious objections have lately been taken to the marked and necessary deficiency of hospital training. On this ground, as well as from their pauperising tendency, hospitals for children are suffering in public estimation; and extended in number beyond all reasonable bounds, as they are in Edinburgh and some other places, are remonstrated against as being inconsistent with a sound social economy.

Hospitals for indigent old men and women are found in several European countries, but nowhere are they so common as in Great Britain and the Netherlands, where begging is rigorously proscribed by the police, and almsgiving assumes the character of rates for support of the poor. The workhouses for the reception of parish paupers are the humblest variety of these hospitia, though as seen in some parts of England and Scotland, they are on a vast scale of accommodation, adapted to the wants of unions or clusters of parishes. Considerably above these in point of comfort and liberality of management, are the hospitals endowed by individuals or by incorporations for persons who once occupied a respectable position, and have through misfortunes lapsed into decayed circumstances. Almost every city of any note in the United Kingdom has one or more of this species of hospital; the claim for admission being ordinarily a privilege of local burgesses or members of incorporated crafts. Analogous to this class of institutions was Greenwich Hospital for superannuated mariners connected with the Royal Navy, and the Military Hospital, Chelsea. In England there are numerous establishments called Alms Houses. These are of the nature of hospitals for indigent men and women of respectable character, but with this difference, that instead of all living in wards under one roof, the inmates are each provided with a small dwelling for him or herself, and receive the means of separate livelihood. These establishments, consisting of clusters of neat small cottages in contiguity, or of separate dwellings grouped in the form of a spacious building, abound in London and its vicinity, where they afford pleasing examples of the munificence of opulent benefactors, and incorporated city companies. At St Cross, near Winchester, and at Coventry, there are Alms Houses curious from their antiquity and external appearance. The noblest example of this class of institutions is the Charter-House, London, described in the present work. W. C.

HOSPITALS, Military, establishments for the reception of the sick and wounded of an army. The smallest is the Regimental Hospital, under the medical officers of the regiment; next, there is the Divisional Hospital, presided over by staff medical officers, for the benefit of all the corps in the division; and, lastly, there is the General Hospital, applicable to the whole force. In these hospitals, the medical officers are responsible directly to the Secretary of State for War for all purely medical functions. With regard to discipline, inspections, and other military duties, the principal medical officer is responsible to the commandant of the regiment or division, who in his turn is answerable to the general-in-chief for the state of the hospitals in his command. Soldiers while in hospital are subjected to a stoppage of 7*d*. a day from their pay, unless in hospital on account of wounds received in action, or on service in the field; but their whole pay is stopped if detention in hospital be certified to have become necessary from their own misconduct. There are several large military hospitals at home—e. g., Netley (q. v.), Fort Pitt for lunatic soldiers, Woolwich, &c. In the French army the service of the Field Hospitals forms part of the intendence of the army, the medical officers in charge being under the supreme control of the intendant-general.

HOSPITALS, Naval, establishments for the cure of sick and wounded seamen. They are served by naval medical officers. The naval hospitals at home which are at present kept up are at Haslar (q. v.) and Plymouth, Yarmouth, Haulbowline, Chatham, and Portsmouth; but abroad there are such establishments at Malta, Bermuda, Halifax, Jamaica, Ascension, the Cape, Hong-kong, Yokohama, and Lisbon. The annual cost of the naval hospitals amounts to about £64,000.

HO'SPODAR is the title now usually given to the governors of Moldavia and Wallachia. Formerly, they were called by the Turks, Beys; by the Slaves, Wojewods. The latter title is frequently given in connection with that of hospodar, the term wojewod signifying the right and dignity of leading the army (being thus identical with Duke), while hospodar (gospodar, gospod, gospodin, in the various Slavonic dialects) means simply, master (dominus). Formerly, the Lithuanian princes were likewise called *hospodars*, and the Polish kings, down to the time of Sobieski, assumed this title in their diplomatic negotiations with Russia. *Gosudar* (ruler, monarch) is even now the title of the Emperor of Russia, and in ordinary conversation signifies master. See MOLDAVIA, WALLACHIA.

HOST (Lat. *hostia*, a victim), the name given in the Roman Catholic Church to the consecrated bread of the Eucharist. It is so called in conformity with the doctrine of that church, that the Eucharist is a 'sacrifice,' in the strict sense of the word. The host in the Latin Church is a thin circular disc of unleavened bread, made of the finest flour, and generally bearing some emblematic device, as the Crucifixion, the Lamb, or some words or initials of words having reference to the sacrifice. In the Greek and other Oriental churches, as well as in the various Protestant communities, the Eucharist is celebrated in leavened bread, only differing from ordinary bread in being of a finer quality; and one of the grounds of separation from the West alleged by Michael Cerularius was the western practice of using unleavened bread. The Greek and Protestant controversialists allege that, in the early church, ordinary or leavened bread was always used, and that our Lord himself, at the Last Supper, employed the same. Even the learned Cardinal Bona, and the Jesuit Sirmond, are of the same opinion; but most Roman divines, with the great Mabillon at their head, contend for the antiquity of the use of the unleavened bread, and especially for its conformity with the institution of our Lord, inasmuch as at the paschal supper, at which 'he took bread, and blessed, and brake it,' none other than the unleavened was admissible (Exod. xii. 8, 15; Levit. xxiii. 5). See Klee's *Dogmatik*, iii. 190.

HOST, JENS KRAGH, a Danish historian, born at St Thomas, 15th September 1772, and died 26th March 1844. The great aim of his literary career was to create a conviction of their unity among the Scandinavian nations. With this view, he established, in company with Nyerup, Pram, and Baggesen, the Scandinavian Literary Society, which originated the journal entitled the *Scandinavian Museum*. His most important work is *Count Struensee and his Ministry* (3 vols. Copenh. 1824), which was the first attempt to delineate, in a thoroughly impartial manner, the events of that singular period in Danish history. Among his other writings are: *Svenske Blade; Euphrosyne; Dannora; A Swedish Grammar and Dictionary for Danes; Lectures on the Swedish Language and Poetry; Life and Government of Gustavus Adolphus; Memorials of the Life and Government of Christian VII.; and History of the Danish Monarchy under Christian VII.*

HO'STAGE (through the French *ôtage* (ostage), from the Latin *obses*), one given in pledge for the performance of conditions. When a town capitulates, victors and vanquished usually give into the custody, one of the other, several officers, as pledges that each party will duly carry out the terms stipulated. When the terms are fulfilled, the hostages are exchanged; but if the terms be evaded, the opposite side holds the right to put to death, or otherwise punish, the hostages in its possession. It is needless, however, to add that, in modern civilised warfare, the circumstances would have to be very remarkable indeed to be held to justify so cruel a measure as the execution of a hostage.

HOSTI'LIUS, TULLUS, grandson of Hostus Hostilius, the champion of Rome in the first war with the Sabines, succeeded Numa Pompilius on the throne of Rome, 670 B.C. According to Livy and other writers, H. made the famous arrangement, by the combat of the Horatii with the Curiatii, for the decision of the question of supremacy between Rome and Alba, which was decided in favour of the former; he fought against Fidenæ and Veii, and conquered these cities, destroyed Alba, and removed the inhabitants to Rome, giving them Mount Cælius to dwell on, and carried on war against the Sabines. As he grew old, he became more pacific in his inclinations, and determined to attend more diligently to the worship of the gods, but he had too long provoked them by his negligence to be forgiven, so that, when he wished to inquire of Jupiter Elicius, the god consumed H. and his house with fire, about 638 B.C. According to Niebuhr, Arnold, &c., there are glimpses of a distinct personality in the legend of H., unlike those of Romulus and Numa, which are merely personifications of the two principal stages of a nation's growth.

HOTBED, a heap of fermenting matter, covered with a layer of earth, and generally surmounted with a frame, for the cultivation of plants which require more than the natural heat of the climate and season, but not so much as to render the hothouse necessary. The heat is the result of fermentation. Hotbeds not being expensive, are in very general use; as for growing melons, and, in the northern parts of Britain, cucumbers, for raising ornamental plants from seed in spring, to be planted in the open ground as summer advances, &c. The material mostly used is stable-dung, or a mixture of horse-dung and litter; but tanners' bark, leaves, the waste of flax, cotton, or woollen factories, &c., are sometimes substituted for it. The heat of a very rapid fermentation being too great, it is necessary that this be over before the hotbed is planted; and it is usual, on this account, to prepare the materials for some time before it is formed. A hotbed is made highest at the back, sloping—in the northern parts of the world—towards the south. The bed extends on all sides six inches or thereby beyond the frame, which has a movable glass sash or sashes, according to its size. The thickness of the hotbed, and of the earth upon it, are accommodated to the purpose intended, and the degree of heat required. When the heat decreases, it is for some purposes necessary to keep it up by *linings* of the same material as the hotbed, added to the sides of it. The sashes of hotbeds must be partially removed during the day, to permit ventilation and the escape of vapour.

HOTHOUSE, a building intended for the cultivation of exotic plants requiring a higher temperature than that of the open air. The term is sometimes employed to include even the green-house and conservatory, but more generally it is applied to those buildings in which artificial heat is kept up at all seasons of the year, as the Bark-stove (q. v.), Dry-stove (q. v.), forcing-houses, pinery, peach-house, &c. Hothouses resemble green-houses in their general form and structure, and with most of the same varieties in both. It is important that they have a good exposure, so that the plants may enjoy as much sunshine as possible; and the free admission of air to the utmost extent allowed by the requirements of climate, is very advantageous. The oldest mode of heating hothouses is by furnaces and flues; the other modes practised are by steam, or by hot water led through the house in tubes, and by hot air admitted into the atmosphere of the house. Into the details of these modes, we cannot enter.

HOT SPRINGS, a small village in Arkansas, United States, America, 53 miles west-by-south of Little Rock, and celebrated as a resort for invalids to the hot springs which give the name to the village and the county. Fifty springs, from 110° to 150° F., break out from the west side of a mountain, and flow into a creek, which empties into the Wachita river, six miles distant. There are also cold chalybeate springs, much frequented, and sulphur springs, in the same county.

HOT WALLS, or **FLUED WALLS**, in Gardening, are walls furnished with furnaces and flues, in order to the production of finer kinds of fruit than could otherwise be expected in the climate. The flues are led as obliquely, and make as many turns from right to left as are consistent with their drawing well, so that as little heat as possible may escape by the chimney, and as much as possible may be expended on the wall. The heat is applied chiefly during spring. At that season, also, movable glazed frames, or sometimes mere screens, are placed in front of the walls.

HOTCHPOT, a phrase used in English law to denote that where one child has already received an advancement out of the father's personal estate, that child must bring such sum into hotchpot before he will be allowed to share with the other children, under the statute of distributions, after the father's death. In other words, a child who has got money from the father to place him in business, &c., must treat that as a payment to account of his share at the father's death. A similar, but not identical doctrine exists in Scotland under the name of COLLATION (q. v.).

HÔTEL, originally *Hostel*, or *Hostelrie*, a French term applied to an inn, or house for the temporary accommodation of travellers. The term, however, is also applied in France to the town mansion of a distinguished personage, and in like manner the word inn was at one time indifferently used in England to signify the town residence of a great man. The name hostelrie was applied by Chaucer to a public inn, and till a more recent period it was similarly used in Scotland. From its general use comes the designation hostler, which originally signified the keeper of the inn or hostel. Only in recent times has the significant old English word inn been eclipsed by the reintroduction of hostel, under the softened form of hôtel.

An account of inns ancient and modern, under whatever designation, would form an interesting chapter in social history. The Caravansarai (q. v.) of the East is the most ancient species of inn of which there is any notice. The Greeks and Romans did not improve on the quality of these oriental establishments. Their inns, if worthy of the name, were little better than receptacles for humble classes of wayfarers, or places where cooked food and wine were dispensed to the hungry and thirsty stranger. Along their highways, the Romans gave encouragement to these primitive varieties of inns; the best of such establishments being called *caupona*, or *taberna diversoria*, while those of an inferior kind were known as *popinæ*, of which some specimens have been disclosed at Pompeii.

The duties of hospitality and also the obligations of religion long postponed the introduction of regular inns. In medieval times, the castles of the barons offered shelter with straw, and sometimes food, to the wayfarer of high and low degree, and there are traditions to the effect that to pass some of these strongholds without calling to render obeisance, and receive the hospitality of the owner, was deemed an insult. But the monastic establishments, great and small, scattered over every part of Christendom, formed the chief *hospitia* (see HOSPICE). With the general improvement of society and the increasing concourse of travellers came the modern inn, or professional hospitium, at which entertainment for man and horse was afforded as a matter of business. Nowhere in Europe did this class of establishments so soon attain to a determinate and respectable character as in England. Growing first into importance in London, York, Oxford, Bristol, and some other cities, the substantial and well-managed English inn was imitated on a smaller scale in the different provincial towns, and gained a good standing in national usage before it spread to Scotland; the inns of which, even up to the middle of the 18th c., were on a meagre scale of accommodation. It is not necessary to call to mind more than a few of the interesting old inns in London, all celebrated less or more from their respective signs: the *Angel* at St Clement Danes, and *Angel* at Islington; the *Bell*, Warwick Lane, Newgate Street; *Belle Savage*, Ludgate Hill; *Bull and Mouth*, St Martin's-le-Grand; *Four Swans*, Bishopsgate Street; *Saracen's Head*, Snow Hill; *Golden Cross*, Charing Cross; *White Horse*, Fetter Lane; and *Tabard*, Southwark. For brief notices of these and others, see *Curiosities of London*, by J. Timbs. For the most part, the old inns of London, Westminster, and Southwark, consisted of a building round a courtyard, entered from the street by a wide covered passage. The ground-floor was disposed as stables, kitchens, and other offices, with a large reception-room; above, were the lesser apartments and bedrooms, these last all opening on hanging wooden galleries, whence the inmates could look down on the busy scene of arrivals and departures in the courtyard beneath. Some specimens of these old inns with open galleries still survive. Such was the *Tabard*, renowned as the hostelrie from which Chaucer's pilgrims set out for Canterbury. There is reason to believe that this form of construction was derived from the arrangement of ancient Roman villas, which consisted of buildings round a series of courtyards; hence, also, the form of French hôtels, public and private. Modern Italy has examples of inns of this form. We may allude particularly to the *Hôtel de Ville* at Milan, and the *Albergo delle Due Torri* at Verona; this last having hanging galleries round a courtyard in precisely the old English style.

Of the character and management of the inns of England, with their offers of 'entertainment to man and horse,' we are favoured with innumerable glimpses in the fictions of Fielding, Smollett, Goldsmith, and others—the jolly hostess, the obsequious waiters, the bouncing chambermaids, the hostler who takes the traveller's nag, and above all the garrulous host who, when invited, gives his company to his guests, tells them the news, and at dinner, according to use and wont, places the first dish on the table. See *Dr Syntax's Tour in Search of the Picturesque*, illustrated by Rowlandson, for some humorous delineations of inn-usages. The great personal comfort and independence of feeling enjoyed in English inns is frequently referred to in literature. Archbishop Leighton, who died 1684, in the *Bell*, Warwick Lane, 'often used to say, that if he were to choose a place to die in, it should be an inn; it looking like a pilgrim's home, to whom this world was all as an inn, and who was weary of the noise and confusion of it. And he obtained what he desired.'—Burnet's *Own Times*. Dr Samuel Johnson, as is well known, expatiates on the delights of an English inn; on one occasion, as related by Boswell, repeating with great emotion Shenstone's lines:

'Whoe'er has travelled life's dull round,
Where'er his stages may have been,
May sigh to think he still has found
The warmest welcome at an inn.'

English inns have not lost their reputation for comfort and the attention paid to guests; but the almost entire alteration in the methods of travelling by the introduction of railways has left them considerably behind the requirements of the age. Except in the smaller towns and villages, they have been superseded by hôtels—that is, houses of a more pretentious kind. The better classes of these hôtels contain private parlours for families or individuals who choose to be alone, also a large apartment for travellers generally. Houses frequented by commercial travellers have a room set apart for this class of customers. The plan of taking meals at a *table-d'hôte* has not hitherto made much progress in England, as if it were somehow contrary to the national reserve and exclusiveness. The marked defect in the modern hôtels in London and elsewhere in England consists in their insufficient size. The greater number are merely private houses transformed for the purpose, and are inadequate to meet the swollen dimensions of railway traffic. The truth is, the establishment of inns or hôtels in any part of Great Britain has not hitherto been looked to as a profitable investment for a large capital. The business of innkeeping has been thought a little derogatory, and few except old waiters, who had realised some money by their services, embarked in the business. On the continent of Europe, the trade of hôtel-keeping enjoys a considerably higher social status. A large capital is invested, the keeper or manager is a man of local note, and the waiters or *garçons* are young men who follow the business as a profession in which they expect to rise by their diligence and acquirements. In point of fact, the *garçon* is much above the English waiter in his aims. He voluntarily undergoes a kind of curriculum of education, by passing from the hôtels of one country to those of another, and does not consider himself proficient till he speaks German, French, Italian, and English; at the very least, if of German birth, speaking French with fluency. Some good and capacious hôtels, built distinctly as such, have lately been established at the principal railway termini in London, also at Dover and a few other places. With these exceptions, the hôtels of England are far behind the new high-class hôtels of the continent; nor do we know of any English hôtel which approaches in grandeur or extent to the *Hôtel de Louvre* in Paris, the *Metropole* at Geneva, or to some of the magnificent hôtels at Hamburg. The tendency, however, is in the direction of gigantic establishments, the property of joint-stock companies (limited). Already some very large hôtels on this footing have sprung up in the metropolis.

In England, the hôtel system of living is simply that of paying for what is called for, with the addition of a certain charge per diem for the rooms which are occupied; in France and other continental countries, this plan is so far modified by the plan of dining at a table d'hôte, which lessens the general expenses. Both in English and continental hôtels, the charge for attendance is now made explicitly in the bill, a very grateful improvement. The ordinary hôtels in all parts of the United Kingdom are licensed by magistrates to sell wines, spirits, and other excisable liquors, and therefore come under the category of public-houses open to the supervision of the police. In the higher-class hôtels, however, the supply of liquors is confined to the resident guests; and it is only in the others that drink is sold as in taverns. See Tavern. Latterly, there has sprung up a class of houses, some of them on a considerable scale, known as *Temperance Hôtels*, which have no licence, and do not supply any excisable liquors. See Temperance Movement.

Throughout the United States of America, the system of hôtels has taken a peculiar turn. The hôtels are built for the purpose, and usually very large; with few exceptions they are conducted as boarding-houses on the plan of charging so much per diem, everything included excepting liquor, which is obtainable in a large drinking-room called the bar. A common charge is about 10*s.* 6*d.* sterling a day. All the meals are given with liberal profusion in the table-d'hôte fashion; and as absence from these entertainments—to dine with a friend, for example—makes no difference of charge, the system, though simple and adapted to a constant flow of customers, is not without its disadvantages. Elegant in their architecture, and spacious and commodious in their interior arrangements, the American hôtels are got up at great expense, as may be judged from their extensive accommodation, which ranges from 180 to 800 rooms. The *Astor House*, the *St Nicholas*, and the *Metropolitan*, at New York, are among the largest and most splendid of these establishments. The system of American hôtels is generally followed in the British colonies.

W. C.

HOTTENTOT COUNTRY, a region of South Africa, stretches indefinitely to the N. from the Cape Colony, having the Atlantic on the W., and the Bechuanas and Kafirs on the E. In E. long. it extends between 15° and 27°; and in S. lat. between 31° and some line to the north of the tropic of Capricorn. This territory is but of little value. Its principal river, the Orange, is almost useless for navigation; and though here and there well wooded, yet the surface is chiefly an arid desert. The only examples of civilisation are to be found in several missionary establishments.

HOTTENTOTS is the name generally given by Europeans to a singular race of people, supposed to be descended from the aborigines of Southern Africa, and now dwelling for the most part in and about the English settlement of the Cape of Good Hope. The origin of the name Hottentot is uncertain. Some think it is of Dutch origin; a word coined by the early Dutch settlers to convey by the sounds Hot *en* Tot, Hot *and* Tot, some idea of the peculiar clicking noise made by the people when speaking. Dampier, however, wrote the name *Hodmadods*, instead of H.; and Prichard says that it is probably a corruption of *Houteniqua*, the name of a particular tribe now extinct, or at least unknown. They now call themselves by various names, supposed to be those of tribes, as Attaquas, Hessaquas, Dammaras, Saabs or Saaps, Namaquas, and Koranas; and by the collective name of Quai-quæ, or Gkhui-gkhui.

In the ethnological classification given by Dr Latham, the H. are ranged under the second great division of the human family—Atlantidæ. In the older classification, that of Blumenbach, they are ranged under the third great division of the human race—the *Ethiopians*—under which division that author also places the negroes. But the H. are not like the negroes, and are more akin to the Mongolians; having broad foreheads, high cheek-bones, oblique eyes, and a dirty, olive-coloured complexion. The width of the orbits, their distance from each other, the large size of the occipital foramen, are points in which the H. resemble the northern Asiatics, and even the Esquimaux. The person of the Hottentot, when young, is remarkable for its symmetry. The joints and extremities are small, and the males look almost as effeminate as the women. The face, however, is in general extremely ugly, and with age this ugliness increases. Sir John Barrow, in describing the Hottentot women, observes of them that before child-bearing they are models of proportion, every joint and limb rounded and well turned, their hands and feet small and delicate, and their gait by no means deficient in grace.

'Their charms, however, are very fleeting. At an early period of life, and immediately after the first child, their breasts begin to grow loose and flaccid, and as old age approaches, become distended to an enormous size; the belly protrudes; and the hinder parts swelling out to incredible dimensions, give to the spine a degree of curvature inwards that makes it appear as if the *os coccygis*, or bone at the lower extremity of the spine, was elongated and bent outwards, which is not the case.' The appearance of the Bosjesmen or Bushmen, who are the most degraded tribe of the H., is still more revolting.

The language of the H. is quite as singular as their personal appearance. It has been called 'the click language,' and has also been compared to the clucking of a hen when she has laid an egg. The dress of the Hottentot in his native state is exceedingly simple, being merely a strip of the skin of some animal tied round the waist, from which there depends a sort of apron, that hangs down both before and behind. This is nearly the same for both sexes, so that in the summer both go almost naked, protecting their persons from the sun by a covering of grease; but in the winter they have a sort of cloak made with skins, that covers nearly the whole body. The H. live in kraals or villages, consisting of a number of circular huts like beehives. They have both oxen and sheep, in the management of which they shew great skill. They are also addicted to the chase, in which they use poisoned arrows, javelins, and spears. Their only manufacture is a rude kind of earthenware; except, of course, that they make their own sheepskin clothes, such as they are, also their bows and arrows, and other weapons. Like most savages, they have some taste for music, which they practise upon a rude sort of guitar with three strings, and a flute made of the bark of trees. Of religion, there appears to be but very little notion among the H., and they have no particular observances at either births, marriages, or funerals. Dr Prichard, however, observes of them: 'Although the wild tribes of the Hottentot race display ferocity and all the other vices of savage life, yet we have abundant proof that these people are not insusceptible of the blessings of civilisation and Christianity. No uncultivated people appear to have received the instructions of the Moravian missionaries more readily than the Hottentots, or to have been more fully reclaimed and Christianised.'

The H., as a distinct race, first became known to Europeans about the year 1509, when Francisco d'Almeyda, Viceroy of India, landing at Table Bay, was killed, with about seventy of his followers, in a scuffle with the natives. They were afterwards frequently visited by navigators from different countries; but no authentic accounts reached Europe respecting them until the Dutch settled in the Cape of Good Hope in the middle of the 17th century. The H. were then much more numerous than at present, but upon becoming addicted to rum and brandy, their numbers diminished gradually. Many of the tribes parted with their flocks and herds to procure the fire-water, and eventually they became the absolute slaves of the Dutch settlers or Boers. From this condition they have been delivered by the enlightened and humane policy of the British government; and as free labourers they make excellent herdsmen and drovers. Their number at present is thought to amount to about fifteen, or from that to twenty thousand, not including those who in all probability may be found dwelling more in the interior. Of the Bushmen, no numerical estimate has been formed. They are widely scattered throughout the English settlements, but their numbers must be very small, while their wretched and degraded habits are such that it is thought they will soon become utterly extinct.

HOTTO'NIA, a genus of plants of the natural order *Primulaceæ*, of which one species, *H. palustris*, Water Violet or Featherfoil, is among the most beautiful of British aquatic plants. It is not found in Scotland. Its leaves are all submerged, crowded, and much divided; the large, beautiful, pale purple, whorled flowers alone rise above water on a long cylindrical stalk. Other species of H. are found in the East.

Water Violet (*Hottonia palustris*):
a, corolla; *b*, calyx; *c*, pistil; *d*, stamen.

HOUA'RIOS are small coasting-vessels and pleasure-boats used in parts of the Mediterranean. They bear lateen sails, and have each two masts and a bowsprit.

HOUND (Ger. *Hund*), a name commonly given to those kinds of dog which are used in hunting, but more especially, at least by systematic writers on dogs, to those which hunt by scent rather than by sight. When this definition is adopted, greyhounds are not regarded as true hounds. Examples of true hounds are found in the Bloodhound, the old English Southern hound, the Staghound, the Foxhound, the Harrier, and the Beagle; closely allied to which are also the Pointer, Setter, Spaniel, &c. See these heads. The Hounds are by some naturalists regarded as a distinct species of dog (*Canis sagax*). They are characterised not only by fineness of scent, but by great docility and sagacity.

Old English Hound (*Canis sagax*).

The muzzle is not so sharp as in greyhounds, nor is the form so slender. The ears are large and pendulous. Some varieties have rough, and some have smooth hair. The rough-haired varieties are generally those which exhibit the most perfect domestication, and in which the attachment to man is closest. True hounds are figured in ancient Egyptian paintings and sculptures. It is believed that all the best varieties were introduced into Europe in comparatively recent times from the East.

HOUNDS, in point of law, render the person who keeps them liable to the dog-tax—viz., five shillings each—unless compounded for; but a person who follows the hounds, i. e., goes out hunting with them, does not require a game licence. Though such a person, however, is not punishable summarily by a magistrate for an illegal trespass when following the hounds on a stranger's lands, yet he is liable to an action at law for the trespass, except only in the case of fox-hunting, which to this extent may be called a privileged pursuit, at least in England. In Scotland, fox-hunting is not allowed as an excuse for a trespass; and in England and Ireland, even in following the fox-hounds, no more damage is to be done than what is absolutely necessary.

HOUND'S-TONGUE (*Cynoglossum*), a genus of plants of the natural order *Boragineæ*, of which there are many species, all of a coarse appearance, with small flowers. The COMMON H. (*C. officinale*) is a native of Europe, Asia, Africa, and North America; not uncommon in some parts of Britain, especially near the sea-coast. It has soft downy leaves, of a dull-green colour, purplish-red flowers, and a stem about two feet high. Its odour is very disagreeable. The root was formerly administered in scrofula, dysentery, &c., and is said to be anodyne. It is also one of the pretended specifics for serpent-bites and hydrophobia.

Hound's-Tongue (*Cynoglossum officinale*).

HOU'NSLOW, a small town of England, in the county of Middlesex, consists of a single street, stretching along the Great Western Road from London, from which it is distant ten miles west. Its church, a modern building in the Italian style, is surmounted by twelve small spires and a belfry. The numerous inns and posting-houses of H. were busy and prosperous till the opening of the railways to Southampton and Bath. Previous to that event, its posting business was as extensive as that of almost any town in England. About 800 horses were then maintained here, and about 183 coaches, while 500 coaches passed through the village daily. The Heath, formerly notorious as the scene of highway robberies, is now in great part enclosed. Numerous villas have risen up around the town. On the Heath are extensive gunpowder mills, cavalry barracks, and an arsenal. Pop. (1871) 9294.

HOUR, a measure of time equal to $\frac{1}{24}$th part of a day. The division of the day into hours seems to have been known to the Babylonians and Egyptians, from whom, first the Greeks, and then the Romans derived it. But their scheme of division extended only to the natural day (while the sun was above the horizon), which they divided into twelve parts. The consequence of this was that the hour constantly varied in length. This system was introduced into Rome by L. Papirius Cursor about 293 B. C., and during the Punic Wars, the Romans adopted the division of the night also into twelve parts. This system continued till about the end of the 4th c., when the present system was adopted. In the British Empire, and most continental countries, the day is reckoned from midnight to mid-day 12 hours, and mid-day to midnight 12 hours. In Italy, the day is reckoned from sunset to sunset, and the hours are counted from 1 to 24. The Chinese reckon from an hour (in our time) before midnight till the corresponding time next night, 12 hours, each hour being equal to two of ours. The Japanese still follow the old custom of reckoning from sunrise till sunset. Astronomers reckon from mid-day (on the previous day) to mid-day, counting from 1 to 24.

HOÚRA, a town on the right or west bank of the Hooghly, stands within the limits of the Twenty-four Pergunnahs, in lat. 22° 36′ N., and long. 88° 23′ E. It is directly opposite to Calcutta, of which it may, in fact, be regarded as a suburb. The river between them is their common harbour; and H., being inhabited chiefly by ship-builders, bears pretty nearly the same relation to the aggregate metropolis of India as Blackwall bears to London in its largest sense. It is hence that the great railway takes its departure for the North-west Provinces.

HOUR-GLASS, an instrument for measuring intervals of time. It is made of glass, and consists of two bulbs united by a narrow neck; one of the bulbs is nearly filled with dry sand, fine enough to run freely through the orifice in the neck, and the quantity of sand is just as much as can run through the orifice in an hour, if the instrument is to be an hour-glass; in a minute, if a minute-glass, &c. The obvious defects of this instrument are the expansion or contraction of the orifice produced by heat or cold, and the variations in the dryness of the sand, all of which produce deviations from the true measurement of the time. The hour-glass was almost universally employed in churches during the 16th c., and continued in use till about fifty years ago. In several of the churches in England, hour-glass stands of elegant workmanship are still to be seen.

HOUSATO'NIC, a river of New England, which rises in Massachusetts, and flows southwardly through Connecticut into Long Island Sound. Its length is about 150 miles, through a picturesque country, and its numerous falls afford water-power to many manufacturing villages. For forty miles its course is followed by the Housatonic Railway.

HOUSE, in point of law, is an Englishman's castle, though not a Scotchman's. In other words, when a man shuts himself up in his own house, no bailiff can break open the door to arrest him, or seize his goods for debt in England or Ireland, and no court can give a bailiff such power; in Scotland, however, even a man's own house is no protection, for leave can be got from the court, often called on that account the Queen's keys, which enables the messenger to break open the outer-door and arrest. In England, therefore, if a person can manage to procure supplies from without, he can fortify himself against the enemy for any length of time; but though it is not competent for the bailiff to break open the outer-door by force, yet every trick or stratagem is fair in order to effect a peaceable entry, and once in, he cannot be turned out. Where the party is charged with a criminal offence, a constable armed with a warrant, or in some cases without, is entitled to break into the house and arrest him, both in England and Scotland. A man is entitled also to defend his house against trespassers and thieves, using no greater force than is necessary; and if necessary in that sense, he may even kill the intruder, though very strong circumstances are required to justify this. He may also put spring-guns on the premises. In Scotland, a peculiar name is given to the offence of feloniously assaulting a man in his own house, called Haimsucken (q. v.), a name also used in the old law of England; and all offences committed in a house are generally punished more severely. *Housebreaking* is a technical name in Scotland, but in England is a popular phrase, the legal terms being larceny or robbery in a dwelling-house, or burglary, according to the circumstances.

HOUSE OF COMMONS. See PARLIAMENT.

HOUSE OF CORRECTION, a jail which is not under the ordinary charge of the sheriff, but is governed by a keeper; it is also sometimes called a Bridewell. These houses were originally intended for the detention of vagrants and convicted persons, and compelling these to work; but their purpose is now extended in England, and the distinction between jail and house of correction abolished. The persons who may be committed to them are prisoners convicted of felony, or misdemeanour; persons committed on charge or suspicion of felony, or of misdemeanour; and vagrants. And any justice may commit to the House of Correction persons awaiting their trial, and persons convicted of small offences. The prisoners are classified, and the regulations are mainly defined by the Prison Act of 28 and 29 Vict. c. 126. In Scotland, the regulation of prisons is transferred to a Board of Directors of Prisons in Scotland, 23 and 24 Vict. c. 105, 28 and 29 Vict. c. 84, 34 and 35 Vict. c. 112.

HOUSE OF LORDS. See PARLIAMENT.

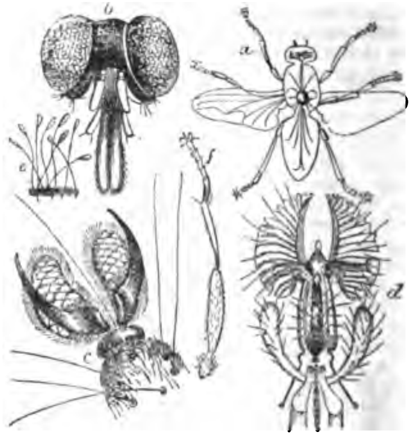
HOUSEBOTE, in English Law, the right which a tenant has to cut wood on the land to repair the house, often called *Estovers.*

HOUSEBREAKING. See HOUSE.

HOUSEBURNING, a crime in Scotland, generally called Arson in England.

HOUSE-DOVES, in the Law of England, are protected like domesticated animals, and the taking of them is in general larceny; and if the offence of larceny cannot be made out, then a magistrate may inflict a penalty of £2, over and above the value of the bird (24 and 25 Vict. c. 96, s. 23). In Scotland, it is also theft to break into dove-cotes. But there is no summary redress for the lesser offences.

HOUSE-FLY (*Musca domestica*), an insect too well known to need description, and remarkable for its extensive distribution both in the Old and in the New World. It belongs to the vast dipterous family *Muscides.* The maggots live in moist dung, in heaps of rotting vegetables, &c. When house-flies become annoying, various expedients are resorted to for killing them, as trapping in glasses partially filled with some sweet viscid fluid, or by pieces of paper covered with a mixture of sweet and poisonous substances. Sweet substances, however, attract flies into a room, so that the benefit of fly-traps is often doubtful; and care must be taken that the poisons used do not endanger the lives of children or others. Quassia is safe enough in this respect, and very fatal to flies.



Various parts of House-Fly, highly magnified:
Copied from Samuelson's *Earthworm and Common House-Fly.*
a, section of fly, shewing nervous system; *b*, head of house-fly, shewing the compound eyes, and, beneath, the proboscis; *c*, last joint of tarsus, or foot of fly, with hooks and pads; *d*, proboscis of house-fly; *e*, portion of fringe of the pad, to shew the supposed suckers; *f*, leg of fly.

In addition to what has been said in the article DIPTERA concerning the power which many insects possess of walking on perpendicular walls, ceilings, &c., it may here be mentioned that, according to the observations of Mr Hepworth, who has carefully investigated this subject, although the membranous discs (*pulvilli*) on the foot of a fly are incapable of being used as suckers, yet the hairs with which they are thickly beset, are terminated by minute discs, which probably are so used. At the same time, these minute discs appear to exude a liquid, not viscid, which probably serves to make the adhesion more perfect.

The proboscis of the H. is a very interesting microscopic object. It is chiefly formed by an extraordinary development of the *tonguelet* or *ligula*, the upper part of the under lip (*labium*), but with this are combined lancets formed of the metamorphosed *maxillæ.* (For these, see COLEOPTERA.) The lobes of the ligula are much enlarged and fleshy. They are surrounded by rough hairs, to aid in scraping or tearing delicate surfaces. There are many rows of these hairs on each lobe. In using its proboscis to feed on dry substances, as sugar, the fly moistens them with a liquid which may be regarded as saliva, so as to fit them for suctorial action. To aid in this suctorial action, the muscles of the lobes of the ligula are disposed in a spiral form.

HOUSEHOLD TROOPS are those troops whose especial duty it is to attend the sovereign, and to guard the metropolis. These forces comprise three regiments of cavalry—the 1st and 2d Life-guards, and the Royal Horse-guards, and three regiments of Foot-guards (which include seven battalions), the Grenadier, Coldstream, and Scots Fusilier Guards. The cost of these corps, for pay and allowances only, reaches the sum of £231,598 a year; and they number in all ranks 1302 cavalry and 5940 infantry, who are justly held to be the flower of the British army.

HOUSE-LEEK (*Sempervivum*), a genus of plants of the natural order *Crassulaceæ*, having a calyx of 6—20 sepals, the petals equal in number to the sepals, and inserted into the base of the calyx; the leaves generally very succulent, and forming close rosettes. The Common H., or Cyphel (*S. tectorum*), called *Fous* or *Fouets* in Scotland, and in some countries *Jupiter's Beard*, grows wild on the rocks of the Alps, but has long been common in almost every part of Europe, planted on walls, roofs of cottages, &c. It sends up leafy flowering stems of 6—12 inches in height, bearing branches of pale-red star-like flowers, equally curious and beautiful. The leaves cut or bruised, and applied to burns, afford immediate relief; as they do also in stings of bees or wasps; and they are a beneficial application to ulcers and inflamed sores. They were formerly in high esteem as a remedy for fevers and other diseases, and an edict of Charlemagne contributed greatly to the extensive distribution of the plant. The edict is in these words: *Et habeat quisque supra domum suum Jovis barbam* (And let everybody have the Jupiter's beard on his house).—Other species possess similar properties. *S. soboliferum*, with yellowish-green flowers, is very frequently planted on walls in Germany. Some of the species, natives of the south of Europe, Canary Isles, &c., are shrubby; others are common greenhouse plants.

House-Leek (*Sempervivum tectorum*).

HOUSEMAID'S KNEE is the term commonly applied to an acute inflammation of the bursa or sac that intervenes between the patella, or knee-pan, and the skin. Housemaids are especially liable to it from their kneeling on hard damp stones. It causes considerable pain, swelling, and febrile disturbance. The only disease for which it can be mistaken is acute inflammation of the synovial membrane lining the cavity of the joint; but in this disease, the patella is thrown forwards, and the swelling is at the sides, while in housemaid's knee, the swelling is very superficial, and is in front of the patella.

The treatment consists essentially in the means usually employed to combat inflammation; viz., rest, leeches, fomentations, and purgatives; if suppuration take place, the sac must be freely opened, and the pus evacuated.

HOUSE-RENTS, in Scotland, when the lease is verbal, prescribe in three years—i. e., no action can be maintained after that time; but in England an action can be brought within six years. See Landlord and Tenant.

HOU'SSA, or, according to Dr Barth, Háusa, a district of Africa, in Sudan, forming a portion of the empire of Sókoto (q. v.). The name, however, is used to designate rather the race inhabiting the district, and the language which there prevails, than to mark any distinct political division. H. Proper comprises seven states. The country of the H. is very beautiful, and the inhabitants lively, spirited, and industrious.—See Barth's *Travels and Discoveries in North and Central Africa*.

HOU'STON, a city in Texas, United States of America, at the head of steam-boat navigation on Buffalo Bayou, 45 miles from its mouth in Galveston Bay, and 80 miles from Galveston. It has iron foundries, machine-shops, and cotton-presses, and exports cotton, cattle, and agricultural products. Pop. in 1870, 9382.

HOUSTON, Sam, general and ex-president of Texas, was born near Lexington, Rockbridge Co., Virginia, March 2, 1793; enlisted as a common soldier in the war of 1812; was chosen ensign, and fought under Jackson with a courage that won his lasting friendship. In 1823, he was chosen member of congress, and in 1827, governor of Tennessee. In January 1829, he married the daughter of an ex-governor; and in the following April, for reasons never made public, abandoned wife, country, and civilisation, was adopted as a son by the chief of the Cherokee nation, beyond the Mississippi, and was formally admitted as a chief. In 1832, he went to Washington, and procured the removal of several United States Indian agents, on charges of fraud, but got into personal difficulties with their friends. The Texan war offered a new field to his ambition. H. was made commander-in-chief. The Americans at first sustained some severe defeats, and H. was obliged to retreat before the Mexicans under Santa-Anna for nearly 300 miles, but suddenly turning on his pursuers, H. fought the remarkable and decisive battle of San Jacinto, 21st April 1836, at one blow annihilated the Mexican army, and achieved the independence of Texas. The hero of San Jacinto was elected first president of Texas, and re-elected in 1841, and on the annexation of Texas to the United States, in 1845, sent to the national senate, where he remained until 1859, when he retired, and was elected governor of Texas. He opposed secession, but retired to private life when he found that opposition was fruitless. He died in 1862.

HO'VEN, or distention of the rumen or first stomach with gas, is a common complaint among cattle and sheep, and results from the eating of food to which the animal has been unaccustomed, from wet clover or vetches, or from any easily fermentable food. Relief generally follows walking exercise, friction on the belly, and a dose of any ordinary stimulant, which for a cow may consist of a couple of ounces of turpentine, whisky, ether, or ginger, to which should also be added, in order to clear the bowels of the offending food, a laxative, such as a pint of oil or a pound of salts. A fourth or fifth of these quantities will suffice for sheep. The introduction of the probang, with the small end downwards, allows the escape of gas when there is little food in the stomach. If simple remedies fail, the breathing become distressed, and the animal stupid; the gas may with safety be allowed to escape by an external opening made at a point intermediate between the last rib, the lumbar vertebræ, and the prominence of the haunch, either with a canula and trochar, or a large pocket or table knife. For several days after an attack of hoven, the digestive organs are apt to be easily deranged, and the animal must have soft and digestible food, and an occasional dose of simple laxative medicine.

HOWARD. The noble House of H. has stood for many centuries at the head of the English nobility. The Howards have enjoyed the dukedom of Norfolk since the middle of the 15th c., and have contributed to the annals of the nation several persons of the most distinguished character both in politics and in literature. Neither Sir W. Dugdale, nor Collins, nor Sir Bernard Burke claims for the Howards any more ancient origin than Sir William H., a learned Chief-justice of the Common Pleas under Edward I. and Edward II., though Dugdale incidentally mentions a tradition that their name is of Saxon origin, and derived either from an eminent office under the crown before the Conquest, or from Hereward, the leader of those forces which for a time defended the isle of Ely so valiantly against William the Conqueror. Be this as it may, it is certain that Sir John H., the grandson of the above-mentioned judge, was not only admiral and captain of the king's navy in the north of England, but sheriff of Norfolk, in which county he held extensive property, which was subsequently increased by the marriage of his grandson, Sir Robert, with the co-heiress of the ancient and noble House of Mowbray, Dukes of Norfolk. The only son of this union was Sir John H., one of the leading supporters of the House of York, who, having gained early distinction in the French wars of Henry VI., was constituted by Edward IV. constable of the important castle of Norwich, and sheriff of Norfolk and Suffolk. He subsequently became treasurer of the royal household, obtained 'a grant of the whole benefit that should accrue to the king by coinage of money in the City and Tower of London, and elsewhere in England;' and further, was raised to the peerage as Lord Howard and Duke of Norfolk. We find him in 1470 made captain-general of the king's forces at sea, and he was most strenuous in that capacity in his resistance to the House of Lancaster. Finally, he was created Earl Marshal of England, an honorary distinction still borne by his descendants, and in 1484 was constituted Lord Admiral of England, Ireland, and Aquitaine. He fell next year, however, on Bosworth Field, and, after his death, his honours were attainted, as also were those of his son Thomas, who had been created Earl of Surrey. The latter, however, after suffering three years of imprisonment in the Tower of London, obtained a reversal of his own and his father's attainders, and being restored to his honours accordingly, became distinguished as a general, and is more particularly celebrated in history for his defeat of the Scotch at Flodden in 1513. His son Thomas, third Duke of Norfolk, was attainted by Henry VIII., though afterwards restored in blood, and by his marriage with a daughter of King Edward IV., became the father of the ill-fated and accomplished Earl of Surrey, whose execution was the last of the many acts of tyranny which disgrace the memory of Henry VIII. Eminent as a statesman, a warrior, and a poet, Surrey is thus described by Sir Egerton Brydges: 'Excellent in arts and in arms; a man of learning, a genius, and a hero; of a generous temper and a refined mind, he united all the gallantry and unbroken spirit of a rude age with all the elegance and grace of a polished era. With the greatest splendour of descent, in possession of the highest honours and unbounded wealth, he relaxed not his efforts to deserve distinction by his personal worth. Conspicuous in the rough exercises of tilts and of tournaments, and commanding armies with skill and bravery in expeditions against the Scots under his father, he still found time, at a period when our literature was rude and barbarous, to cultivate his mind with all the exquisite spirit of the choicest models of Greece and Rome, to catch the excellences of the revived muses of Italy, and to produce in his own language compositions which, in simplicity, perspicuity, graceful ornament, and just and natural thought, exhibit a shining contrast to the works of his predecessors, and an example which his successors long attempted in vain to follow.'

The Earl of Surrey was executed during the lifetime of his father, on whom the same sentence had been passed, when the death of the royal tyrant saved him from the block. His grandson, Thomas, fourth Duke of Norfolk, in like manner suffered attainder, and was executed on Tower Hill for high treason, for his communication with Mary, Queen of Scots. The family honours, however, were again restored, partly by James I., to his grandson, and partly by Charles II. to his great-great-grandson, Thomas, who thus became eighth duke, and whose cousin and successor, Charles, ninth duke, was the direct ancestor of the present Duke of Norfolk.

It would be impossible here to give a list of all the honours which from time to time have been conferred on various branches of the ducal House of H.; it is sufficient to say, that in one or other of their widespread branches, the Howards either have enjoyed within the last three centuries, or still enjoy, the earldoms of Carlisle, Suffolk, Berkshire, Northampton, Arundel, Wicklow, Norwich, and Effingham, and the baronies of Bindon, Howard de Walden, Howard of Castle Rising, and Howard of Effingham.

It will be seen from the above remarks, that the ducal House of Norfolk is one whose fate it has been, beyond all others among the English nobility, to find its name interwoven with the thread of English history, and not rarely in colours of blood. The accomplished but unfortunate Surrey, and his scarcely less unhappy father, Thomas H.—whose head was only saved from the block on which his son so nobly suffered by the death of the eighth Henry—are 'household words' in the pages of English history; and readers of Shakspeare will have other recollections of the same name allied with other historical events; while those who are familiar with the writings of Pope, will not have forgotten how tersely and pointedly he typifies the glory of ancestral pedigrees by

'All the blood of all the Howards.'

Other members of the House of H. have gained a place in the pages of English history. Sir Edward H., K.G., brother of the first Earl of Surrey, was made by Henry VIII. the king's standard-bearer and admiral of the fleet, in which capacity he lost his life in boarding a French vessel off Brest in action in 1513; his brother, Sir Edmund, acted as marshal of the horse at Flodden; and his half-brother, Sir Thomas H., was attainted, and died a prisoner in the Tower, for aspiring to the hand of the Lady Margaret Douglas, daughter of Margaret Queen of Scotland, and niece of Henry VIII., one of whose ill-fated consorts was the Lady Catharine Howard.

HOWARD, John, 'the philanthropist,' was born at Hackney, near London, about 1726. From his father, who had been engaged in trade, H. inherited a considerable fortune. In 1756, the year of the great earthquake at Lisbon, urged by motives of benevolence, as well as of curiosity, he set sail for that city. On this voyage his vessel was taken by a French privateer, and he was carried into the interior, when he suffered imprisonment for some time. The hardships which he here underwent, combined with the knowledge of prisons and the miseries of prison-life which he acquired as a county sheriff in 1773 and afterwards, determined him in devoting himself to prison reform. His life hereafter is but a chronicle of his journeys throughout the United Kingdom and the continent, in which he visited the principal prisons and hospitals. His chief work is *An Account of the Lazarettos in Europe, &c., with Remarks on the Present State of the Prisons in Great Britain and Ireland* (1789). He died January 20, 1790, at Kherson, in the south of Russia, from having caught infection from a fevered patient for whom he had prescribed. The fame of H. is peculiar. He is remembered not so much for his talents as for that devotion to his suffering fellow-men, in which he expended his fortune and his life.

HOWE, Earl (Richard Howe), British admiral, was the second son of Emanuel Scrope, second Viscount Howe of the Irish peerage. He was born in 1725, and educated at Eton. Having a boyish passion for the sea, he left Eton at 14, and went to the South Seas in the squadron under Anson. He was with Admiral Vernon in 1745, and at the time of the Scottish rebellion, being in command of the *Baltimore* sloop, took part in the siege of Fort William. He also, with another vessel, beat off two French ships conveying troops and ammunition to the Pretender, for which he was made post-captain. In 1755, his ship, the *Dunkirk*, captured the *Alcide*, a French 64, off Newfoundland. He next served under Sir E. Hawke in the expedition against Rochefort. He was ordered to attack the fort on the isle of Aix with his ship the *Magnanime*, compelled it to surrender after an hour's cannonade, and achieved the only material success which attended the expedition. He was commodore of the squadron which sailed in 1758 for St Malo. The troops were landed and re-embarked without loss, after destroying all the magazines and shipping in the port, to the number of 120 sail. In the same year he took Cherbourg. Nearly 200 pieces of iron cannon and mortars were here rendered unserviceable; the brass cannon were brought to England; the celebrated basin was destroyed, and 27 ships and vessels were burned or sunk. A second attack upon St Malo was less successful. The French troops assembled in force at the Bay of St Cas, and it was only by the intrepidity of H., who went in his own barge into the centre of the enemy's fire, that the re-embarkation of the rear-guard was effected, with great loss of life. In 1758, he succeeded to the Irish title of viscount on the death of his brother, the brigadier-general, who was killed before Ticonderago. He took part in the defeat of the fleet under the Marquis de Conflans, and captured the *Hero*, 74 guns. In 1760, he was made colonel of the Chatham division of marines, and afterwards a Lord of the Admiralty, and Treasurer of the Navy. In 1776, he commanded a fleet on the American coast, when the conquest of New York, Rhode Island, Philadelphia, and every settlement within the reach of a naval force, testified to his skill and energy. In 1778, he defended the American coast against a superior naval force under D'Estaing. He was made a viscount of Great Britain in 1782, and sent out with a fleet to relieve Gibraltar. He succeeded in disembarking troops, ammunition, and supplies, and then offered battle to the combined fleets of France and Spain, which declined an engagement. He was made First Lord of the Admiralty in 1783, and received an English earldom in 1788. When war with France broke out in 1793, he took the command of the Channel fleet, and next year gained the victory which will long be known as that of 'the glorious first of June.' The French fleet consisted of 26 ships of the line, and the English of 25. H., in his flag-ship, the *Queen Charlotte*, engaged in the Bay of Biscay, off Ushant, the French admiral, who in less than an hour crowded all the sail he could carry, followed by as many of his ships as could get away. The English captured two ships of eighty guns, and four seventy-fours; another seventy-four sank immediately after she was taken possession of. London was illuminated three nights in honour of the victory. The thanks of parliament were voted to Howe. George III. visited him on board the *Queen Charlotte*, gave him a sword, and made him a Knight of the Garter. His last service was in bringing back the mutinous seamen at Portsmouth to their duty in 1797. He died August 5, 1799, aged 74, leaving a name high in the rôle of English naval worthies.

HOWE, John, who has been called the *Platonic Puritan*, was born 17th May 1630, at Loughborough, in Leicestershire, to the living of which parish his father had been presented by Laud. He studied both at Cambridge and Oxford, and after preaching for some time at Winwick, in Lancashire, and Great Torrington, in Devonshire, he was appointed domestic chaplain to Cromwell in 1656, in which difficult situation his conduct was such as to win praise even from the enemies of his party. At the Restoration, he returned to Torrington, where the position he had held during the Commonwealth made him an object of close suspicion to the government. The *Act of Uniformity*, however, ejected him from his parish, 24th August 1662, and he wandered about preaching in secret till 1671, when he was invited by Lord Massarene, of Antrim Castle, in Ireland, to become his domestic chaplain. Enjoying there the friendship of the bishop of that diocese, and liberty to preach in all the churches under his jurisdiction, he wrote his *Vanity of Man as Mortal*, and began his greatest work, *The Good Man the Living Temple of God* (1676—1702), which occupies one of the highest places in Puritan theology. In 1675, he was called to be pastor of the dissenting congregation in Silver Street, London, and went thither in the beginning of 1676. In 1677 he published, at the request of Mr Boyle, *The Reconcilableness of God's Prescience of the Sins of Men with the Wisdom of His Counsels and Exhortations*; in 1681, *Thoughtfulness for the Morrow*; in 1682, *Self-dedication*; in 1683, *Union among Protestants*; and in 1684, *The Redeemer's Tears wept over Lost Souls*. In 1685, he was invited by Lord Wharton to travel with him on the continent; and after visiting the principal cities, he resolved, owing to the state of England, to settle for a time at Utrecht, where he was admitted to several interviews with the Prince of Orange. In 1687, the *Declaration for Liberty of Conscience* induced him to return to England, and at the Revolution next year he headed the deputation of dissenting clergymen when they brought their address to the throne. Besides smaller works, he published, in 1693, *Carnality of Religious Contention*; in 1694—1695, several treatises on the Trinity; in 1699, *The Redeemer's Dominion over the Invisible World*; and he continued writing till 1705, when he published *Patience in Expectation of Future Blessedness*. He died 2d April 1706.—See Henry Rogers's *Life and Character of John Howe, with an Analysis of his Writings*.

HOWE, Samuel Gridley, M.D., an American physician, was born at Boston, November 10, 1801, and educated at the Boston Latin School, and Brown University, where he graduated in 1821. He then studied medicine. Being an admirer of Lord Byron, he wished to join him in aiding the Greek revolution, and embarked from Boston for Greece in 1824; volunteered as a surgeon; served two years as a guerrilla; organised the medical staff of the Greek army, and was appointed its chief. The Greeks were suffering for supplies, and even for food; and he went to America, and raised large contributions. Returning with food, clothing, and supplies, he formed the colony of Corinth, in which he filled all offices, from governor to constable. Taken down with the swamp-fever in 1830, he went to Paris, where he attended medical lectures, and in 1832 returned to the United States. Having become interested in the education of the blind, he was sent to Europe, to examine the best institutions, but volunteered in the Polish insurrection, and spent six weeks in a Prussian prison. On his return, the Massachusetts Institution for the Blind was established, and placed under his management. He also established a school for idiots, and in 1828 published a *Sketch of the Greek Revolution.* He revisited Greece in 1867, bearing supplies to the Cretans, then struggling for their independence.

HOWITT, WILLIAM AND MARY, two English authors that may most properly be treated together. William H. was born in 1795 at Heanor, in Derbyshire, and was educated at various schools in connection with the Society of Friends, to which persuasion his family belonged. In his youth, he was fond of outdoor sports, and he celebrated in verse the scenery with which he was familiar. In 1823, he married Miss Mary Botham, a lady of literary taste and acquirements, and whose family, like his own, was attached to the principles of Quakerism. *The Forest Minstrel,* with their joint names on the title-page, was published during the year in which they were married. For three or four years thereafter, they employed themselves in contributions to annuals and magazines, and in 1827 a selection from these fugitive pieces appeared under the title of *The Desolation of Eyam.* From this date up till 1837, William H. wrote *The Book of the Seasons, Popular History of Priestcraft,* and *Tales of the Pantika.* During the same period, Mary H. produced *The Seven Temptations,* and a country novel entitled *Wood-Leighton.* In 1837, William and Mary H. removed to Esher, in Surrey, and at that place William H. wrote *Rural Life in England, Colonisation and Christianity, Boy's Country Book,* and *Visits to Remarkable Places,* first series. Mary H. at the same time employed herself in writing *Tales for Children,* many of which are popular. In 1840, William H., with his wife and family, removed to Heidelberg, where they resided two years. The influence of this residence has been visible on both. Mary H. made herself mistress of the northern languages, and translated the works of Miss Bremer and Hans C. Andersen. These translations appeared between 1844 and 1852. William H. was also busy during the same period. He wrote and translated novels; he published a political work, entitled *The Aristocracy of England;* and *The Homes and Haunts of the British Poets.* In 1852, he went to Australia, where he remained two years, and since his return he has published the following works: *Law, Labour, and Gold, or Two Years in Victoria, with Visits to Sydney and Van Diemen's Land; The Illustrated History of England,* 6 vols., completed in 1861; *History of the Supernatural in all Ages and Nations* (1863); *Discovery in Australia, Tasmania, and New Zealand* (1865); and *The Mad War Planet and other Poems* (1871).

HOW'ITZERS are guns which came into use early in the history of field-artillery, as portable instruments for discharging shell into a hostile force. As, for this purpose, no great range was necessary, a small charge of powder sufficed; and the howitzer could be made, in proportion to its large bore, extremely light. It combines in some degree the accuracy of a cannon with the calibre of a mortar; and while equally effective at short ranges, is far more portable than either. That the powder, on its expansion, may act with full force on the shell, it is confined in a hemispherical chamber of smaller diameter than the rest of the bore, the mouth of which is completely closed by the shell when rammed home. The Coehorn howitzer, much used in India for mountain-service, is a small gun, light enough to be borne by a horse up hilly defiles, &c.

HOWLER, HOWLING MONKEY, or **STENTOR** (*Mycetes*), *Alouatte* of the French, a genus of American monkeys, remarkable for the dilatation of the Hyoid (q. v.) bone into a hollow drum, which communicates with the larynx, makes a conspicuous external swelling of the throat, and gives prodigious power to the voice, enabling these animals to emit hideous sounds, which are heard miles away, and to which all their names refer. They live chiefly among the branches of trees, and take extraordinary leaps from one to another, taking hold by the tail as readily as by the hands, and often swinging by it alone. They are gregarious, and unite their voices in concert, so as to produce a most deafening noise. The monkeys of this genus are regarded as in their low intelligence and their fierceness of disposition American representatives of the baboons, whilst in many of their habits they more nearly accord with the gibbons of the Old World. They inhabit the north-eastern parts of South America. They are the largest monkeys in the New World. There are not many species.

Howling Monkey (*Mycetes ursinus*).

HOWTH, a small peninsula on the east coast of Ireland, forms the north shore of the Bay of Dublin, and is two and a half miles long by about two miles broad, with an area of about 2600 acres. H. is connected with the mainland by a low and narrow isthmus, and its insular appearance greatly enhances the picturesque effect of Dublin Bay.

HOY, a small vessel differing little, if at all, from the sloop or smack. Its ordinary employment is in carrying goods or passengers coastwise from one place to another, and particularly in inlets, &c.,

where longer lighters and other vessels could manœuvre only with difficulty.

HOY, one of the Orkney Islands, lies south-west from Pomona, or the Mainland, from which it is separated by a passage about 2 miles in width. It is 14 miles long, and 6 miles broad, and its population in 1871 was 1385. Unlike the most of the islands of its group, Hoy rises abruptly from the sea, with precipitous cliffs 1000 feet in height fronting the west; the highest eminence, Wart Hill, is 1555 feet above sea-level. It has in the south the harbour of Long Hope, said to be the finest in the Orkneys, and defended by a fort and two martello towers. Among the curiosities of the island are the Dwarfie Stone, a block of sandstone, 22 feet long, 17 feet broad, and 7 feet high. One end of it has been hollowed out by iron tools, the marks of which are still visible, and a kind of apartment formed. In the south-west of the island is the Old Man of Hoy, a pillar of rock 300 feet in height.

HO'YA, a genus of tropical plants of the order *Asclepiadaceæ*, having a 5-cleft wheel-shaped corolla, and a 5-leaved spreading fleshy corona. Some of the species are common in hothouses, and from the appearance of their flowers, they are called *Wax-plants*.

HUAHEI'NÉ, the most easterly of the Society Islands (q. v.).

HUALLA'GA, a river of Peru, rises on the east side of the Andes, near lat. 11° S., at an elevation of 13,200 feet above the sea. After a northerly course of about 500 miles, during which it presents many considerable falls, it enters the Amazon.

HUAMA'NGA (now called Ayacucho), a city of Peru, in the department of Ayacucho, stands on an affluent of the Apurimac. It was founded by Pizarro in 1539, on the route between the old and new capitals of the country, Cuzco and Lima. It has a population of about 16,000, with a cathedral and a university. Near H., in 1824, was completed the independence of Spanish America, by the decisive victory of General Sucré.

HUA'NACA, or **GUANACO** (*Auchenia Huanaca;* see Auchenia), a species of the same genus with the llama and alpaca, of both of which some naturalists suppose it to be the wild original. It is found not only on the Andes, but throughout great part of Patagonia. It is of a reddish-brown colour, the ears and hind-legs gray. It generally lives in herds of ten to forty, and is very quick-sighted and wary; although such is the strength of its curiosity, that hunters attract the herds within easy reach of their rifles by lying down on the ground, and kicking their feet in the air. Like its congeners, the H. is extremely sure-footed on rocky ground.

HUANCAVELI'CA, a town of Peru, about 80 miles to the west-north-west of Huamanga, stands, at an elevation of 11,000 feet above the sea, on the east declivity of the Andes. Its inhabitants, said to be about 10,000 in number, are chiefly engaged in the working of the neighbouring mines of gold, silver, and quicksilver.

HUA'NUCO, a town of Peru, on an affluent of the Huallaga (q. v.), which bears its own name, is situated on the east declivity of the Andes, at a distance of 180 miles to the north-north-east of Lima. It contains 5000 inhabitants, and is one of the most ancient places in the country.

HUARA'Z, or **HUARAS**, a small town of Peru, situated in a valley of the Andes, on the right bank of the river Santa, 150 miles south-east of the seaport of Truxillo. Pop. 6000.

HUBER, François, a Swiss naturalist, was born at Geneva, July 2, 1750. At an early age he lost his eyesight, and some years after this, married a Mademoiselle Lullin, by whose assistance, and that of an intelligent domestic, named Burnens, he made a vast variety of original and important observations on the habits of bees, which did much to correct the errors and imperfections of previous writers. H.'s first work was entitled *Lettres à Ch. Bonnet* (1792). It was reprinted in 1796, and again in 1814, under the title of *Nouvelles Observations sur les Abeilles.* In his latter years, H. derived important aid in his studies fron his son Pierre (born 1777, died 1840), the author of a valuable treatise on the *Habits of Ants*, and of several able memoirs relating to Zoology and Meteorology, which are to be found in the Mem. Soc. Genève, between the years 1821 and 1830. H. died at Lausanne, 21st December 1831.

HÜBNER, Rud. Jul. Benno, one of the most eminent painters of the modern German school, was born at Oels, in Silesia, in 1806, and first attracted attention by his picture of 'Ruth and Boaz.' In 1839, he settled at Dresden, where he has been a professor since 1841. His principal productions are —'Samson overthrowing the Pillars of the Temple,' 'The Departure of Naomi,' 'Christ and the Evangelists,' 'Job and his Friends,' 'The Lovers of the Canticles,' 'Happiness and Sleep,' 'Christ in the midst of the People,' 'The Fisherman' (from the ballad of Goethe), 'The Golden Age,' and 'The Dispute between Luther and Dr Eck at Leipzig.' H. belongs to the great historic and religious school of German art, whose principal seat is Düsseldorf.

HUC, Evariste Regis, a distinguished missionary and traveller, was born at Toulouse, August 1, 1813. He was educated in his native city, and about his 24th year he entered the missionary congregation of the Lazarist Fathers, and received holy orders at Paris in the year 1839. Almost immediately after his ordination, he joined the missionary expedition of his order to China. After he had spent about three years of missionary life in the northern districts of China, the new apostolic vicariate of Mongolia was founded, and H., in company with a priest of the same congregation, Père Gabet, and a single native Chinese convert, undertook to explore the new district, and to ascertain, for the guidance of the mission, its extent and its missionary capabilities. After a few months' study of the Tartar dialects, they set out from the missionary station, north of the Great Wall, called Si-wang, towards the close of 1844; and after a journey of excessive hardship over the high table-lands of Tartary, they took up their quarters for some months in one of the Lamaseries, or Tartar monasteries. Having here become familiarised in some degree with the Tibetan language, they succeeded in making their way, in January 1846, to H'lassa, the capital of Tibet, and the residence of the Grand Lama; but scarcely had they settled in that city, when an order for their immediate expulsion from the country was obtained from the Lama by the Chinese resident in H'lassa. They were not permitted to choose their own route homewards, but having been put in charge of a Chinese escort, were carried back a journey of nearly 2000 miles to the extreme south, and arrived in October 1846 at Macao, where they were subjected to a tedious trial by the Chinese tribunals. In the end, they were permitted to return to the missionary station of Si-wang, from which they had originally taken their departure. H.'s health having been completely broken down, he sailed from Macao in the beginning of January 1849, and in the autumn of the same year reached his native city of Toulouse. In the following year he returned to Paris, where he published *Souvenirs d'un Voyage dans la Tartarie, le Thibet, et la Chine pendant les Années* 1844—1846 (2 vols. Paris, 1852). This was followed, in 1854, by a similar record of his Chinese experience (*L'Empire Chinois*, 2 vols. 3d edit. 1857); and in 1857 by an elaborate historical work on Christianity in China (*Le Christianisme en Chine*). All these works have been translated into English and most other European languages. The strangeness of some of the incidents recorded in the book on Tibet provoked some degree of incredulity in certain quarters; but Captain Blakiston, a later traveller in the same regions, which have hitherto been almost a *terra incognita* for Europeans, bears unhesitating testimony to the fidelity of Père Huc's narrative and description.

During his latter years, Père Huc, in order to devote himself more freely to his literary occupations, withdrew from the Lazarist congregation. His health, however, never fully recovered from the fatigues of his Tibetan expedition, and he died in Paris March 31, 1860, at the early age of 46.

HU'CKABACK, a very coarse kind of linen-cloth, figured somewhat like damask; it is usually employed for common towelling.

HU'DDERSFIELD, a parliamentary borough and important manufacturing and market town of England, in the West Riding of Yorkshire, is situated in the midst of a fertile district, on an acclivity rising from the left bank of the Colne, 16 miles south-west of Leeds, and about 25 miles north-east of Manchester. It is remarkably regular, is well built and drained, and very healthy. Upon the Holme and the Colne, which unite in the town, numerous mills have been erected for the manufacture of woollen fabrics, and for fulling and washing the goods manufactured. H. stands in the centre of a district rich in coal, and its natural advantages are enhanced through its direct connection with the principal seats of manufacture in the north of England, by means of the London and North-Western, Lancashire and Yorkshire, and Manchester, Sheffield, and Lincolnshire railways. Among its churches, several are noteworthy in an architectural view. It has a proprietary college, now in connection with the London University; a collegiate school, and many other educational institutions; a circular cloth-hall, 2640 feet in circumference, in which a market is held for woollen goods every Tuesday, and for general produce every Saturday; an infirmary; and in the vicinity the Lockwood Spa Baths, where the water is strongly sulphureous. H. is the chief seat in the north of England of what is called the 'fancy trade,' comprising shawls, waistcoatings, flushings, &c., of the most elegant patterns and the finest fabric; it also carries on extensive manufactures of narrow and broad woollen fabrics, kerseymeres, serges, and cords. It is connected by canals with the Mersey and the Humber. The parliamentary borough sends one member to the House of Commons. Pop. (1871) 74,358.

HUDSON, George, English railway director and speculator, was born in 1800, and apprenticed to a linen-draper in the city of York, where he subsequently carried on business for himself. He took an early share in railway speculation, and was appointed chairman of the North Midland Company. His plans of management were carried out, schemes of railway annexation and extension were undertaken, embarrassed lines were relieved, and rivals were subdued. He was elevated into the dictatorship of railway speculation; everything he touched turned into gold; and H. was everywhere known as 'the Railway King.' The shares of the lines with which he consented to become connected went up, and he was said to have made £100,000 in one day. He bought large estates; was three times elected lord mayor of York; was sent to parliament by the electors of Sunderland; and found his acquaintance courted by persons of the highest rank. When the railway mania was at its height, a statue to H. was proposed; and names were put down for £25,000; but before the money could be collected, the popularity of the 'Railway King' was on the wane. His connection with the Eastern Counties Railway led to some exposures. The accounts had been 'cooked;' matters had been 'made pleasant;' and dividends had been paid out of capital. Suspicions were excited in regard to his direction of other companies, shares fell, the bubble burst, the railway monarch was deposed, and encountered nothing but invective from quarters which had pursued him with adulation. Every board-room was closed against him, and his suddenly acquired gains were almost swept away. The constituency of Sunderland, however, continued to elect him as their representative until March 1859. He afterwards resided abroad, in comparatively narrow circumstances, and died Dec. 14, 1871.

HUDSON, Henry, a distinguished navigator. His early history is unknown. He undertook his first voyage for the discovery of a north-east passage in 1607, in a small vessel with ten sailors, but failed in this attempt. In his second voyage in 1608, he reached Nova Zembla. He undertook a third voyage in 1609 from Amsterdam, at the expense of the Dutch East India Company. Giving up all hope of finding a north-east passage, he sailed for Davis' Strait, but came upon the American continent about 44° N. lat., and, steering southwards, discovered the mouth of the river which now bears his name. He sailed upon his last voyage in April 1610, with 23 sailors, and reached Greenland in June. Steering westward, he discovered the strait now known as Hudson's Strait, and passed through it, and entered the great bay, which has received the name of Hudson's Bay. Although very insufficiently supplied with provisions, he adopted the resolution of wintering in these desolate regions, in order to prosecute his discoveries further in the following spring. He proceeded to carry this design into execution, but his provisions became so much exhausted, that he was under the necessity of returning. An incautious utterance of his opinion, that in the destitute condition to which he was reduced, he would be obliged to leave some of his people behind, led to his death. The sailors mutinied, and placed him, with his son and some others who adhered to him, in a small boat, at the mercy of the waves and of the savages. His fate was revealed by one of the conspirators. An expedition was sent from England in quest of him, but no trace of him or of his companions in misfortune was ever discovered.

HUDSON, Sir James, G.C.B., diplomatist, is the son of a Yorkshire gentleman, and was born in London in 1810. He was educated at Rugby and Westminster, and subsequently studied at Paris and Rome. He was made private secretary to William IV.; and after the king's death, entered the diplomatic service, and became Secretary of Legation at Washington in 1838, at the Hague in 1843, and at Rio de Janeiro in 1845. In 1850, he was appointed minister at Rio, but was transferred to Florence in 1851, and to Turin, January 1852. His counsels exercised great influence over the Sardinian government; and the conclusion of a commercial treaty between that country and England, the accession of Sardinia to the treaty of alliance between England and France against Russia, and the despatch of a Sardinian army to the Crimea, were services which procured for him the dignity of K.C.B. The long train of stirring events that resulted in the united and independent kingdom of Italy, demanded the watchful vigilance, and sometimes the active interference, of the British minister at the court of Turin. H. never forgot that he was the minister and representative of a constitutional government, which sympathised with the aspirations of the Italians for national independence, and which had therefore the privilege to warn and counsel as well as to animate. He retired from Turin in 1863. His diplomatic course has not escaped the animadversion of the partisans of things as they were; but it has commanded the approbation of the vast majority of his countrymen.

HUDSON, a city of New York, United States, America, on the east bank of the Hudson River, one hundred and sixteen miles north of New York, and twenty-nine miles south of Albany. It is a beautifully situated and well-built city, is a port of entry, and formerly had a large amount of shipping engaged in foreign trade and the whale-fisheries. It is now chiefly engaged in manufactures of iron and clothing, and in the export of agricultural staples. It has a fine court-house, eleven churches, public library, orphan asylum, and three newspaper-offices. Pop. (1870) 8615.

HUDSON, a river in New York, United States, America, and one of the most beautiful and important in America. It rises in the Adirondac mountains, 4000 feet above the level of the sea, and its head-streams are the outlets of many mountain lakes, in the north-eastern portion of the state. At Glenn's Falls, it has a fall of 50 feet, and soon after, taking a southerly course, runs nearly in a straight line to its mouth, at New York city. At Troy, 151 miles from its mouth, it is affected by the tide, and becomes a broad deep river, having a width of from 300 to 700 yards, and deep enough for the largest river steam-boats, and for ships to Hudson, 116 miles. At Newburg, 61 miles from New York, the river enters the highlands, which rise abruptly from the water to the height of 1200—1600 feet. Here the scenery is of great beauty and grandeur, and is admired by all travellers. Several of the heights are crowned with the ruins of fortifications, built to prevent the passage of British ships in the War of Independence. Here was the scene of Arnold's treason, and the sad fate of Major André. Emerging from the highlands, the river widens into a broad expanse called the Tappan Zee. Below, on the west bank, on the New Jersey shore, rises an almost straight and perpendicular wall of trap rock, from the river's brink, to a height of 300 to 500 feet, called the Pallisades, extending 15 miles to the upper portion of the city of New York. The river is here from one to two miles wide, and here it falls into New York Bay. Its whole length is about 300 miles, and its principal tributaries are the Hoosic, Mohawk, Walkill, and Croton. The steam-boats which ply on the H. are among the finest and fastest in the world. Some are more than 400 feet long, are fitted up with great luxury, and attain a speed of 23 to 24 miles an hour. The Hudson River Railway runs along the margin of the river on the east bank, to Albany. By this river, and the Erie Canal, and several railways, New York is connected with the great lakes and the west. The river is named from the English navigator who discovered it, 1609. The first successful experiment in steam-boat navigation was made on this river by Robert Fulton in 1807.

HUDSON'S BAY, a spacious gulf in the north-east section of the American continent, may be regarded as an arm at once of the Arctic Sea and of the Atlantic Ocean. With the Atlantic Ocean it communicates by means of a strait, which, besides being solidly bridged for about ten months of the year, is beset, even during its brief period of navigation, by detached floes and bergs of ice. The eastern portion of this outlet is broken up into two branches, offsets of Davis' Strait, the more northerly bearing the name of Frobisher, and the more southerly that of Hudson. It is fully 400 miles long, and averages at least 100 miles in width. With the Arctic Sea, again, H. B. is connected by channels, which, notwithstanding the comparative lowness of their latitude, have proved far less practicable than the Arctic Sea itself, never having been navigated throughout; but it is only within these twenty-five years that this hopeless result has been definitively accepted by the world.

H. B., taken in its narrowest sense, extends in N. lat. from 51° to 62½°, and in W. long. from 76½° to 95°. When compared with the corresponding regions on the eastern side of the Atlantic, the shores of H. B. possess a singularly inhospitable climate. At York Factory, lying nearly in the latitude of Aberdeen, the finest weather of summer is liable to a wintry temperature through a mere change of wind; and the most southerly extremity of the gulf is beset for months by snow at the very season when the Faroe Islands, stretching as far north as the parallel of its opposite end, yield available pasture to sheep and cattle.

Though H. B. is not particularly remarkable for the extent of its drainage, yet towards the south and west its basin meets at once the waters of the St Lawrence, the Mississippi, the Columbia, and the Mackenzie. Its largest feeder, the Nelson, fills perhaps a full half of the area, touching the Rocky Mountains on the west, embracing Rainy Lake on the east, and considerably overlapping the international boundary on the south.

HUDSON'S BAY COMPANY, a corporation erected, in 1670, by Charles II., primarily consisted of Prince Rupert, the king's cousin, and certain specified associates. It was invested with the absolute proprietorship, subordinate sovereignty, and exclusive traffic of an undefined territory, which, under the name of Rupert's Land, comprised all the regions discovered, or to be discovered, within the entrance of Hudson's Strait. Rupert's Land was decidedly the most extensive of the dependencies of England, being held to embrace all the lands that poured water into Hudson's Bay or Hudson's Strait. For more than a century, however, the grantees confined themselves to the coast. About the period of the formation of the American republic, their advance into the interior was accelerated, if not occasioned, by the more mature development of an ancient rivalry. From about the middle of the 17th c.—an epoch antecedent to the charter—New France, besides stretching, in name, to the arctic circle, had, in reality, advanced to the shores of Hudson's Bay; and this position of affairs was virtually recognised by that provision of the letters-patent, which exempted from their operation any actual possessions of any Christian prince or state. Though the claims of France, after being confirmed in 1697 by the treaty of Ryswick, were at last abandoned in 1713 by the treaty of Utrecht, yet, in point of fact, adventurers from the great lakes, while Canada was still French, had penetrated, in quest of peltry, far up the Saskatchewan towards the Rocky Mountains. Such overland enterprises—interrupted, for a few years, by the conquest and cession of 1759—1763

—soon came to be prosecuted, with more systematic energy, under English auspices, till, in 1783, they led to the formation of the North-west Company of Montreal. After an age of stubborn competition, the Hudson's Bay Company coalesced, in 1821, with its formidable opponent.

But the two members of the new partnership had already almost doubled the original field of contention. The older association had, about 1770, traversed the basin of the Coppermine; and, fully twenty years later, the younger one had descended the Mackenzie to the Arctic Sea, and had, through the barrier of the Rocky Mountains, reached the Pacific Ocean. Even in general equity, a body, which now represented all the discoverers, had a peculiar right to the discoveries themselves; but beyond general equity, a secondary provision of the letters-patent of Charles II. had regarded such discoveries, at least for the purposes of trade, as accretions to the primary grant. Accordingly, when, in 1821, parliament, in view of the intolerable evils of competition, empowered the crown to issue licences for the 'Indian Territories'—expressly declared to be all the wildernesses of British North America to the west of Rupert's Land—the government exercised this statutory authority in favour of the Hudson's Bay Company, as recast and extended by the coalition. So far as commerce was concerned, there was now no practical difference between Rupert's Land and the Indian Territories, excepting that the charter of the former was perpetual, and the licence of the latter was to be for 20 years at a time; and thus the newly-modified association virtually ruled the western world, through 75° of long., from Davis' Strait to Mount St Elias, and, through 28° of lat., from the mouth of the Mackenzie to the borders of California.

About twenty years after the coalition, Oregon from the borders of California to the parallel of 49° N., which had always been open to Americans by international arrangement, was given up to the United States by the same treaty which sacrificed sections of Canada and New Brunswick; in 1859, the rest of the tramontane tract was brought within the pale of civilisation as the national colonies of Vancouver's Island and British Columbia; and lastly, as the second term of the licence was, in 1859, also permitted to expire without renewal, the remainder of the 'Indian Territories' was then potentially thrown back into the condition from which the statute of 1821 had seen fit to rescue it. —In all these cases, excepting, of course, the case of Oregon, the Hudson's Bay Company would appear to have lost rather formal privilege than actual influence, retaining, if not a legal monopoly as of old, at least a commercial supremacy on a wider basis.

Though the withholding of the licence neither affected, nor professed to affect Rupert's Land, yet between it and the remaining portion of the Indian Territories the difference, so far as Hudson's Bay Company was concerned, was little more than nominal; and in 1869 the company made a formal cession to the British government of whatever territorial claims remained, receiving an indemnity of £300,000 from the Dominion of Canada, to which the whole territories were forthwith annexed. So far as the Indians are concerned, the ultimate results of the system of competition thus sanctioned are fairly open to question. The methods adopted by speculators to secure native co-operation have long been condemned—especially that free supply of whisky which has had such a degrading effect upon them. This the company never betook themselves to. Besides, the company neither extirpated nor expatriated the tribes. Their great influence for good over the half-breeds also is not to be forgotten. The natives are held in higher esteem than these descendants of mixed blood, who are looked down upon by both the white folk and the aborigines. This matter of feeling, however, has not prevented the half-breeds enjoying the same rights and privileges as their white neighbours. In fact, they have been elevated under the influence and care of the H. B. C., to a higher degree of civilisation than the same class has elsewhere attained. The company were, while holding territorial authority, strong enough to prevent any encroachments on their lands. Occasionally a few speculators and their emissaries would attempt a settlement, but they found it useless to try to compete with their formidable rival. Now these competitors are free to put forth all their energies, or to fritter them away; and in such a life many will lose all relish for steady occupation, will operate as much against each other as against the company, reduce the rate of profit, and, in the absence of all permanent interest, exhaust both the hunters and the game.

Formerly there were but few immigrants into the Hudson's Bay territory. Most of the settlers were either retired servants of the company or their offspring. The few immigrants in pursuit of agricultural enterprise were sent to Rupert's Land at the expense of others, such as the Earl of Selkirk (see RED RIVER SETTLEMENT), or the company itself. But since the annexation of the territory to Canada, and the formation of the province of Manitoba, there has been an influx of immigrants into the land; and this influx will become broader and deeper, for a finer grain-growing country than that to the north-west of Lake Superior does not lie under the sun. The loss of territorial control has not in the least affected the H. B. C. as a trading community. Its organisation is still complete. Its shares or parts are indeed now quoted on the stock exchanges, an arrangement quite recently come to, but this only means that a wider public may enjoy its benefits than was formerly allowed under a very close corporation. It has still its offices, its outlets for young energy to risk itself 'over flood and fell;' but, best of all, very large dividends. As a single part, between one year and another, ranges from about £300 to about £500, the total revenue may easily be found to vary from about £63,750 to about £106,250—averaging perhaps about £80,000, so as to yield about £48,000 to the proprietors, and about £32,000 to the wintering partners. This income arises almost entirely from furs; for other articles, such as tallow, oil, feathers, fish, timber, &c., have never been of much account. The working organisation of the company is as follows: A young man commences with the rank of apprentice-clerk, or apprentice-postmaster. These postmasters are those in charge of the various posts which have been from time to time erected around the central one, at distances varying from about 200 to 500 miles. Such settlements are supplied with goods in accordance with the amount of trade likely to be done. In the fall of the year the Indians collect and get what is called 'debt' proportionately with their known qualifications as hunters. They then depart to their hunting-grounds, and are visited at various periods during the winter by the servants of the company (generally half-breeds), who bring back with them any peltries (or furs) that may be on hand. These, in turn, are made into packs and transmitted, in spring, by canoes to the central post, and from thence are transmitted either to England or Canada, as the case may be. These skins are given to the traders in repayment of the 'debt' paid to the Indians.

For further particulars, see Fitzgerald's *Examination* *of the Charter and Proceedings of the Hudson's Bay Company,* and Montgomery Martin's *Hudson's Bay Company's Territories, and Vancouver's Island,* both published in 1849—perhaps the leading works on opposite sides of a much vexed controversy.

HUÉ, the capital of Cochin China, or, more properly speaking, Annam, in the gulf of Tonquin, in the prefecture of Thua Thuan, 16° 30′ N. lat., 107° 12′ E. long., 10 miles from the mouth of the Hue River. It is built almost in the European style. Under the reign of King Cia-lung (1801—1820), it was strongly fortified by French officers, to whom, with a French bishop, that monarch was indebted for his throne. It is accessible only to vessels of the smallest class, owing to the shallowness of the small river on which it is situated. Pop. variously estimated at from 30,000 to 100,000.

HUE AND CRY, a phrase used in English law to describe the body of persons joining in the pursuit of a felon. Whoever arrests the person pursued is so far protected, that he requires no warrant to justify the arrest; and even if the party turn out to be no felon, no action can be brought if the arrest was *bonâ fide.* But it is not only a ground of action, but an offence subject to fine and imprisonment, to maliciously and wantonly raise the hue and cry against a person. It is the duty of all persons to join in a hue and cry, and if a person who has been robbed, or knows of a robbery, fail to raise the hue and cry, he is liable to fine or imprisonment, or, according to some authors, to indictment; but these punishments are never inflicted.

HUE'LVA, a maritime and trading town in the south of Spain, capital of the modern province of the same name, which was formed out of a portion of the ancient kingdom of Seville (q. v.), is situated at the confluence of the Odiel and the Tinto, 63 miles west-south-west of Seville. The town is in constant communication with Portugal, Cadiz, and Seville; sends great quantities of fruit and floor-mattings to the latter places, and carries on an extensive tunny-fishery. The remains of the Roman aqueduct, which for many years has served as a quarry for the rude and ignorant inhabitants of the vicinity, are now fast disappearing. Pop. 7500.

HUERTA, Vicente Garcia de la, a Spanish poet and critic of the 18th c., was born in 1729 at Zafra, in Estremadura, but spent the greater part of his life in Madrid, where he held the office of principal librarian of the Royal Library, and where he died on 12th March 1797. He early distinguished himself by his poetic talent. His tragedy of *Raquel*, founded upon the story of the love of King Alfonso VIII. for the fair Jewess Rachel, and its tragical catastrophe, was received with great enthusiasm when first produced in 1778, and is to this day esteemed as one of the very best of modern Spanish tragedies. H. was a most zealous but not always a wise or skilful defender of the ancient Spanish national taste against the Gallicism which then prevailed. As a lyric and dramatic poet, he shews great command of language and versification. His poems were published in two volumes (*Obras Poeticas*, Madrid, 1778—1779). H. edited the *Teatro Español* (17 vols. Madrid, 1785—1786), a collection of the best works of the older Spanish dramatists.

HUE'SCA (the *Osca* of the Romans), a very old and picturesque town of Spain, capital of the modern province of the same name (see Aragon), is surrounded by old walls once surmounted by 99 towers, two of which only remain, and is situated in the midst of a plain covered with vineyards, on the right bank of the Isuela, 50 miles north-east of Zaragosa. Among its chief buildings are the cathedral, built in 1400, a beautiful Gothic edifice; the university, founded in 1354 by Pedro IV.; and the picturesque college of Santiago. It was once famous as a seat of learning. Tanning and manufactures of linens are here carried on to some extent. Pop. 10,068.

HUE'SCAR, a small town of Spain, in the province of Granada, is situated 75 miles north-east of the city of that name, and is said to contain a population of about 6000, who are chiefly employed in the manufacture of linen and woollen goods.

HUET, Peter Daniel, was born at Caen, February 8, 1630. His father had been converted from Calvinism, but died while H. was still very young. The latter was educated in the Jesuit school of Caen, and was early distinguished by his extraordinary progress in almost every department of learning. He was a zealous pupil of Descartes and of Bochart—the latter of whom he accompanied on his visit to Stockholm in 1652, when he discovered and transcribed the MS. of Origen, which, subsequently, was the basis of his celebrated edition of that father. On his return to Caen, he gave himself up entirely to study; and as a preliminary to his translation of the text of Origen, he published, in 1664, his well-known essay *De Interpretatione;* but it was only at the end of 15 years' study that he published his edition of Origen's *Commentaria in Sac. Scripturam*, 2 vols. fol. (Rouen, 1668), with a most learned introduction, entitled *Origeniana*, which has since been reprinted in the great Benedictine edition of that father. In 1670, H. received the degree of Doctor of Law; and soon after, he was summoned to Paris, to take part, with Bossuet, in the education of the dauphin. In 1679, he published his *Demonstratio Evangelica.* He had an active part, moreover, in the Delphin edition of the classics. In 1676, he entered into holy orders; and in 1678, was named abbot of the Cistercian abbey of Aunay, from which place is named his well-known work, *Quæstiones Alnetanæ de Concordia Rationis et Fidei* (1690). About the same time, also, he published a work *On the Site of the Terrestrial Paradise*, another *On the Voyages of Solomon*, which were followed later by his equally celebrated work in classical geography, *History of the Commerce and Navigation of the Ancients.* In 1685, he was named Bishop of Soissons, a dignity, however, on which he never entered, being transferred to the see of Avranches in 1692. He was as zealous in the discharge of his episcopal duties as he had been in his devotion to literature; but his health having given way, he obtained permission to resign his see in 1699, and retired to the abbey of Fontenay, near Caen; but, in 1701, he took up his residence in the Jesuits' house in Paris, and published, in 1717, his autobiographical memoirs—a model of pure Latinity as well as a most interesting record of the history of his time. H. died in 1721. His works were published in a collected form in 1712, and a volume of *Huetiana* appeared in 1722.

HUFELAND, Christopher. See Supp., Vol. X.

HUG, John Leonhard, was born at Constance, June 1, 1765, studied at Freiburg, and in 1789 entered into priest's orders. In 1791, he was appointed professor of Oriental languages, and of the Old Testament, to which was added, in 1792, the professorship of the New Testament also. These united professorships H. continued to hold uninterruptedly for upwards of half a century, with the exception of some brief occasional visits to the great libraries of Munich, Vienna, Paris, Milan, Rome, and Naples. The most important fruit of his biblical researches was his *Introduction to the New Testament*, which appeared in 1808, in 2 vols., and which, besides several German editions, has been translated into most of the European languages. His great eminence as a biblical scholar led to his being called on to take part in the arrangement of the newly organised studies of most of the German universities—as at Breslau, in 1811; at Bonn, in 1816; at Tübingen, in 1817; and again at Bonn, in 1818 and 1831. He died 11th March 1846. His works, which are indifferently in Latin and German, are chiefly in the department of biblical criticism, as *On the Age of the Vatican MS.* (1810), *On the Canticle of Canticles* (1813, and again 1818), *On the Indissolubility of Marriage* (1816), *On the Alexandrian Version* (1818), *Re-examination of Strauss's Life of Jesus*, 2 vols. (1835); but there are also some on subjects of classical criticism, especially an interesting work on the ancient mythologies (1812). See Maier's *Gedächtnissrede auf Hug* (1847).

HUGHES, THOMAS. See SUPP., Vol. X.

HUGO, VICTOR MARIE, VICOMTE, one of the most distinguished French writers of the present day, was born, 26th February 1802, at Besançon, where his father was then commandant of the garrison. His mother was a native of La Vendée, and from her he imbibed romantic royalist sentiments, although his father was a most devoted follower of Napoleon. His youth was spent partly with his mother in Paris, partly in Italy and Spain, where his father held high appointments. He early acquired distinction by his poetic effusions; and before he was 30 years of age, his published works were numerous, and his name famous. Odes and ballads, romances, dramas, &c., flowed from his prolific pen. Shortly before the revolution of 1830, a literary revolution took place, at the head of which was Hugo. A band of young men, imaginative, ardent, and confident, sought to renovate French literature, by departing from classic rules and models, substituting a varied and very irregular verse for the monotonous Alexandrines of the old school, and making art precisely conform to nature, which they carried so far as even to bring into prominence things disagreeable, which nature herself is displeased with, and teaches us to keep out of sight. The new school, *la jeune France*, as they called themselves, formed the *Romanticists*, and their opponents, the Classicists. The literary war lasted several years. H.'s drama of *Marion Delorme* was received with enthusiasm; and he added to his reputation by the publication of *Feuilles d'Automne*. In 1832, the ministry suspended one of his dramas, *Le Roi s'amuse;* but his popularity continued to increase, and in 1837 Louis Philippe made him an officer of the Legion of Honour, and in 1845 a peer of France. After the revolution of 1848, he was elected to represent Paris, both in the Constituent and in the Legislative Assembly, in which he manifested Democratic principles, and was one of the members of the extreme left who were banished from France for life by Louis Napoleon. He went to reside in the island of Jersey. In 1852, he assailed the ruler of France in a political pamphlet, *Napoleon le Petit;* and next year, in *Les Châtiments*, a series of poems written with great *verve*, in the same spirit. In 1856, he published his *Contemplations*. He refused to avail himself of the amnesty of August 15, 1859; but on the fall of the empire, hastened back to his native country, joined in the republican movement, and was returned to the National Assembly at Bordeaux, which, however, he soon quitted in disgust. He then went to Brussels, but the Belgian government expelled him from the country, and he had to seek refuge in Vianden, a village of Luxemburg, where *L'Année Terrible* was composed. Returning to Paris in July 1871, he pleaded earnestly, but without effect, for the lives of the Communists. H. has given an account of his life in *Actes et Paroles*, 1870—1872. 1862 witnessed the publication of *Les Misérables*, a prose romance treating of social questions; *L'Homme qui Rit*, appeared in 1869; *Quatrevingt-treize in* 1874. A collection of his *Speeches* was published in 1875. H.'s writings are often extravagant both in form and substance, and sometimes marred by an affected triviality of images and harshness of versification. Yet they have also great excellences, the command of language shewn is wonderful, and as a lyric poet H. has, perhaps, never been equalled in France.

HU'GUENOTS (probably corrupted from the Ger. *eidgenossen*, confederates), the name formerly given in France to the adherents of the Reformation. This movement commenced almost simultaneously in France and Germany. One of the most eminent names in the early history of French Protestantism is that of Farel (q. v.), and one of the first supporters of its cause was Margaret of Valois, queen of Navarre, the sister of Francis I. Subsequently, in the time of Calvin, many of the nobles and middle classes embraced the reformed religion. Francis I., however, opposed it with great severity, and caused many to be burned as heretics. The alliance of Henry II. with the German Protestants gave at first an impulse to the cause of the Reformation, but the aspect of things was again changed when the family of Guise obtained the ascendency at court. Under Francis II., a chamber (*chambre ardente*) was established in each parliament for the punishment of Protestants; and executions, confiscations, and banishments were common in all parts of the kingdom. The Protestants took up arms against the government, choosing Louis I., Prince of Bourbon-Condé, for their leader. On February 1, 1560, in a meeting at Nantes, they resolved to petition the king for freedom of religion, and for the removal of the Guises; and in the event of his refusal, to seize the king's person, and proclaim Condé governor-general of the kingdom. But the court, being apprised of the conspiracy, fled from Blois to Amboise, and the Duke of Guise was appointed governor-general. Some bands of Protestants, approaching Amboise with weapons in their hands, were easily defeated and taken; 1200 died by the hand of the executioner. The Edict of Romorantin, in May 1560, took the prosecution of heretics out of the hands of the parliament, and gave it into those of the bishops. By the Assembly of Notables in August, it was resolved that the whole matter of religion should rest until the next Assembly of the States. Whilst the Guises plotted the death of the Protestant leaders, Charles IX. ascended the throne, a prince not yet of age; and the queen-mother, Catharine de' Medici (q. v.), having removed the Guises from the helm of the state, was compelled to seek the support of the Protestants against them and their party. In July 1561, appeared an edict which freed the H. from the penalty of death. For the complete termination of strife, the court opened a religious conference at Poissy on the 3d of September. The chief disputants were the Cardinal of Lorraine on the one side, and Theodore Beza (q. v.) on the other. The effect of the discussion was to unite and embolden the Protestants, with whom the machinations of the Guises forced Catharine into closer alliance. On January 17, 1562, appeared an edict, giving noblemen the right of the free exercise of their religion on their own estates.

The Guises and their partisans became exasperated. On March 1, 1562, a company of Protestants met in a barn at Vassy for religious exercises, was attacked, and many of them were massacred by the followers of the Duke of Guise. On this, Condé hastened to Orleans, and called his co-religionists again to his standard; whilst the Guises took possession of the persons of the king and his mother, and proclaimed the Protestants rebels. On September 11, 1562, the royal troops, after much bloodshed, took Rouen, and on December 19 a battle was fought at Dreux, in which, after a hard struggle, the Protestants were defeated. The Duke of Guise marched on Orleans, but was assassinated in his camp before that city, February 18, 1563. Hereupon the queen-mother hastened to conclude the peace of Amboise on March 19, by which the Protestants were allowed the free exercise of their religion, except in certain districts and towns. Catharine, however, hated the new faith, and formed a close alliance with the Spaniards for the extirpation of heresy, retrenched the new liberties of the Protestants, and made attempts upon the liberty and the life of Condé and of the Admiral Coligny (q. v.). These leaders of the Protestant party adopted the resolution of taking possession of the king's person. The court fled to Paris, which Condé invested; but on 10th November 1567, a battle was fought at St Denis between Condé and a much superior force under the Constable Montmorency (q. v.), in consequence of which Condé fell back into Lorraine, where he effected a junction with an auxiliary force of 10,000 men from Germany, under Prince John Casimir. After this, he again threatened Paris; upon which Catharine concluded peace at Longjumeau on 27th March 1568, re-establishing the terms of the treaty of Amboise. Nevertheless, she proceeded to persecute the Protestants, of whom 3000 were assassinated or executed. The Protestants having, however, received assistance in troops from Germany, and in money and artillery from England, began the third religious war. But on March 13, 1569, they were defeated, and Condé their leader slain, at Jarnac by the royal troops under the Duke of Anjou, afterwards Henry III. These misfortunes greatly dispirited the Protestants. Jeanne d'Albret, queen of Navarre, endeavoured to reanimate them in an assembly at Cognac, and set up her son, afterwards Henry IV., as the head of the Protestant cause. Coligny became their military leader, and having received further assistance of troops from Germany, he laid siege to Poitiers, but was again defeated by the Duke of Anjou at Moncontour, on 3d October. Fresh reinforcements from England, Switzerland, and Germany, enabled Coligny to take Nîmes in 1569, and to relieve Rochelle, whilst Lanoue obtained a victory over the royal troops at Luçon. Catharine and her son now sought for peace, to which the Protestants, weary of the hard contest, consented. The treaty, concluded at St Germain-en-Laye on August 8, 1570, gave to the Protestants an amnesty, the free exercise of their religion everywhere except in Paris, and the possession of a number of places of security.

Catharine, having failed to overthrow the Protestant cause in the open field, sought to accomplish her object by treachery, and by a general massacre of Protestants on St Bartholomew's Day (q. v.) 1572. Although deprived of their leaders, and weakened by the slaughter of great numbers of their best and bravest, the Protestants flew to arms. The Duke of Anjou, after having lost his army before Rochelle, took advantage of his election to the throne of Poland, and on June 24, 1573, concluded a peace, by which the Protestants obtained the free exercise of their religion in their places of security, Montauban, Nîmes, and Rochelle, and a certain concession of liberty of conscience. A section of the Roman Catholic nobility, at whose head was the Duke of Alençon, the youngest son of Catharine, from purely political motives, united with the Protestants in opposition to the government of the queen-mother and the Guises. Catharine, therefore, incited her third son, Henry III., who had now succeeded to the throne, immediately to recommence hostilities against the Protestants. But, contrary to all expectation, the Protestant cause was in the highest degree prosperous during the year 1575. A peace was concluded at Beaulieu on 8th May, by which the Protestants were freed from all restrictions in the exercise of their religion, and obtained a number of places of security. The king also paid their German auxiliaries. The Duke of Guise, thus frustrated in his political designs, originated a Catholic association, called the Holy League, at the head of which the king put himself in the Assembly of the States at Blois, on November 6, 1576, and then the sixth religious war began. Peace was, however, again concluded by the king himself at Bergerac, in September 1577, on the former conditions; and Catharine, to diminish the power of the Duke of Guise, entered into a private treaty with Henry of Navarre at Nerac, by which several places of security were made over to the Protestants. The terms of peace being violated by the court, Henry I., Prince of Condé, son of Louis I., and, like his father, a leader of the Protestant party, commenced the seventh religious war (called the *guerre des amoureux*) in November 1579, by the occupation of Lafère, and Henry of Navarre, in April 1580, took Cahors. But Condé, having been driven out of Lafère by Matignon, and Henry of Navarre vanquished at Mont-Crabel by Biron, peace was concluded at Fleix, November 1580.

There was now a comparatively long interval of repose till 1584, when, by the death of the Duke of Anjou (formerly of Alençon), Henry of Navarre became heir to the throne of France. Hereupon Henry, Duke of Guise, exerted himself for the revival of the League, entered into an alliance with Spain and the pope for the extirpation of heresy, declared the Cardinal of Bourbon heir to the throne, and began hostilities against the Protestants. This war is commonly known as the 'war of the three Henries.' The king soon made terms with him, and declared all the privileges of the Protestants to be forfeited. The Protestants, having obtained troops from Germany and money from England, entered on the eighth religious war, which was prosecuted with various success, Henry of Navarre commanding the Protestant army. The Duke of Guise, in the midst of these troubles, grasped the whole power of the state. But his designs with regard to the throne having become very evident, the king caused him and his brother the cardinal to be assassinated at the Assembly of the States at Blois in September 1588. In less than a year, the king was himself assassinated by a monk named Jacques Clement, and Henry of Navarre succeeded to the throne, and signed the famous Edict of Nantes (see Nantes), on 13th April 1598, by which the rights of the Protestants were established and enlarged.

Under the reign of Henry IV., whose great minister, Sully, was himself a Protestant, the Protestants lived in tranquillity. But when, during the minority of Louis XIII., Mary de' Medici, the queen of Henry IV., assumed the reins of government, the independence which the Protestants enjoyed stood too plainly in the way of a court bent upon absolutism. The king, indeed, took an oath in 1614 to maintain the Edict of Nantes, but the marriage treaties with the Spanish court excited the apprehensions of the Protestants to such a degree that, in November 1615, they made common cause with the Prince of Condé, who had then set up the standard of rebellion. This they did contrary to the advice of the most sagacious of their own party. Although by the treaty of Loudun, 4th May 1616, they obtained a new confirmation of their freedom of worship, the court now only waited for an opportunity of breaking at least their political power. In June 1617, a royal edict commanded the entire suppression at once of the Protestant Church, and of political privileges, in the province of Béarn; but the provincial court at Pau refused to register the edict, and the matter lay over till 1620, when, at the instigation of the Jesuits, and of his favourite De Luynes, the king carried the edict into full effect by force of arms. The Protestants throughout all France took alarm, and hostilities again broke out in May 1621. At the head of the Protestants were the two brothers, the Duke of Rohan and the Prince Soubise. Their cause, however, was feebly maintained; almost all the Protestant towns fell into the hands of the king, force, stratagem, and bribery being equally employed. At last, after the capitulation of Montpellier, 21st October 1622, there followed a general peace, by which the Edict of Nantes was confirmed, but the right of prohibiting the assemblies of the Protestants was assumed on the part of the crown. The court, however, paid little attention to the stipulations of the treaty, and when the government was involved in difficulties in Italy, the Protestants took the opportunity again to rise in arms. Soubise, with a fleet furnished by the town of Rochelle, oftener than once defeated the weak royal navy. Cardinal Richelieu (q. v.), who was now at the helm of affairs, found himself under the necessity of making offers of pacification, which were rejected. Hereupon the cardinal resolved upon the capture of Rochelle, the most important stronghold of the Protestants. This he accomplished after a heroic resistance by the inhabitants. The fall of Rochelle was speedily followed by that of Nîmes, Montauban, Castres, and all the other Protestant strongholds. Now left defenceless, the Protestants were entirely dependent on the will of the court, which, however, made no attempt to deprive them of their liberty of conscience. It was Louis XIV., when he became superstitious in his old age, who, at the instigation of Madame de Maintenon and his confessor Lachaise, commenced anew the persecution of the Protestants. He gradually deprived them of their equal civil rights, and endeavoured to put down the Protestant Church altogether. Bodies of troops, accompanied by monks, passed through the southern provinces, compelling the inhabitants to renounce their religion, demolishing the places of worship, and putting to death the preachers. Hundreds of thousands of Protestants fled to Switzerland, the Netherlands, England, and Germany. In vain was it attempted to restrain this self-expatriation by cordons along the borders. Many Protestants also made an insincere profession of Roman Catholicism. These, on the slightest appearance of relapse, were put to death. On 23d October 1685, Louis at last revoked the Edict of Nantes. (See Rulhière, *Eclaircissements Historiques sur les Causes de la Révocation de l'édit de Nantes*, 2 vols. Paris, 1788.) Hereupon began a new flight, followed by a still more fearful persecution of the Protestants. Their marriages were declared null; their children deprived of the right of inheritance, and forcibly shut up in convents; their preachers indiscriminately put to death. From the vicinity of Nîmes, where they had always been very numerous, thousands betook themselves to the mountains of the Cevennes, and continued the exercise of their religion in secret. Amongst these and the mountaineers of the Cevennes, a remarkable fanatical enthusiasm displayed itself, and, under the name of Camisards, they maintained for a number of years a wonderfully successful opposition to the forces of the great monarchy. The *War of the Cevennes* (q. v.), or *Camisard War*, was not terminated till 1706, the suppression of the local rebellion being attended with circumstances of great cruelty. France had lost by this time more than a million of her most active, enterprising, and industrious citizens; and, notwithstanding all the persecutions, about two millions continued to adhere to the Protestant religion.

The partial repose which the Protestants enjoyed for more than ten years was attended by a revival of their worship, especially in Provence and Dauphiné. In 1724, therefore, Louis XV., at the instigation of the Jesuits, issued a severe edict against them. The spirit of the age, however, now began to be opposed to persecution. An edict of 1752 declared marriages and baptisms by Protestant ministers to be null, and required the repetition of them by the Roman Catholic clergy. But when, upon this, many began again to flee from their country, the disgust of the Roman Catholics themselves was so much excited, that the court recalled the edict. Montesquieu successfully advocated the cause of toleration; Voltaire did much to promote it by his exposure of the judicial murder of John Calas (q. v.). At last, by an edict in 1787, which indeed was not registered by the parliament till 1789, Louis XVI. declared the Protestant marriages and baptisms to be valid, and restored to the Protestants equal civil rights, except that they might not be advanced to public offices and dignities. Even in 1789, a proposal for the complete emancipation of the Protestants was rejected by the National Assembly, which, however, admitted Protestants, and even Protestant preachers as members without objection; and in 1790, it passed a decree for the restitution of all the properties of non-Catholics confiscated since the time of Louis XIV. The *Code Napoleon* gave Protestants in France equal civil and political rights with Roman Catholics. The charter granted by the Bourbons acknowledged the freedom of Protestant worship, and the state pledged itself for the maintenance of the pastors; yet, under the government of the Restoration, the privileges of Protestants were in many ways circumscribed. After the revolution of July 1830, the Reformed Charter of France proclaimed universal freedom of conscience and of worship, which principle has been maintained in subsequent changes. Protestants are not now subjected to many exceptional hardships, and have in various important instances been protected by the imperial authority from the arbitrary exercise of power attempted by illiberal local magistrates adverse to their religion. But the *recognised* Protestant Church—in which are included both *Reformed* and *Lutherans*, and of which the pastors receive small salaries from the state (see FRANCE)—is not permitted to hold synods or general assemblies; its affairs being managed by local *consistories*, somewhat analogous to kirk-sessions and presbyteries in Presbyterian churches, but of which by law those members of the congregation are members who pay the highest amount of taxes.

HUILE DE CADE, a brownish, inflammable, oily liquid, obtained by the dry distillation of the wood of *Juniperus Oxycedrus*. It has a strong odour of tar, and an acrid, caustic taste. It is almost entirely manufactured in France, and hence its name. It is employed externally in veterinary medicine, and has been used in the human subject both externally and internally, but chiefly externally in chronic skin-diseases. It is a good local remedy in toothache. It has been given internally in worms, but is a dangerous and uncertain remedy.

HU'LDA, or **HOLDA**, 'the friendly, the benignant,' well known in old German legends and traditions as *Frau Holle*, was originally a goddess of marriage and fecundity. Worshipped and invoked by maids and wives, to the former, she sent bridegrooms, to the latter, children; great numbers of whom surrounded her in her favourite haunts in the depths of the sea, or the hearts of hills. She was also the patroness of agriculture and domestic life, with its manifold employments. Sometimes she was regarded as a celestial being, and long ago the people used to say when the snow fell: 'Hulda is making her bed.'

HULK, a name given to any old ship unfit for sea-service, which is used in harbour as a depôt of some sort. In the great naval harbours, there are coal-hulks, powder-hulks, convict-hulks, and hulks to which the crews of vessels repairing are turned over.

HULL. The hull of a ship is her main body, exclusive of masts or rigging.

HULL, or **KINGSTON-ON-HULL**, an important and flourishing English river-port, a parliamentary and municipal borough and county of itself, is situated in the East Riding of Yorkshire, in a low, level plain on the northern bank of the Humber, at the confluence of the Hull with that river, 53 miles east-south-east of York. Of the ecclesiastical edifices, the most notable are the Church of the Holy Trinity, a beautiful and ornate Gothic structure, the transept of which is the oldest English brick-building in the country; and St Mary's Church, Lowgate, one half of which was removed to make room for the mansion-house of Henry VIII., who occasionally resided here. The most important educational establishments are the Hull Grammar-school, and Trinity House School, where 36 boys receive a nautical education. An equestrian statue of William III. stands in the market-place, and a statue of Wilberforce. Among many other benevolent establishments, the Trinity House, instituted for the relief of decayed seamen, and the Charter House, an endowed institution for the poor, are the most worthy of note. A prettily laid-out People's Park was presented to the town in 1860 by Sir P. C. Pearson, then mayor.

The docks—the Old Dock, the Humber, the Junction, the Railway, and the Victoria Docks—are very extensive, the last named being the largest. A citadel, with a battery of 21 guns, used to stand between the Humber and the Victoria Docks, and commanded the entrance of the Hull Roads and the Humber; but it was removed: in 1864, the Victoria Dock extended, and some elegant streets constructed on the site of the old citadel. A new west dock which greatly increases the accommodation for shipping was opened in 1869. A town-hall, a new exchange, and a new theatre were all opened in 1866. A spacious borough jail was built during 1866—1868. H. is a principal steam-packet station, and ocean-steamers ply regularly along the eastern British coasts, and to many of the principal ports of Belgium, the Netherlands, and Denmark. It is the great outlet for the woollen and cotton goods of the midland counties, with all of which it is in direct communication, by means of railway, river, or canal. Many ship-building yards are in operation here, and the chief manufactures are those principally to which a flourishing port gives rise, as ropes, canvas, chain, chain-cables, machinery, &c. Many mills of various kinds are here carried on, as well as chemical factories, tanneries, potteries, and sugar-refineries. Immense commercial intercourse subsists between H. and the countries of Northern Europe, the principal exports being woollen and cotton manufactured goods, and the imports timber, corn, wool, iron, flax, hemp, tallow, hides, pitch, bones, and horn. In 1872, 9768 vessels, of 2,868,995 tonnage, entered and cleared the port. H. returns 2 members to parliament. Pop. (1871) 123,408. Constituency, 19,012, including 1298 freemen.

HULSEAN LECTURES, &c. The Rev. John Hulse, of Elworth, in the county of Chester, was born at Middlewich, in 1708, and was educated at St John's College, Cambridge. Having no children, he bequeathed the bulk of his property to the university. His will, an extraordinary document, containing 400 pages folio, of closely written manuscript, with nine codicils appended, provides for the founding of two divinity scholarships in St John's College, the Hulsean Prize, the office of Christian Advocate, and that of Hulsean Lecturer or Christian Preacher. By a statute confirmed by the Queen in council in 1860, the office of Christian Advocate was changed into a professorship, called the Hulsean Professorship of Divinity. Bishop Ellicot was the first professor under the new statute. The office of Hulsean Lecturer, or Preacher, is an annual one; and the duty of the lecturer is to preach not less than four, nor more than six sermons before the university in the course of the year.

HU'MANISTS (Lat. *literæ humaniores*, polite letters), the name assumed in the beginning of the 16th c. by the party who devoted themselves specially to the cultivation of classical literature, and who, as not unfrequently happens in the enthusiasm of a new pursuit, arrayed themselves in opposition to the received system of the schools, not alone in the study of the classical languages, but even in philosophy, and eventually in theology.

HUMANITA'RIANS, the name assigned to the several classes of anti-Trinitarians, who regard Christ as a mere man, and refuse to ascribe to him any supernatural character, whether of origin or of nature. In this class are commonly enumerated the early Judaising sects of Ebion and Cerinthus; but this is by no means certain, at least as regards the former, who taught that at the baptism in the Jordan the Demiurge descended upon Christ, and was united to him. The earliest recorded author of the purely Humanitarian theory is Theodotus of Byzantium, surnamed the Currier, who, having denied Christ in time of persecution, defended himself afterwards by declaring that in so doing 'he had denied not God, but man.' A contemporary of Theodotus, Artemon, taught in like manner that Christ was a mere man, and asserted that such had been the universal belief of Christians till the time of Zephyrinus, 202. These opinions must be carefully distinguished from the doctrines of the various sects of Arians, even the lowest schools of which have admitted the pre-existence of Christ, and his pre-eminence among the creatures of God.

The name Humanitarian is also sometimes applied to the disciples of St Simon, and in general to those who look to the perfectibility of human nature as their great moral and social dogma, and ignore altogether the dependence of man upon supernatural aid, believing in the all-sufficiency of his own innate powers.

HU'MBER, the continuation and estuary of the river Ouse (q. v.).

HUMBLE-BEE (*Bombus*), a genus of *social* bees (see BEE), having a thick and very hairy body, the hairs often arranged in coloured bands; and also differing from the honey-bees in having the tibiæ of the hinder-legs terminated by two spines. The species are numerous, and are found in almost all parts of the world, from the equator to the utmost polar limits of vegetation, but they seem to abound most of all in temperate climates. About forty are natives of Britain, one of the largest of which, and of British hymenopterous insects, is the common H. (*B. terrestris*), the *Bumbee* (boom-bee) of the Scotch; black, with a yellow ring before the wings, and another on the abdomen, the apex of the abdomen white. Another of the largest species is the **Red-tailed Bee** (*B. lapidarius*), and one of the most abundant is the yellow and orange **Moss-bee** (*B. muscorum*), the *Foggie* of the Scotch. Some of the tropical species are much larger than any found in Britain. The name H. is supposed to be a modification of *Hummel* or *Hummer Bee*, and to refer to the loud hum produced by the wings of these insects.

Humble-bees do not form communities so large as those of honey-bees; seldom more than two or three hundred occupying one nest, and in some species not more than fifty or sixty. The females are much less prolific than those of honey-bees. The community is dissolved on the approach of winter, the males and workers die, and only females remain in a torpid state—among moss, in rotten wood, or in some other situation where they may enjoy protection from frost, and concealment from enemies—to perpetuate the race by founding new communities in the ensuing spring. The nests of some species, as *B. terrestris*, are in holes in the ground, at the depth of a foot or more, floored with leaves, and lined with wax, and often entered by a winding passage. Others, as *B. lapidarius*, make their waxen nests among stones; while others still, as *B. muscorum*, make them among moss, which they mix and join with wax. The nests are enlarged as the community increases. Some of the eggs are deposited in balls of mingled pollen and honey, on which the larvæ feed, one ball containing several larvæ; afterwards, eggs are also deposited in waxen cells. Workers are chiefly produced in the earlier part of the season, males and perfect females in the latter part of it. The females are larger than the males and workers. Humble-bees differ from honey-bees in their females existing together in the same community without seeking to destroy one another. There is among them nothing analogous to swarming. Their combs do not exhibit the beautiful regularity of structure which characterises those of honey-bees; but cells of a comparatively coarse appearance are clustered together, with silken cocoons of pupæ, balls of the kind already noticed, and open cells or pots filled with honey, the frequent prize of schoolboys and youthful haymakers, who know well how to open and plunder the humble-bee's nest. Many animals are also expert in this, as badgers, foxes, rats, &c., which, however, devour the brood as well as the honey.

Humble-Bees and Nest:
1, humble bee and nest; 2, orange-tailed bee; 3, moss bee.

HUMBOLDT, Friedrich Heinrich Alexander, Baron von, one of the greatest of naturalists, and who has contributed more than any man of modern times to the progress of several departments of physical science, was born at Berlin, 14th September 1769. His father, whom he lost when he was not quite ten years of age, was chamberlain to the king of Prussia. He studied at the universities of Frankfurt-on-the-Oder, Berlin, and Göttingen. His love of natural history was very strongly manifested at this period; and during his residence at Göttingen (1789—1790), he made visits of scientific exploration to the Harz and the banks of the Rhine, the fruit of which was his first publication, 'On the Basalts of the Rhine,' &c. In the spring and summer of 1790, he accompanied George Forster in a tour through Belgium, Holland, England, and France. In June 1791, he entered the Mining Academy at Freiberg, where he enjoyed the private instructions of Werner. His eight months' residence here led to the subsequent publication of his *Flora Subterranea Fribergensis et Aphorismi ex Physiologia Chemica Plantarum* (Berlin, 1793). He was afterwards appointed to an office in the mining department, and spent some years in this capacity, chiefly at the Fichtelgebirge, in Upper Franconia. His researches here resulted in a work 'On the Irritability of the Muscular and Nervous Fibres, with Conjectures regarding the Chemical Process of Life in the Animal and Vegetable World' (*Ueber die Gereizte*, &c., 2 vols. Berlin, 1797—1799).

The desire of visiting tropical countries, however, led him to resign his office, and devote himself entirely to the study of nature. He spent three months at Jena, where he was the intimate associate of Goethe and Schiller, and studied anatomy under Loder. Circumstances now led him to Paris, where he contracted a friendship with a distinguished young botanist, Aimé Bonpland (q. v.), afterwards his companion in many and various scenes. Some time after, he obtained permission from the Spanish government to visit all the Spanish settlements in America and the Indian Ocean, with every additional favour which could promote his researches in the various departments of natural science. He sailed from Corunna, along with Bonpland, on 5th June 1799. They visited Teneriffe, ascended the Peak, and made many scientific observations. On 16th July, they arrived at Cumana in South America, and in the course of five years explored a vast extent of territory in Venezuela, Granada, Ecuador, and Peru, whence they sailed for Mexico, which they crossed from west to east. On 7th March 1804, H. sailed from Vera Cruz for Havana, where he spent two months, completing the preparation of materials afterwards employed in his *Essai Politique sur l'Isle de Cuba* (Paris, 1826). From Havana he proceeded by sea to Philadelphia, and thence to Bordeaux, where he arrived after a course of travels unparalleled for variety and importance of scientific results, not only in the different departments of natural history, but also in geography, statistics, and ethnography.

H. resided in Paris till March 1805, occupied in the arrangement of his collections and manuscripts, and jointly with Gay-Lussac in experiments on the chemical constitution of the atmosphere. Having visited Italy, and returned to Berlin, he accompanied Prince Wilhelm of Prussia in 1807 on a political mission to France, and obtained leave from the government of his own country to remain there, for the publication of his travels, for which the disturbed state of Germany at that time did not allow proper opportunity. He continued to reside in Paris till 1827. In 1807—1817, his great work, embodying the chief results of his travels, appeared in two forms, folio and quarto, in each consisting of 29 volumes, and containing 1425 copper-plates. The wish of the king that he should reside in his native country was gratified in 1827, when he proceeded to Berlin, and there, in the winter of 1827—1828, he gave lectures on the *Cosmos*, or physical universe.

In 1829, H. again became a traveller, the Emperor Nicholas then sending out a well-appointed expedition to the north of Asia, to explore the Ural and Altai Mountains, the Chinese Dsongarei, and the Caspian Sea. In this expedition, H. was accompanied by his two friends, Ehrenberg and Gustavus Rose. Its principal results were the scientific examination of the beds which produce gold and platina, the discovery of diamonds in an extra-tropical region, the astronomical determination of positions, magnetic observations, and geological and botanical collections. The whole journey occupied nine months, and extended to 2320 miles. It is described in Rose's 'Mineralogical and Geological Travels to the Ural, the Altai, and the Caspian Sea' (*Mineralogisch-geognostischer Reise*, &c., 2 vols., Berlin, 1837—1842), and in H.'s *Asie Centrale, Recherches sur les Chaines de Montagnes et la Climatologie comparée* (3 vols., Paris, 1843). This expedition must be regarded as having also led to much increase of our knowledge of the earth's magnetism, through the adoption by the Emperor of Russia of H.'s proposal for the establishment of magnetic and meteorological stations from Petersburg to Pekin; which was followed, on H.'s application to the Duke of Sussex, by the establishment of similar stations in the southern hemisphere.

The political changes of the year 1830 led to H.'s employment in political services. He had been long on friendly terms with the members of the House of Orleans, and therefore, after Louis Philippe ascended the French throne, he was chosen by the king of Prussia to carry to Paris his recognition of the new sovereign, and was afterwards, during the ensuing twelve years, frequently sent to Paris to reside for four or five months. He accompanied the king of Prussia also in visits to England, Denmark, &c. During this time, he published his *Examen Critique de la Géographie du Nouveau Continent* (5 vols., Par. 1835—1838).

H. spent the latter years of his long life at Berlin, where he occupied a high position at the Prussian court. His last great work, *Cosmos* (4 vols. Stuttg. 1845—1858), has been unanimously recognised as one of the greatest scientific works ever published, exhibiting in most lucid arrangement many of the principal facts of the physical sciences, and their relations to each other. It has been translated into all the languages in which a book of science is required. The germ of the work was the author's *Views of Nature* (Ansichten der Natur, Stuttg. 1808). H. died May 6, 1859.

It is not easy to estimate the amount of H.'s contributions to science. The geography of Spanish America was most imperfectly known previous to his travels there, during which he astronomically determined more than 700 positions, and he bestowed much labour on the preparation of the maps in which his discoveries were exhibited. His barometrical observations were likewise very numerous, as well as his observations on all points connected with meteorology. To him we are indebted for the most important generalisations concerning magnetism and also climate, some results of which are exhibited in the isothermal and other lines which have begun to be drawn in our maps.

Among his botanical works, that on the geography of plants, *De Distributione Geographicâ Plantarum secundum Cœli Temperiem et Altitudinem Montium* (Paris, 1817), must be reckoned the most important. It was preceded by an *Essai sur la Géographie des Plantes* (Paris, 1805). The botanical discoveries made by himself and Bonpland in their American travels were given to the world in a number of works by H. and Kunth, published at Paris from 1809 to 1834. He gave to the world also his observations, many of them most valuable, which were made at the same time, in zoology and comparative anatomy; and in a magnificent volume, *Vues des Cordillères et Monuments des Peuples Indigènes de l'Amerique*, he directed the attention of Europe to the monuments of a little known antiquity in America, and shewed for the first time the possibility of combining artistic beauty with scientific accuracy. He published in 1823 an *Essai Geognostique sur le Gisement des Roches dans les deux Hemisphères* (Paris); and in 1831, *Fragments de Géologie et Climatologie Asiatique* (2 vols., Paris). In 1811, he produced a work on political economy, *Essai Politique sur le Royaume de la Nouvelle Espagne* (2 vols., Paris), abounding in philosophical reflections as well as in statistical facts. He obtained distinction also by his labours in the determination of the magnetic equator, and by his observations on electrical eels, and on the respiration of fishes and young crocodiles. His labours have won him a high name in almost every department of science.

HUMBOLDT, KARL WILHELM, BARON VON, the elder brother of the preceding, eminent as a statesman, and for his works in philology, æsthetics, and general literature, was born at Potsdam, 22d June 1767, and educated at Berlin, Frankfurt-on-the-Oder, and Göttingen. He eagerly studied antiquities, æsthetics, and the Kantian philosophy, as well as law, to which he professedly devoted himself. After travelling in Germany, France, and Switzerland, he acquired the rank of counsellor of legation, but shewed little inclination for official employment, and in 1791 married, and for some years resided chiefly on his wife's estate in Thuringia, and afterwards in Jena, associating most intimately with Schiller, and devoting himself to poetry and other literary and scientific pursuits. A valuable memorial of his friendship with Schiller is the correspondence between them (*Briefwechsel zwischen Schiller und Wilhelm von Humboldt*, Stuttg. und Tüb. 1830), published by him after Schiller's death. From 1797 to 1799, H. resided partly in Paris and partly in Spain, and in 1801 became Prussian resident at Rome, where he remained for a number of years, in this capacity, and in that of minister-plenipotentiary, a most generous patron of young artists and men of science. From Rome he returned to his native country, to fill the high place of first Minister of Public Instruction, in which capacity he did much to promote education in Prussia. The Berlin university owed its existence to him. In 1810, he went to Vienna as minister-plenipotentiary, and from this time he took part in all the most important political affairs in which his country was concerned. After 1819 he resided chiefly at Tegel, where he laid out fine pleasure-grounds, and formed a noble collection of sculptures by the greatest masters. He died 8th April 1835.

His earliest literary works were collected by himself under the title of 'Æsthetic Essays' (*Æsthetischen Versuchen*, Brunswick, 1799). His 'Collected

Works' appeared at Berlin (7 vols. 1841—1852). H. devoted himself with the greatest eagerness and assiduity to the study of philology, and produced several works on the Basque tongue, and the evidence which it affords concerning the aboriginal inhabitants of Spain—the languages of the East, and various questions connected with Oriental literature, and the languages of the South Sea Islands. One of his most important works is that 'On the Kawi Language in the Island of Java' (*Ueber die Kawisprache*, &c., 3 vols., Berlin, 1836—1840), published after his death by Edward Buschmann; the introduction to which, On the Variety of Structure in Human Speech, &c., and its influence on the intellectual progress of mankind, may be said to mark a new era in the science of philology, and has given occasion to many further researches and publications. *Wilhelm von Humboldt's Briefen an eine Freundin*, Leip. 1847 (Wilhelm von Humboldt's Letters to a Lady Friend), exhibit his character in a most pure and amiable light. This work has been translated into English.

HU'MBOLDT, a river in the west part of Utah Territory, United States, America, formed by the union of two streams which rise on the west side of the Humboldt Mountains. It is a small and rapid stream, 350 miles in length, unnavigable even for canoes, strongly impregnated with alkaline matter, and after a westerly course, falls into a lake 40 miles in circumference, known as the Sink of Humboldt's River, which has no outlet. The banks are destitute of trees or shrubs, and the region through which it flows is one of the most barren in Utah. The Pacific Railroad, traversing the United States from east to west, runs through the valley of the H.

HUME, DAVID, the philosopher and historian, was born at Edinburgh on the 26th of April (O. S.) 1711. His father was the laird or proprietor of the estate of Ninewells in Berwickshire, but David, being the younger son, had to make his own fortune with no other assistance than an education and the influence of his respectable family. He was educated at home and at the college of Edinburgh. His father designed law as his profession, and he submitted to the initial steps of the proper practical training, but it was not a pursuit to his liking. Deserting it, he experimented on a mercantile house in Bristol, but commerce was not more congenial to him than jurisprudence, and he gave it a very short trial. He now became a musty student, devoting himself to books with no settled practical object before him. He has recorded his sufferings at this time from despondency and depression of spirits, caused, apparently, by the effects of monotonous study on the stomach. At 23 years of age, he went to France, and lived some time in La Fleche, where he describes himself as wandering about in solitude, and dreaming the dream of his philosophy. In 1739, he published the first and second book of his *Treatise on Human Nature*—the germ of his philosophy, and still perhaps the best exposition of it, since it has there a freshness and decision approaching to paradox, which he modified in his later works. Although the dawn of a new era in philosophy, this book was little noticed. It was a work of demolition. By separating the impressions or ideas created on the thinking mind by an external world from the absolute existence of that world itself, he shewed that almost everything concerning the latter was taken for granted, and he demanded proof of its existence of a kind not yet afforded. It was thus that he set a whole army of philosophers at work, either to refute what he had said, or seriously to fill up the blanks which he discovered, and hence he originated both the Scotch and the German school of metaphysicians. In 1741 and 1742, he published two small volumes, called *Essays Moral and Political;* they were marked by learning and thought, and elegantly written, but are not among the more remarkable of his works. He felt keenly at this time the want of some fixed lucrative pursuit, and his longing for independence was the cause of a sad interruption to his studious and philosophical pursuits. He was induced to become the companion or guardian of an insane nobleman, and had to mix with the jealousies and mercenary objects of those who naturally gather round such a centre. In 1747, he obtained a rather more congenial appointment, as secretary to General St Clair, whom he accompanied in the expedition to the coast of France and the attack on Port L'Orient, the depôt of the French East India Company; this affair had no important results, but it gave H. a notion of actual warfare. Next year, he accompanied the general in a diplomatic mission to France, and as he travelled he took notes of his impressions of Holland, Germany, and Italy, which are published in his *Life and Correspondence.* In 1751, he published his *Inquiry into the Principles of Morals*, a work of great originality, and one of the clearest expositions of the leading principles of what is termed the utilitarian system. At the same time, he intended to publish his *Dialogues concerning Natural Religion*, but his friends, alarmed by the sceptical spirit pervading them, prevailed on him to lay them aside, and they were not made public until after his death. In his 35th year, he had unsuccessfully competed for the chair of Moral Philosophy in Edinburgh, and at this period we find him unsuccessful in an attempt to obtain the chair of Logic in Glasgow. Next year, in 1752, appeared his *Political Discourses.* Here, again, he made an era in literature, for in this little work he announced those principles of political economy comprehending the doctrine of free-trade, which it fell to his friend Adam Smith more fully and comprehensively to develop. He was appointed at this time keeper of the Advocates' Library, with a very small salary, which he devoted to a charitable purpose. It was here that, surrounded with books, he formed the design of writing the history of England. In 1754, he issued a quarto volume of the *History of the Stuarts, containing the Reigns of James I. and Charles I.*, and presently completed this portion of the work in a second volume, bringing it down to the Revolution. He then went backwards through the House of Tudor, and completed the work from the Roman period downwards in 1762. While so employed, he published *Four Dissertations: the Natural History of Religion; of the Passions; of Tragedy; of the Standard of Taste* (1757). Two other dissertations, intended to accompany these, were cancelled by him after they were printed—they are *On Suicide* and *The Immortality of the Soul*, and were subsequently printed in his works.

In 1763, he went to France as secretary to Lord Hertford's embassy; here he was in his element, and found fame at last. He became familiar with the brilliant wits and savants of the Parisian circle—with Turgot, D'Alembert, Helvetius, Holbach, Diderot, Buffon, Malesherbes, Crebillon, and the rest, as well as with the no less distinguished female eminences, De Boufflers, Page de Boccage, Geofrin, Du Deffand, and L'Espinasse. His sojourn in Paris was unfortunate in bringing him into intimacy with the restless, vain, and self-tormenting Rousseau, who, after experiencing much substantial kindness from H., got suspicious, and forced him into a memorable quarrel. After his return home, in 1766, he accepted the responsible office of Under-secretary of State for the Home Department. In his own Life he says: 'I returned to Edinburgh in 1769 very opulent (for I possessed a revenue of £1000 a year), healthy, and, though somewhat stricken in years, with the prospect of enjoying long my ease, and of seeing the increase of my reputation.' Early in 1774, he was attacked with an internal disease, for which he in vain sought a remedy in the Bath waters. He died at Edinburgh on the 25th of August 1776.

HUME, Joseph, politician, was born January 1777, at Montrose. His father was the master of a small coasting-vessel, who, dying while his family were young, left his widow and children in narrow circumstances. He was educated in the local schools of Montrose, and at the age of 13 was placed with an apothecary. He studied for the medical profession; was admitted in 1796 a member of the College of Surgeons, Edinburgh; and became assistant-surgeon in the marine service of the East India Company. He applied himself to the acquisition of the native languages, and during the Mahratta war, from 1802 to 1807, filled the office of Persian interpreter to the army. He also discharged duties connected with the prize agencies and the commissariat, and arrived in England in 1808, with an honestly earned fortune of £30,000 or £40,000. He entered the House of Commons in 1812, as M.P. for the borough of Weymouth and Melcombe Regis. The future radical was then of Tory politics, and paid a sum of money for his seat, which he only enjoyed a few months. He obtained, in 1818, a seat for the Aberdeen district of burghs, comprehending his native town of Montrose. In 1830, he had gained such distinction as a radical reformer, that he was returned without opposition as one of the members for Middlesex, which he represented until 1837. In 1842, he was again chosen for his native burgh, Montrose, and remained until his death in the service of his fellow-townsmen. Although by no means a man of brilliant abilities, his indefatigable industry in his parliamentary duties, his plans of reform in every department of church and state, his hatred of sinecures and official abuses of every kind, and his advocacy of economy in the public service, made him one of the most useful and influential members of the legislature. He was probably often wrong-headed and mistaken, and as the leader of the Radical party in the House of Commons, usually found himself in active conflict with both Whig and Tory governments. Yet a tardy but sincere homage was paid to his integrity and public services by the late Sir Robert Peel, and other political opponents. He died Feb. 20, 1855, aged 78, leaving a name venerated by his fellow-countrymen for public honesty and personal disinterestedness.

HUME'TTY, a term in Heraldry, applied to a cross or other ordinary which is cut off, and nowhere reaches the edge of the shield.

HUMIC ACID. See Humus.

HUMMEL, Johann. See Supp., Vol. X.

HU'MMELER, an implement or machine used for *hummelling* barley—that is, removing the awn from the grain after it has been thrashed. A common kind of H. is a set of blunt knives fixed in a frame, with a handle, by means of which they are used in the manner of stamping. Another form consists of blunt knives set on a roller. These implements are worked by the hand. But hummellers of various construction are often attached to thrashing-machines, in all of which blunt knives are made to pass frequently through the grain.

HUMMING-BIRD (*Trochilus*), a Linnæan genus of birds, now constituting a family, *Trochilidæ*, of the order *Insessores*, and tribe *Tenuirostres*. The species are numerous, more than 300 being known, whilst new ones are continually being discovered. They are found only in America and its islands, although represented, both in habits and in brilliancy of plumage, by the Sun-birds (q. v.) of eastern tropical regions. Most of them are tropical, although a few species are summer visitants of the colder parts of America, very seldom, however, seen beyond lat. 57° N.; whilst some of those found only within the tropics inhabit elevated mountainous tracts, even to the confines of perpetual snow. The dazzling brilliancy of humming-birds, the extreme rapidity with which they dart through the air, their hovering above the flowers from which they obtain their food, with humming sound of wings, which move so quickly as to be indistinctly visible, or 'like a mist,' have attracted universal admiration since the first discovery of America. The diminutive size of almost all of them—some of them being the smallest of birds, and if stripped of their feathers, not larger than a humble-bee—has still further contributed to render them objects of interest, whilst the plumage of the different species exhibits an almost endless variety of forms, as well as of colours, in crests, neck-tufts, leg-tufts, and many an extraordinary development of tail.

Humming-Bird and Nest.

Humming-birds have slender bills, which are also generally long, and in some extremely so, the form of the bill exhibiting a wonderful adaptation to the kind of flowers from which the bird obtains its food—straight in some, curved in others. Humming-birds do not, as was long supposed, feed on honey alone, but to a considerable extent, and some of them perhaps chiefly, on insects, not rejecting spiders, whilst they often snatch away the insects which have become entangled in spiders' webs. The lower mandible fits into the upper, and the bill is thus adapted as a tube for sucking, in which, as well as in seizing small insects within the recesses of flowers, the tongue is also a very efficient organ. The tongue is very long, capable of being darted out to a considerable length; the bone of the tongue (*hyoid bone*) being much elongated, and its branches passing round the back of the skull to the forehead, where they meet in a point before the line of the eyes. The tongue itself consists of two filaments, joined together for the greater part of their length, and separated at the tip. The wings of humming-birds are very long and powerful, the first quill-feather the longest, and the rest shorter in succession. Humming-birds construct their nests with nice art, generally of lichens and of fibrous substances, such as cotton. They do not lay more than two eggs. They are very bold in defence of their nests and young, and are said to strike fearlessly with their needle-like bills at the eyes of birds of prey, which they far surpass in agility and rapidity of flight. They are very easily tamed and rendered familiar, and have been known to return again in spring, after a winter migration to a warmer climate, to the window from which they had been allowed to escape. Attempts to keep tamed humming-birds have generally failed, perhaps on account of their being supposed capable of feeding only on honey or syrup, whereas insect food seems necessary for them. Attempts made to bring them across the Atlantic have, in the great majority of cases, been unsuccessful.

We cannot propose to describe any of the species of H., nor to give the characters of the numerous genera into which the family has been divided. Form alone without colour is insufficient to convey a proper idea of their metallic and gem-like splendour, which in many cases varies with every change of position and of light.

The Ruby-throated H. (*Trochilus colubris*) is the only species found in the Northern Atlantic states of North America. It ventures even into the regions of the Hudson's Bay Company.

The skins of humming-birds were employed for ornamental purposes by the more civilised American races before the discovery of America by Europeans, and were used by the Mexicans for making those pictures which so much attracted the admiration of their Spanish conquerors.

One of the greatest authorities on the H.-B. is Gould, who has written a work upon the subject, magnificently illustrated.

HU'MORAL PATHO'LOGY. See MEDICINE.

HU'MUS is a generic term applied to a group of closely allied substances, which collectively form the organic matter of the soil. These substances may be divided into three great classes: 1. Such as are soluble in water—crenic, apocrenic, and ulmic acids; 2. Such as are soluble in alkaline solutions, but not in pure water—humic and geic acids; 3. Such as are insoluble in all menstrua—humin and ulmin.

All of these are amorphous, ranging in colour from a brownish yellow to a blackish brown, and non-volatile; they are probably all composed of carbon, hydrogen, and oxygen, and they are all remarkable for their power of fixing ammonia. 'They are all products of the decomposition of vegetable matters in the soil, and are formed during their decay by a succession of changes, which may be easily traced by observing the course of events, when a piece of wood, or any other vegetable substance, is exposed for a length of time to air and moisture. It is then found gradually to disintegrate with the evolution of carbonic acid, acquiring first a brown, and finally a black colour. At one particular stage of the process, it is converted into one or other of two substances, called humin and ulmin, both insoluble in alkalies, and apparently identical with the insoluble humus of the soil; but when the decomposition is more advanced, the products become soluble in alkalies, and then contain humic, ulmic, and geic acids; and finally, by a still further progress, crenic and apocrenic acids are formed, as the result of an oxidation occurring at certain periods of the decay.'—Anderson's *Agricultural Chemistry*, 1860, p. 22.

The roots and other vegetable matters remaining in the soil gradually undergo the changes which have been described in the preceding extract, and are thus converted into humus, which is found only in the surface soil, in which its quantity varies with the activity and profusion of the vegetation.

Numerous analyses of the humus compounds have been made, but, as might be expected from the gradual passage of one substance into another, they present considerable discrepancies. According to Mulder, who is perhaps the highest authority on this subject, geic acid is represented by $C_{40}H_{12}O_{14}$; humic acid, by $C_{40}H_{12}O_{12}$; ulmic acid, by $C_{40}H_{14}O_{12}$; crenic acid, by $3HO,C_{24}H_{12}O_{16}$; apocrenic acid, by $2HO,C_{48}H_{12}O_{24}$. Crenic and apocrenic acids (which derive their names from *crenē*, the Greek word for *a spring*) not only occur in combination with ammonia, in the organic matter of the soil, but are likewise found in many mineral waters, and in the ochry deposits that accumulate round the margins of chalybeate springs.

All the above-named substances closely resemble in their composition the woody fibre or cellulose ($C_{24}H_{21}O_{21}$), from which they are derived by a slow process of oxidation.

Chemists hold very different opinions regarding the physiological value of humus. The earlier chemists, and Mulder at the present day, regard it as the almost (if not quite) exclusive source of the organic constituents of plants; while Liebig and the great majority of the chemists of the present day regard the atmosphere (which consists of a mixture of nitrogen and oxygen gases, watery vapour, carbonic and nitric acids, and ammonia) as capable of affording an abundant supply of all these substances. The latter is probably the more correct view; but although humus is not a direct source of the organic constituents of plants, and is not absorbed by their roots, as was formerly supposed, it is so indirectly in at least two modes—viz., by evolving during its decomposition a certain quantity of carbonic acid which can be absorbed, and by its power of absorbing and combining with ammonia, and with certain soluble inorganic constituents of plants. Its power of absorbing ammonia is readily shewn by pouring some ammoniacal solution on peat (which contains the humus compounds in great abundance); the pungent smell at once disappears, which is an evidence that combination has taken place. It possesses a similar but less marked power in reference to potash, soda, lime, and magnesia, and thus plays an important part in preventing these substances from being washed out of the soil. The physical properties of humus are also of great importance in relation to the fertility of the soil. Humus is one of the most highly hygrometrical substances known. While silicious sand absorbs only one-fourth of its weight of water, and again gives off, in the course of four hours, four-fifths of its water, humus imbibes nearly twice its weight of water, and retains nine-tenths of it after four hours' exposure. It thus confers on the soil the power of absorbing and retaining water, and thus diminishes its tenacity, and allows of its being more easily worked; and additionally, from its dark colour, it causes the more rapid absorption of heat from the sun's rays. Hence, although not contributing directly to the food of plants, it is in moderate quantity an indispensable constituent of a fertile soil. The best wheat-bearing soils contain 9 or 10 per cent. of humus compounds.

HU-NAN, a province in the lake district of China, on the south side of Tung-ting-hu, the largest lake in China. It is a fertile region, yielding two crops of rice annually, while its mountains yield malachite, iron, lead, and coal. Area, 74,320 square miles; pop. 18,652,507. Its capital is Chang-sha-fu, situated on the river Siang.

HUNDRED, in English Law, an ancient subdivision of counties, the origin of which is not very clearly settled, though probably the name arose from there being a hundred sureties in each to keep the peace. In ancient times, if a crime was committed, such as robbery, maiming of cattle, burning of stacks, &c., the hundred had to make it good. The old distinctions have, however, now less significance. But the characteristic of a hundred is still this, that it has a constable or bailiff, and when any damage is done by rioters feloniously destroying property, the individual owner has his remedy by suing the hundred for the damage. In order to secure this remedy, the party or his servant must, within seven days, go before a justice, and state on oath the names of the offenders, and engage to prosecute them. So, where there is no hundred, the county, or city, or town, is liable in like manner, and in all cases the expenses are paid by the county rate, or a rate in the nature of a county rate. In the northern counties, a hundred is generally called a wapentake. The act 7 and 8 Geo. IV. c. 31, giving the above remedy against the hundred, does not extend to Scotland. See Riot.

HUN'DREDERS, inhabitants of a Hundred (q. v.).

HUN'GARY (Ger. *Ungarn;* Magyar, *Magyar Orszäg* (Land of the Magyars), a portion of the Austro-Hungarian empire. According to the fundamental laws of the realm, the emperors of Austria are kings of Hungary, which formerly comprehended Hungary proper, Croatia, Slavonia, Dalmatia, the Illyrian sea-coast, Transylvania, and the whole of the military frontier. After 1848, these pendicles were dissociated administratively from Hungary proper and converted into crown lands. Since 1867, Hungary, Croatia, Slavonia, Transylvania, and the Military Frontiers, have constituted the kingdom of Hungary, one member of the bipartite empire. The two knots which tie Austria proper and Hungary together are the person of their common sovereign and the 'Delegations'—a parliament consisting of 120 members, of which 60 are supplied by either portion of the empire. This body legislates for war, finance, and foreign affairs; and the ministers of these three departments are responsible to it, or to a committee of its members. Hungary has an area of 117,600 English square miles, with, in 1869, a population, civil and military, of 15,509,455. The general features of the country are given under the article Austro-Hungary (q. v.), to which may be added that the soil of the vast plains consists chiefly of humus and clay, and is of great fertility. Huge tracts of sand are to be found in several parts; there are also swamps all along the Theiss, but both of these are rapidly diminishing, in consequence of works carried on with great energy and perseverance. The level tracts in the eastern part of H. are subjected to periodical drought, and to frequently recurring blasts. Hailstorms during summer, and the severity of cold during winter, cause much anxiety to farmers, and more especially to the numerous class of vine-growers. In regions where people neglect taking proper care, ague is common; although, according to Bendant, the climate of H., on the whole, is to be regarded as healthful, and favourable not only to physical strength, but also to intellectual development.

H. is an agricultural country, in the strictest sense of the word. According to Fényes, the land under cultivation in 1840 was as follows in the kingdom (with the exception of Transylvania and of the Military Frontier):

	English Acres.
Soil under tillage, ...	17,337,437
Meadows, ...	4,636,113
Pasture, ...	7,968,928
Vineyards, ...	1,456,748
Farm-yards and gardens, . . .	583,241
Forests, ...	15,681,887

In 1872, the soil under tillage (with the same exclusions) was estimated at about 22,613,000, and the pasture-land at about 6,765,000 English acres. The difference arises chiefly from two circumstances: 1. By confining the river Tisza to its proper channel, new tracts of land came under cultivation. 2. By the parcelling out of grounds upon the principle of modern farming, communal pastures became private property in many places, and were thus converted into soil under tillage. The soil under cultivation in the whole of Hungary in 1872 was about 26,200,000, and the pasture-land about 8,100,000 acres. Agriculture in H. is rapidly improving, and English machinery is being extensively introduced on the estates of the great landed proprietors. According to reliable calculation, the annual produce, in grains of every kind, amounts to 239,352,900 imperial bushels, leaving a yearly surplus for exportation of no less than 60,500,000 imperial bushels. The value of the crops of wheat, rye, oats, barley, and maize in 1872 was estimated at about £3,300,000. The mineral wealth of H. may be said to be inexhaustible, but several branches of mining are as yet in their infancy. In 1872, the mineral produce was, in gold, 2500 lbs.; silver, 24,500 lbs.; quicksilver, 3300 cwts.; lead, 28,000 cwts. (Austrian); copper, 26,000 cwts.; pig-iron, 2,221,000 cwts.; coals, black, 6,480,000 cwts.; coals, brown, 15,280,000 cwts. Rock-salt may be had to any amount in the mountains of Marmaros, as also in Transylvania. The quantity of wine is such that it might suffice for supplying the half of Europe. For the dessert-table, Tokay, Ménes, and Ruszt yield their delicious liquor, obtained from dry grapes. The red wines of Eger (Erlau), Buda (Ofen), Visonta, Karlovitz, Szegzárd, &c., may be said to equal the best produce of Burgundy; while the white wines of Magyarát, Neszmély, Somlyó, Pesth, Villány, Monoszló, &c., rank with the choicest of Rhenish wines. Tobacco, hemp, flax, rape seed, timber of every variety, would be extensively exported were the means of communication developed, and commercial intercourse guided by a more liberal policy. Fényes put down the number of horses before 1848 at 1,200,000; in 1870, there were 2,158,819, and the breeding has much improved. The oxen of H. excel equally in size and in the nourishing quality of the meat they yield. The number of sheep, according to Fényes, was 17,000,000; in 1870, there were 15,076,997 (of which 4½ millions produced wool above the average quality), and 572,951 goats. Among the 4,000,000 of swine, the Mangalicza breed is much praised for its size, and for the hardness of the lard it yields. The rearing of bees and of the silkworm is chiefly carried on in the Military Frontier. Industry and commerce are far from being at a level either with the wants of the people or with the natural richness of the soil; nevertheless, great progress has been made; thus Pesth, the capital of H., has been brought into direct railway connection, not only with Vienna, but with Trieste, Temesvár, Arad, Debreczin, and Kassa. A main line has been carried through Transylvania. Fiume, was next drawn into the net, so as to render it an outlet for the inexhaustible stores of the Banat, of Slavonia, and Croatia, while the mountain districts of Upper H. have a line extending to the very heart of Galicia.

Public banks, and other establishments of credit, are springing into life, and the fetters that weighed upon industry and commerce are being removed. A sound system of taxation, together with the revival of constitutional rights, would soon do the rest. Public education, especially in its lower branches, is rapidly extending. The colleges are of two kinds—gymnasia for classical education, and schools for industry and commerce. The higher branches of learning are carried on in academies and lyceums, as well as in the richly endowed Roman Catholic university of Pesth. Among the higher educational institutions of the Protestants, those of Debreczin and Sárospatak (for Calvinists), and of Eperjes, Posony, and Soprony (for Lutherans), occupy a very high rank. The Academy of Sciences, the Society of Naturalists, the Agricultural Society, the National Museum and Theatre, the Kisfaludy Society, together with more than 60 periodicals published in the Magyar tongue, speak well for the interest the Hungarian nation takes in progress and civilisation. The following tables shew the ratio of population, according to religion and nationalities, throughout H., Croatia, Slavonia, and Transylvania:

Religion.	Numbers.	Per cent.
Roman Catholics, ...	7,120,000	48·0
Greek "	1.493,000	10·1
Evangelical Protestants, ...	3,088,000	20·8
Byzantine Greeks, ...	2,630,000	17·7
Jews, ...	428,000	2·9
Unitarians, ...	54,000	0·3
Other Sects, ...	11,000	0·1

According to *Die Völkerstämme der Oestreich* of Dr Ficker, published in Vienna in 1869, the numerical strength of the Hungarian monarchy is as follows:

Magyars, ...	5,408,000
Slavi, ...	3,719,000
Roumanians, ...	2,502,000
Servians, 1,765,000 (others, 611,000), . . .	2,376,000

There are, besides, a few thousands of Bulgarians, Montenegrins, French, &c.

At the head of the Roman Catholic Church in H. is the Prince Primate the Archbishop of Esztergom or Gran; there are two other archbishoprics, and seventeen bishoprics. The Greek Catholics have four bishops; the Non-united Greeks, a patriarch-archbishop and seven bishops. The two Protestant bodies are divided into districts, four for each; the heads of those districts bear the title of Superintendents.

History.—It is generally admitted that the Hungarians—in their own language, Magyars—are of Scythian origin; their ancient seats being in the environs of the Caspian Sea. Part of the people emigrated in the direction of the Ural Mountains, and thence, being pressed by the warlike swarms of Paimacitae, to the regions now known as Moldavia and the Ukraine. In 889, forty thousand families, counting more than 200,000 warriors among them, left their homes under the leadership of Almos, and after many a hard battle arrived at the north-eastern frontiers of the land, which, under the name of Pannonia, contained several independent realms, such as Great Moravia, the Slavo-Bulgarian kingdom of Zalan, &c. The great task of conquest being now at hand, old Almos resigned, and his son Arpád being unanimously elected as chief, the armed invasion began at once in several directions. At the end of 899, Arpád's sway extended from the Carpathians down to Servia, and from the eastern borders of Transylvania to the foot of the Styrian mountains. According to a covenant between Arpád and the other chiefs, the leadership was to remain with the descendants of the former as long as they should keep faithful to the nation. The foundations which were then laid for the political organisation of the realm, have been developed through lapse of time into that system of municipal independence which has outlived the storms of nearly a thousand years, and contains, even after the disastrous issue of 1849, the germs of future national greatness. The periods into which the history of H. is divided are: 1. Period of chiefs of the House of Arpád (894—1000); 2. Period of kings of the House of Arpád (1000—1301); 3. Period of kings from different (foreign) families (1301—1526); 4. Period of kings of the House of Hapsburg (1526 to the present day). The first king of H. was Stephen I., called the Saint; he was crowned in the year 1000 with a crown that had been sent to him by the pope, Sylvester II. It forms to-day the upper part of 'the sacred crown of Hungary.'

With St Stephen, a new era began for H.; Christianity took the place of heathen superstitions; the savage incursions, by which *the people of the east* became a scourge to neighbouring nations, ceased entirely. The House of Arpád gave twenty kings to H., the greatest of whom undoubtedly was Stephen I., who, besides dividing the realm into ten bishoprics, more completely developed the administrative system. Among his successors, Béla I. (1061—1063) distinguished himself by saving the hardly begun Christian civilisation against the rebellious attempt of a numerous party. Ladislaus I. is renowned for wise legislation and for great personal valour. Such was the renown of his deeds, that at the council of Piacenza (1095) he was unanimously elected to be the leader of the crusade to Palestine. Death prevented the hero from accomplishing the task. Coloman (1095—1114) went by the name of 'Learned,' and many of his laws shew how much he was in advance of the age. Gejza II. (1141—1161) was but ten years old when crowned; nevertheless, his reign is worthy of mention, for it was then that colonists from Flanders settled in Northern H., as also in Transylvania, in consequence of which, mining and several branches of industry made rapid progress. Andrew II. (1205—1235) is known in connection with the crusades; the Hungarian Magna Charta (Bulla Aurea), forced from him by his nobles, dates from 1222. Béla IV. (1235—1270) shewed great qualities in subduing the indomitable arrogance of the oligarchy, and in healing the wounds of his people after the terrible invasion of the Mongols in 1242. Andrew III. was the last male scion in the Arpád line; he died without issue in 1301. During the mixed period, two kings, besides the governor Hunyady (q. v.), especially distinguished themselves. Lewis I., called the Great (1342—1381), was the second king from the House of Anjou, being by his great-grandmother connected with the Arpád dynasty. Lewis extended the sway of the Hungarian sceptre to limits formerly unknown; re-established at home the authority of law, trodden down by the mighty oligarchs under his predecessors; and promoted science, industry, and commerce. One of the remarkable episodes of his reign was the expedition to Italy to punish the assassins of his unfortunate brother, Andrew, spouse of the famous Joan of Naples. Sigismund (1387—1437) is better known as Emperor of Germany. As a curious incident in the life of a sovereign, may be mentioned his imprisonment at Siklós during six months. Sigismund was released only after he had taken the oath to his Hungarian subjects, vowing fidelity to the constitution. Mathias I.—better known by the name of Mathias Hunyady or Mathias Corvinus (see MATHIAS)—may be said to have been not only the greatest king of H., but also the greatest sovereign of his age. By his valour, sagacity, and love of learning, he raised his nation to the pinnacle of fame. From the death of Mathias to the day of Mohács, H. exhibits the fiercest strife of factions—a protracted agony, preceding the loss of national independence. Among the many calamities during the reign of Vladislas II. of Bohemia (1490—1516), the Peasant War occupies a prominent place. Dózsa and his bands, after having committed great havoc, were exterminated by the famous John Zapolya of Transylvania, *and the whole of the peasantry reduced to a state of serfdom.* Lewis II. was but ten years old at the death of his father, Vladislas II. Another ten years of rapid disorganisation was required to make a disaster like that of Mohács possible. See Mohács, Battle of. The further history of H. is indissolubly connected with that of the Austrian empire, and may be read as to its principal features under the head Austria.

Fundamental Laws of Hungary.—1. The Golden Bull of Andrew II., given in the year 1222, upon the return of the king from Palestine, contains 31 articles, of which article 2 is a kind of Habeas Corpus Act, but for nobles only. One clause of article 31, declaring armed resistance to any illegal acts of the king not punishable by law, was cancelled by article 4 of the diet in 1687.

2. Treaty of Peace of Vienna, 1606. It was concluded on the 23d of June, between Mathias II. and Stephen Bocskay. Article 1 enacts freedom of worship to Protestants, as far as is consistent with the established rights of the Roman Catholic Church.

3. Treaty of Peace of Linz, enacted during the diet of 1646—1647. Public worship is once more secured to Protestants, such freedom being for the first time extended also to the peasants. Protestants were to be admitted to public functions on an equal footing with Catholics.

4. The Pragmatic Sanction, contained in article 2 of the diet of 1722—1723. In case there should be no male issue in the dynasty of Hapsburg, the females and their descendants are to succeed to the Hungarian throne. The king must be a Roman Catholic, must take oath to the constitution, and sign the so-called *diploma inaugurale*, thus confirming the rights and privileges of the nation. Should there be no descendant, male or female, of the reigning House, the freedom of electing their king belongs to the nation.

Article 11 of 1741. Maria Theresa, abandoned by her allies, surrounded on all sides by fearful dangers, won the love of the Hungarian nation by acceding to their just and legitimate claims. The government of H. was confided to Hungarians only; in public affairs, the Primate, the Palatine, and the Ban were to be consulted. Hungarians were to be eligible for seats in the ministry. Article 17 of 1790—1791 renews those enactments.

Article 10 of 1790—1791 establishes the independence of the Hungarian kingdom with its annexed parts. *Article 12 of the same year declares that the power of making, changing, and interpreting laws in the kingdom of H. belongs to the sovereign legitimately crowned, together with the diet legally convened. Nothing can be done in H. by means of royal letters patent.* Article 13 orders that the diet shall be convoked at least once every three years.

Article 16 guarantees the nation the use and culture of the Magyar tongue.

Article 19 secures to the diet the right of voting taxes and of fixing the number of recruits.

Up to the year 1848, the nobles were free from contribution and military service; they occasionally gave subsidies; and in case of extreme necessity, rose in arms for the defence of the country. Article 8 of 1847—1848 enacts the great principle, that all classes are to participate in the public burdens of the realm. Article 9 abolishes statute labour; the peasant could henceforward become owner of real property; and indemnity was given to their former masters. Article 5 of 1847—1848 establishes the principle of popular representation upon the basis of taxation.

The legislative power in Hungary is intrusted to the king and the Reichstag or Diet, which consists of the House of Magnates and the House of Representatives. In 1872, the former assembly counted 410 members—3 princes, 31 archbishops and bishops of the Roman Catholic and Greek churches, 371 nobles of Hungary, 2 deputies from Croatia and Slavonia, and 3 from Transylvania. The lower House is composed of representatives of the towns and rural districts. It is elected by the votes of all citizens of age who pay direct taxes to the amount of 16s. a year. Neither electors nor their representatives are affected by any distinction of race or religion. In the session of 1872, there were 438 members. The towns and cities of Hungary sent 88 deputies, or rather delegates; from country districts, 289; 29 from Croatia and Slavonia; and returned by ecclesiastical and other bodies, 32.

Hungarian Language and Literature.—Notwithstanding the general sympathy that prevails for H., many are of opinion either that the Hungarians are but a half-civilised people, or that their language and literature are in some sense or another Germanic or Slavonic. The Magyar tongue is as much distinct from German or Slave as is the French or Italian. The language of the Hungarians is called Magyar, and forms, together with the Mogul, the group Ugri, belonging to the great Finnic family. As to its syntax, the language is nearest to the Turkish. Among its characteristics may be noted that the Christian name occupies always the second place, as, for instance, Hunyady János = John Hunyady. How rich in expressions, how abundant in classic beauties that language is, may be collected from the circumstance, that although it was excluded from public life during eight centuries (Latin being used in schools, legislation, and administration), H. possesses to-day a literature which, both in regard to its quantity and quality, will sustain a comparison with that of the most civilised among the western nations. Especially as regards poetry, the names of Kisfaludy, Vorösmasty, Pesöfi, Arany, &c., are well worthy of being ranked with the best in other lands. Those who are desirous of further information on this interesting subject, should consult Toldy's admirable *Handbook of Hungarian Literature*, published both in Magyar and German.

HUNGARY-WATER, a very celebrated perfume, for the preparation of which various receipts have been given. The following is one of the best: Take of fresh rosemary in blossom, 4 pounds; fresh sage in blossom, 6 ounces; ginger in slices, 2 ounces; cut them in small pieces, mix, and add rectified spirit 12 pounds, and common water 2 pints. Let eleven pints distil by a gentle heat. A hermit is said to have given the original receipt to a queen of Hungary, and hence it was called the *Queen of Hungary's Water*, which has been abbreviated into Hungary Water. It is employed principally as a perfume for the toilet; but it is sometimes taken internally as a restorative and stimulant, and it may be used externally as a gently stimulating liniment.

HUNGER. See Digestion.

HUNINGUE, a small town of Germany, in the extreme south of Alsace, is situated on the left bank of the Rhine, 37 miles south-south-east of the town of Colmar. Pop. about 2000.

This place was formerly remarkable as being the centre of the French system of pisciculture. A series of buildings and artificial ponds, covering a space of seventy imperial acres, was erected in 1852—1854 for the breeding and acclimatising of foreign fish. The total cost was £10,607. The expense of carrying on the plan from 1853 to 1862 amounted to £13,887, and the annual cost after the latter year averaged about £2000. This establishment enabled the French government during the second empire to restock many of the barren rivers of France with valuable fish. See PISCICULTURE.

HUNS (Lat. *Hunni;* Gr. *Ounnoi* and *Chounoi*), the name of a considerable nation of antiquity, which, from time to time, made incursions upon the Roman dominions, and which eventually, under Attila, the most renowned of its leaders, brought the empires of both the East and the West to the very verge of destruction.

The H. were of Asiatic origin, and, in all probability, of the Mongolian or Tartar stock; therefore akin to, and perhaps to be identified with, the Scythians and Turks. According to De Guignes, whose theory has been accepted by Gibbon, the H. who invaded the Roman empire were lineally descended from the Hiong-nou, whose ancient seat was an extensive but barren tract of country immediately to the north of the great wall of China. About the year 200 B.C., these people overran the Chinese empire, defeated the Chinese armies in numerous engagements, and even drove the Emperor Kao-ti himself to an ignominious capitulation and treaty. During the reign of Vou-ti (141—87 B.C.) the power of the H. was very much broken. Eventually, they separated into two distinct camps, one of which, amounting to about 50,000 families, went southwards, while the other endeavoured to maintain itself in its original seat. This, however, it was very difficult for them to do; and eventually the most warlike and enterprising went west and north-west in search of new homes. Of those that went north-west, a large number established themselves for a while on the banks of the Volga. Then crossing this river, they advanced into the territories of the Alani, a pastoral people dwelling between the Volga and the Don. At what period this took place is uncertain, but probably it was early in the 4th century. The Alani, who had long dwelt in these plains, resisted the incursions of the H. with much bravery and some effect, until at length a bloody and decisive battle was fought on the banks of the Don, in which the Alan king was slain, and his army utterly routed; the vast majority of the survivors joined the invaders.

The H. are described as being of a dark complexion, almost black; deformed in their appearance, of uncouth gesture, and shrill voice. 'They were distinguished,' says Gibbon, 'from the rest of the human species by their broad shoulders, flat noses, and small black eyes deeply buried in the head; and as they were almost destitute of beards, they never enjoyed either the manly graces of youth, or the venerable aspect of age. A fabulous origin was assigned worthy of their form and manners—that the witches of Scythia, who for their foul and deadly practices had been driven from society, had copulated in the desert with infernal spirits; and that the H. were the offspring of this execrable conjunction.' Such was the origin assigned to them by their enemies the Goths, whom the H. now invaded with fire and sword. Hermanric, the aged sovereign of the Goths, whose dominions reached from the Baltic to the Euxine, roused himself to meet the invaders, but in vain. His successor, Withimir, encountered the H. in a pitched battle, in which he was himself slain, and his countrymen utterly routed. These now threw themselves upon the protection of the Emperor Valens, who in 376 gave permission to a great number of them to cross the Danube and settle in the countries on the other side as auxiliaries to the Roman arms against further invasion. The H. now occupied all the territories that had been abandoned by the Goths; and when these, not long afterwards, revolted against Valens, the H. also crossed the Danube, and joined their arms to those of the Goths in hostilities against the Roman empire. In the wars that followed, the H. were not so conspicuous as the Goths their former enemies. Indeed, we now hear but little of the H. during the remainder of the 4th century. It is supposed, however, that early in the following century they were joined by fresh hordes of their brethren, a circumstance which encouraged them to press onward towards further conquests. In the reign of Theodosius the younger, they had increased so considerably in power, that their sovereign Rugilas, or Roas, was paid an annual tribute to secure the Roman empire from further injury.

Rugilas, dying in the year 434, was succeeded in the sovereignty of the H. by his nephews Attila (q. v.) and Bleda. With Attila's death, however, in 454, the power of the H. was broken in pieces. A few feeble sovereigns succeeded to him, but there was strife now everywhere among the several nations that had owned the firm sway of Attila, and the Huns especially never regained their power. Many of them took service in the armies of the Romans, and others again joined fresh hordes of invaders from the north and east, aiding them in their repeated attacks upon the moribund Roman empire.

HUNT, JAMES HENRY LEIGH, poet and essayist, was born in London, 19th October 1784, educated at Christ's Hospital, and first attracted notice as a writer of theatrical and literary criticisms for the *Examiner* newspaper, which was started in 1805 by his elder brother John. At the age of twenty-four, he became joint editor and proprietor of the *Examiner*. He was a liberal in politics before liberalism had become fashionable; and for one of his articles, reflecting on the obesity of the Prince Regent—'a fat Adonis of fifty,' H. had called him—he was sentenced to pay a fine of £500, and to undergo two years' imprisonment. H. was happy enough in his confinement; he hid the prison-bars with flowers, and received visits from Byron, Shelley, and Keats. On his release, he published *The Story of Rimini*, which he had written in prison, and which gave him a place among the poets of the day. *Foliage*, appeared in 1818, and about the same time he started the *Indicator*, a serial suggested by the *Spectator* and *Tatler*. In 1828, he published *Lord Byron and his Contemporaries*, the record of a brief and not very pleasant companionship in Italy with his lordship, which gave great offence to Byron's friends. In the same year he started *The Companion*, a sequel to *The Indicator*, both of which were republished as one book in 1834. In 1833, he published a collected edition of his poetical works. In 1834, he started the *London Journal*, which he edited for two years. His principal works, besides those already mentioned, are—*Captain Sword and Captain Pen* (1835); *Legend of Florence* (1840); *The Seer*, a publication similar to *The Indicator; The Palfrey* (1842); *Sir Ralph Esher*, a novel (1844); *Imagination and Fancy* (1844); *Wit and Humour* (1846); *Stories of the Italian Poets, with Lives* (1846); *Men, Women, and Books* (1847); *A Jar of Honey from Mount*

Hybla (1848); his *Autobiography* (1850); *The Religion of the Heart* (1853); and *The Old Court Suburb* (1855). In 1847 he received from the crown a pension of £200. He died at Highgate, August 28, 1859. A selection from his *Letters and Correspondence* was published by his son, Mr Thornton Hunt, in 1862.

H.'s reputation rests upon his poems and essays. *The Story of Rimini* is, on the whole, perhaps the finest narrative which has appeared since Dryden, and his *Palfrey* is delightful from its good spirits and bright sunny glimpses of landscape and character. As an essayist, he is always cheerful and fanciful, and he looks determinedly at the bright side of things. The sky may be gloomy, but if there is a bit of blue in it, he, with an admirable practical philosophy, constantly turns his eye to *that*. He delights to wreath the porch of the human dwelling with roses and honeysuckles. Among his poems are to be found several translations, which are the best things of the kind we possess. He transports the wine of Greece and Italy to England, and its colour and flavour are rather improved than otherwise by the voyage.

HUNT, William Holman, a celebrated English painter of the present day, was born in London in 1827, and exhibited his first picture, entitled 'Hark!' in 1846. During the next few years, his reputation steadily advanced; but while the young artist was winning fame, he was at the same time becoming more and more dissatisfied with the principles and practices that ruled his art, and along with Millais, Rosetti, and other young painters who shared his convictions, he commenced a new style of treatment, known as the *Pre-Raphaelite*. This term was originated by H. and his friends, and was employed by them to indicate their predilection for the painters who lived before Raphael, such as Giotto and Fra-Angelico, but did not at all imply that they meant to take the productions of these masters as technical models. It was because of their truthfulness and earnest simplicity that they admired the fathers of Italian art. The first of H.'s works that shewed the new influence, was his 'Converted British Family sheltering a Christian Missionary from the Persecution of the Druids' (1850). He afterwards produced, among others, 'Valentine rescuing Sylvia from Proteus,' 'The Hireling Shepherd,' 'Our English Coasts,' 'London Bridge on the Night of the Marriage of the Prince of Wales,' 'The After-Glow,' 'The Festival of St Swithin,' 'The Awakened Conscience,' 'The Light of the World,' 'The Scape Goat,' 'Christ disputing with the Doctors in the Temple,' and the 'Shadow of Death' (1873). The last four are perhaps H.'s greatest; and multitudes who do not care to understand the *vexata quæstio* of Pre-Raphaelitism, have been moved by their tenderness and religious truth.

HUNT, William, an eminent English painter in water-colours, was born in London in 1790. He ranks very high in his profession, no less an authority than Mr Ruskin pronouncing him to be among the greatest colourists of the English school. His subjects are very simple—'Peaches and Grapes,' 'Old Pollard,' 'Basket of Plums,' 'Roses,' 'Wild Flowers,' 'Trampers at Home,' 'A Farmhouse Beauty,' 'Fast Asleep,' &c., but they are conceived in a finely poetical spirit, and present the perfection of finish. He died February 1864.

HUNTER, John, the greatest name in the combined character of physiologist and surgeon that the whole annals of medicine can furnish, was born at Long Calderwood, in Lanarkshire, in 1728, and was the youngest of ten children. One of his brothers, William, claims a separate notice. One of his sisters, Dorothea, was married to Dr James Baillie, professor of divinity in the university of Glasgow, and was the mother of Matthew Baillie (q. v.), and Joanna Baillie (q. v.). The fact that his father died when H. was only ten years of age, and the probability that he was over-indulged by his mother, explain how, at the age of twenty, he could simply read and write, and was ignorant of every language besides his own. The fame of his brother William's success as an anatomical lecturer, made H. desirous of entering into the same profession, and he accordingly applied for and obtained the situation of assistant in the dissecting-room. His progress in anatomy and surgery was so rapid, that in the second session he was able to undertake the directing of the pupils in their dissections. He studied surgery under Cheselden (the celebrated lithotomist), at Chelsea Hospital, during the summer months of 1749 and 1750; and subsequently under Pott.

In 1753, H. entered as a gentleman commoner at St Mary's Hall, Oxford; but finally deciding on confining himself to the practice of surgery, he entered St George's Hospital as surgeon's-pupil in 1754, and two years afterwards served the office of house-surgeon. In the course of this year (1754), H. became a partner with his brother in the anatomical school. After ten years' hard work in the dissecting-room, his health began to give way, and in 1759 he was strongly advised to seek a more southerly climate. With this view he applied for an appointment in the army, was immediately made staff-surgeon, and sent out to Belleisle, and afterwards to the Peninsula; but in 1763, peace having been proclaimed, he returned home, permanently settled in London, and with nothing but his half-pay and his own talents to support him started as a pure surgeon. For a while he had not a great practice, and consequently devoted much time and money to comparative anatomy. He was in the habit of purchasing the bodies of animals that died in the Tower, and in travelling menageries; and in order conveniently to carry on his anatomical and physiological inquiries, he purchased a piece of ground at Earl's Court, Brompton, where he built a small house, in which he made most of his researches. In 1767, he was elected a Fellow of the Royal Society, and in the following year was appointed surgeon to St George's Hospital. This appointment led to an increase of his practice, and enabled him to take pupils, each of whom paid him 500 guineas. Jenner (q. v.) was one of the earliest of these, and always spoke of his old master in terms of regard and affection. In 1771, he married Miss Home, sister of Mr (afterwards Sir Everard) Home.[*] His practice at this time was increasing rapidly, but his income never reached £1000 a year until 1774. In 1773, he had the first attack of a disease (*angina pectoris*) which ultimately proved fatal. In 1776, he was appointed surgeon-extraordinary to the king.

In 1783, he determined to build a museum. The building, which was completed in 1785, consisted of an upper room for the reception of his collection, 52 feet long by 28 wide, under which were a lecture-room, and another room which became the place of meeting of the Lyceum Medicum, a society established by H. and Fordyce. It was in December of that year that he planned and carried into execution his famous operation for the cure of aneurism—that of simply tying the artery at a distance from the tumour, and between it and the heart, thus introducing into surgery an improvement which has been more fruitful in important results than any since Ambrose Paré's application of ligatures to divided arteries. In 1786, H. was appointed deputy-surgeon-general to the army; in 1787, he received the Copley medal from the Royal Society. He was now universally acknowledged, by all the younger surgeons, as the head of his profession; but most of his contemporaries looked upon him as little better than an innovator and an enthusiast. He died 16th October 1793, and was buried in the church of St Martin's-in-the-Fields, from whence his remains were removed, in 1860, to Westminster Abbey, where a suitable tablet to his memory has been erected by the Council of the Royal College of Surgeons.

---

[*] Mrs Hunter had a taste for music, and was the author of several popular songs. *My Mother bids me bind my Hair* is one of hers, and was written to an air of Pleydell's.

Some idea may be formed of H.'s extreme diligence, by the fact that his museum contained at the time of his death 10,563 specimens and preparations illustrative of human and comparative anatomy, physiology, pathology, and natural history. He died in comparative poverty, and his collection was purchased, two years after his death, by government for £15,000, and was presented to the Royal College of Surgeons, by whom it has been much enlarged.

In addition to numerous papers contributed to the *Transactions* of the Royal and other learned societies, he published the following independent works: *A Treatise on the Natural History of the Human Teeth* (part i. 1771; part ii. 1778); *A Treatise on the Venereal Disease* (1786); *Observations on Certain Parts of the Animal Economy* (1786); and *A Treatise on the Blood, Inflammation, and Gunshot Wounds* (published in 1794). Mr Palmer, with the literary assistance of several eminent surgical friends, published an excellent edition of *The Works of John Hunter, F.R.S., with Notes*, in 4 volumes, in 1835. To this is prefixed *The Life of John Hunter, F.R.S.*, by Drewry Otley, from which most of the materials of this sketch have been taken.

HUNTER, William, M.D., the elder brother of John Hunter, was born at Long Calderwood, in the parish of Kilbride, Lanarkshire, in 1718, and died in London in 1783. After studying for five sessions in the university of Glasgow, with a view to entering the church, he determined to devote himself to the profession of physic. He passed the winter session 1740—1741 in Edinburgh, and in the summer of 1741 arrived in London, where he resided with Dr James Douglas, the well-known anatomist and obstetric physician, for the double purpose of assisting in dissections, and superintending the education of his son. H. was then entered as a surgeon's pupil of St George's Hospital, and as a dissecting pupil of Dr Frank Nicholls, who was then teaching anatomy with great success. To teach anatomy was now the object of his ambition, and in 1746 an opportunity of doing so occurred. A society of naval surgeons had for several years engaged Mr Sharpe to deliver a course of lectures on the operations of surgery, and on his resignation, H. received the appointment. He gave so much satisfaction, that the society requested him to extend his plan to anatomy. In 1747, H. was admitted a member of the Corporation of Surgeons. In the early part of his career, he practised both surgery and midwifery, but he gradually confined himself to the latter line of practice. He was appointed one of the surgeons-accoucheur to the Middlesex Hospital in 1748, and to the British Lying-in Hospital in 1749.

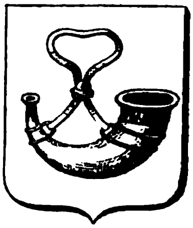
In 1762, H. was consulted by Queen Charlotte, and two years afterwards was appointed physician-extraordinary to her majesty. In 1767, H. was elected a Fellow of the Royal Society, and in the following year was appointed professor of anatomy to the Royal Academy. In 1770, he removed to Great Windmill Street, where he had built a house, in connection with which were a roomy amphitheatre for lectures, a dissecting-room, and a magnificent room which was to form his museum, which consisted of anatomical preparations executed by himself and his pupils, purchases from other museums, also minerals, shells, and other objects of natural history, together with a very rare cabinet of ancient medals and coins.

An estrangement which took place between H. and his brother continued till the former was on his death-bed, when his brother requested that he might be admitted to see him. This was acceded to, and he continued to visit him daily, and to afford him professional assistance, until his death. Together with the bulk of his fortune, H. left his museum to Dr Baillie for a period of thirty years, after which it was to be handed over to the university of Glasgow, to which institution he bequeathed £8000 for its maintenance and increase.

H. excelled as a lecturer in clearness of arrangement, aptness of illustration, and elegance of diction. 'He was, perhaps, the best teacher of anatomy that ever lived.' He published several important contributions to medicine, of which the most important is his *Anatomical Description of the Human Gravid Uterus and its Contents*, which did not appear in its perfect form till after his death.

HUNTER, the name of a river in New South Wales, which enters the Pacific 75 miles north of Sydney.

HUNTING HORN, or **BUGLE HORN**, is a frequent bearing in Heraldry. When adorned with rings, it is said to be *garnished*. If the mouth and strings of the instrument are of a different tincture from the horn, this must be named in blazon.



Hunting Horn.

HU'NTINGDON, a market-town and parliamentary and municipal borough of England, capital of the county of the same name, on the left bank of the Ouse. H. is united with its suburb Godmanchester by a bridge over the Ouse. The Great Eastern Railway and the Great Northern have each a station here. There are 3 established churches, 4 dissenting chapels, and numerous schools, one of which is the Grammar-school, with an endowment of £100 a year, and two exhibitions for Cambridge University. Large brick-works, two breweries, and an iron-foundry, are sources of employment. The house of Oliver Cromwell is of historical interest. Pop. of parl. bor. (1871), 6606; of mun. bor., 4243.

HUNTINGDON, Selina, Countess of, was the second of three daughters and co-heiresses of Washington Shirley, second Earl Ferrars, and was born August 24, 1707. She married, in 1728, Theophilus, 9th Earl of Huntingdon, and became a widow in October 1746. Adopting the principles of the Calvinistic Methodists, the founder of which sect was the famous George Whitefield, she made that eminent preacher one of her chaplains, and assumed a leadership among his followers, who came to be known as 'The Countess of Huntingdon's Connection.' On Whitefield's death in 1770, she was appointed by his will sole proprietrix of all his possessions in the province of Georgia, on which she immediately set about organising a mission to North America. Her labours at home increased with her years. For the education of ministers, she established and maintained a college at Trevecca, in Wales; removed, in 1792, to Cheshunt, Herts; and built, or became possessed of, numerous chapels in different parts of the country, the principal one being at Bath. She likewise expended large sums in the support of young men trained to itinerant preaching, as well as in private charity. But with all her excellences, she was not indisposed to play the part of a female pope, and had quite a passion for carrying her point. She died June 17, 1791. By her will, dated January 11, 1790, she created a trust, bequeathing her chapels to four persons, of whom Lady Anne Erskine, a daughter of the Earl of Buchan, was one, for their care and management after her death, when the number amounted to 64. Most of them have become, in doctrine and practice, almost identical with the Congregational or Independent body. There were lately above 100 chapels belonging to this connection in England and Wales.

HU'NTINGDONSHIRE, a small inland county of England, is bounded on the E. by Cambridgeshire, on the S. by Bedfordshire, and on the W. and N. by the county of Northampton. Area, 229,515 acres, almost the whole of which is in arable or pasture lands. Pop. (1871) 63,708. It is watered chiefly by the Ouse, which flows north-east through the south part of the county; and by the Nene, which skirts its northern boundary. In the southern districts the surface is diversified by low hills; the northern portion of H., however, is included in the great fen-country. The soil is various; clay, however, predominates generally. Grain, with beans, rape, and clover are the chief crops. The county returns two members to the imperial parliament.

The county of H. was traversed by two Roman roads, and Roman remains, as coins, pottery, &c., have been found.

HU'NTLY, a small burgh of barony and market-town of Scotland, in the north-west of Aberdeenshire, situated at the junction of the Bogie and the Deveron, 20 miles south-south-west of Banff. In the vicinity is the ruin of Huntly Castle. Pop. (1871) 3570.

HU'NTSVILLE, a village in Northern Alabama, on the Memphis and Charleston Railway, United States of America, 10 miles north of the Tennessee River. It has the usual county buildings, and a large trade in cotton and imported goods with the surrounding country. Pop. (1870) 4907.

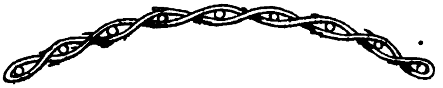
HUNYADY, JÁNOS (Eng. John), governor of Hungary, one of the greatest captains of his age, was born towards the close of the 14th century. H.'s origin is wrapped in mystery, the most accredited legend being that he was a son of the Emperor Sigismund by a Wallachian lady. H. and his descendants had in their escutcheon a raven—*corvus*—hence the designation of Corvinus. We find H. as Ban of a province south of the Danube, distinguishing himself against the Turks, who at that time were the terror of the whole of Christendom. During the period 1437—1456, H. was the shield of Hungary, not only against external foes, but also against the lawless attempts of the nobles. Such was the renown of H.'s arms, that, after the campaign of 1444, the Turks were glad to obtain an armistice of ten years. The vacillating Vladislas I. allowed himself to be induced by the papal legate, Julian Cæsarini, to break the peace he had sworn to keep. H. was defeated in the bloody battle of Várna, 1444; the king perished in the fight, as also the cardinal-legate; H. was captured during his flight by the voivod of Wallachia; but upon a declaration that the whole of Hungary would rise to deliver the noble prisoner, was safely escorted to the frontier, and there set free. During the minority of Ladislaus V. (son of Vladislas I.), H. was elected by the nation to be governor of Hungary. The battle of Rigómagö (1447), one of the bloodiest ever fought, was lost through the treason of the voivod of Wallachia; H. had once more to go through a short captivity. But the most splendid of his deeds was the storming of Belgrade, where the monk, John Capistran, carrying the holy cross, raised the enthusiasm of the Christian warriors to such a height, that a most complete victory brought that fortress again into the possession of the Hungarians. Shortly afterwards dysentery broke out in the camp, and H., the great Christian hero, after a short illness, fell a victim to the disease. Capistran, seventy years old, followed his friend into the grave two months later. H. left two sons, Ladislaus and Mathias (q. v.)—the former of whom was treacherously imprisoned, and beheaded at Buda, by the very prince whom his father had so faithfully served, Ladislaus V.; the latter was given in charge to George Podiebrad (q. v.) of Bohemia.

HUPE'H, one of the central provinces of China, reputed the most fertile. The great river Yangtse flows through the south of the province, where it receives tributaries with various lakes on either side, nearly doubling its volume of water. Area, 70,450; population, 37,370,098. Wuchang is its capital.

HU'RA, a genus of plants of the natural order *Euphorbiaceæ*. *H. crepitans*, a native of the West Indies and tropical America, is a tree abounding in a very acrid milky juice; with stalked, heart-shaped, acuminate, leathery leaves. The fruit is a woody capsule, of the size of a pretty large apple, very much flattened, formed of 12—15 *cocci*, each containing a large seed, surrounding a common axis, which separate with great elastic force. Before the use of blotting-paper became general, the capsule was generally used in the West Indies as a sand-box—whence the tree is called SAND-BOX TREE—for powdering letters with fine sand; but it was found necessary to bind it with a hoop of iron, as even after being used for years, it would sometimes burst with a report like that of a pistol. The seeds are a violent drastic purgative.

HURD, RICHARD, D.D., an eminent English prelate, was born at Congreve, in Staffordshire, January 13, 1720, and studied at Cambridge University, of which he became a fellow in 1742. In 1749, appeared his first notable production, *Commentary on Horace's Ars Poetica.* In 1750, through Warburton's recommendation, he was appointed one of the Whitehall preachers, and ultimately rose to be Bishop of Lichfield and Coventry. He died May 28, 1808. His principal works are—*Dialogues on Sincerity, Retirement, The Golden Age of Elizabeth and the Constitution of the English Government* (1759); *Letters on Chivalry and Romance* (1762); and *An Introduction to the Study of the Prophecies Concerning the Christian Church* (1772). Hallam says of H., that he 'has perhaps the merit of being the first who, in this country, aimed at philosophical criticism.'—*Literary History of Europe*, 4th edit. Lond. 1854, iii. 475.

HU'RDLES, in military affairs, consist of straight flat rectangles of strong wicker-work, about 6 feet long, and 2 feet 9 inches high. They are useful in many ways, both in military and civil life, either as fencing, as barriers, or in fortification, in the construction of *hurdle-batteries.* These last were the invention of Sir William Congreve, who devised them as the speediest means of throwing up earth-works: three hurdles are fastened at their ends in the form of a triangle, and the central space is filled in a short time with earth. These triangles can be constructed to any ground-plan, and with their aid, a body of soldiers can entrench themselves in a few minutes. The hurdle is composed of wattles interwoven (as shewn in the diagram) round stakes or pickets, the latter during the manufacture being fixed upright and firmly in the ground.



Hurdle-weaving.

HURDWA'R, perhaps the most famous spot on the Ganges, stands on the right or west bank of the river at the point where it emerges from the sub-Himalaya into the plains of Hindustan. From its position on the sacred stream, it attracts immense numbers of pilgrims for the purposes of ablution. The orthodox season comprises the end of March and the beginning of April—a great fair at the same time engrafting commerce on religion. In ordinary years, the attendance amounts to 200,000 or 300,000; but on the occasion of every twelfth year, the latest having occurred in 1867, the visitors, from the commencement to the close of the festival, are stated to average about 2,000,000. The place is 1024 feet above the sea, in lat. 29° 57′ N., and long. 78° 14′ E.

HURDY-GURDY, a very old musical instrument of the stringed kind, which, under the name of Leyer, or Baurenleyer, spread from its native country, Germany, over a great part of Europe. The Hurdy-gurdy consists of a flat, oval-shaped sounding-board, over which the strings are stretched, with a back or bottom of the same size and shape. These are bound together by tolerably deep sides, or ribs. On one side are from ten to twelve finger-keys, for shortening the sounding lengths of the strings when required. There are four strings, of gut, which are put into a state of vibration by being rubbed by the edge of a small wooden wheel charged with rosin, and turned by a handle. Two of the strings are tuned in unison as a key-note, or one of them a fifth above; they are placed out of reach of the keys, and form a sort of drone-bass. The other two strings are acted on by the keys, and produce a diatonic scale of from ten to twelve notes. The Hurdy-gurdy is only suited to simple music, and was used for such as had many repetitions. Its simplicity and cheapness rendered it, at one time, a favourite instrument among the peasantry of Europe. The instrument is now mostly to be seen in the hands of Savoyard boys, who play it on the streets.

HU'RON, one of the five great lakes of the St Lawrence, has Superior and Michigan above and Erie and Ontario below it. It separates Upper Canada from the state of Michigan, and extends in N. lat. from 43° to 46° 20′, and in W. long. from 79° to 85°, and has been estimated to contain about 20,000 square miles. Its surface is 584 feet above the level of the sea; its depth about 1000 feet. Its waters are remarkable for their clearness and purity, whence the lake received from the French traders the name of MER DOUCE, or Fresh Sea. This vast body of water is said to contain 3000 islands, one of them, the Great Manitoulin, or Sacred Island, running parallel to almost the whole of the northern coast, which is one continuous mass of comparatively barren rocks.

HURRA'H, a shout of encouragement and applause, peculiar to the English. It serves also as a war-cry. As an engagement at sea commences, the crews of the English vessels send up deafening hurrahs; in a charge on shore, English soldiers hurrah as they rush upon the enemy. There is something strangely exciting in this simple sound, and the combatants work themselves, as they shout, into a frenzied forgetfulness of danger.

HU'RRICANE. See STORMS and WIND.

HURST, a charge in Heraldry representing a small group of trees, generally borne upon a mount in base.

HUSBAND AND WIFE are the correct legal as well as popular terms to denote two persons married to each other. The modes of contracting marriage, with the accompanying ceremonies, and the impediments to marriage, will be more properly described under the head of Marriage (q. v.), and the mode of dissolving the marriage has been already partly described under Divorce (q. v.). The effects of marriage on the parties, and upon their property, will here be described, for which purpose the relation of husband and wife will be assumed to have been duly constituted. And as the effect is not the same in all parts of the United Kingdom, the laws of England and Ireland, which agree in this respect, will first be stated, and afterwards those of Scotland separately.

The effect of marriage in England and Ireland may be viewed under two heads—first, as regards the persons and the personal rights of the married persons; and secondly, as regards their property. 1. As to the person. So far as regards the person of the husband, he remains in precisely the same position as before marriage. He can sue and be sued, enter into contracts, and bind himself as fully after as before marriage, and he can even make a will, and bequeath all his property to strangers, regardless of the wife. As regards the person and personal rights of the wife, however, there is a material difference. Her person is said to be merged in that of her husband, and for many purposes they are treated as one person in the eye of the law. The meaning of that is, that the wife is under many disabilities. She cannot enter into contracts in her own name, and for most of the purposes of business she cannot be treated with as apart from her husband. Even the personal property she had before marriage, unless settled upon her by some settlement made before the marriage, becomes her husband's absolutely, and he can squander it at will. The principal thing which the wife can do in the way of entering into contracts after marriage, is to order goods and necessaries for the use of herself and family and for household use; but this she does not in her own right, but merely as the agent of the husband, who is presumed by the law to give her an implied authority to that effect, and therefore the wife, when ordering goods, does not in any way bind herself, but merely her husband. As, however, this power is often abused by extravagant wives, the law qualifies the power in this way, that the goods and necessaries so ordered must be reasonable, and suited to the rank and position in life of the husband. If goods are therefore ordered which are extravagant, the husband can repudiate the contract, and return them, but he cannot keep the goods and refuse payment; if, for example, he has seen his wife wearing an expensive dress which he knows he did not himself order or pay for, if he do not at once repudiate the transaction, and return the goods, he will be held to have consented and approved of the purchase, and he cannot afterwards escape liability for the price. This position of husband and wife is taken advantage of in the lower walks of life by means of the tally system, which is the cause of much demoralisation. The tallyman calls upon the wife in the husband's absence, and offers her goods, which are generally in the end charged for at an exorbitant rate; but as he consents to take payment by instalments, and as the wife is advised to pay them secretly, the result is that the husband's money is often squandered. These transactions being a fraud on the husband, can generally be checked if, at the first moment he becomes aware of them, the husband repudiates them; and a county court, or any other court, would give him every assistance in getting rid of any liability so incurred, if he should afterwards be sued; but it generally happens that the matter has advanced too far before it is discovered; or he has done something which is construed into an adoption of the contract; or, what is frequently the case, he ignorantly supposes that he has no remedy.

The husband, being entire master of his own actions, has the power to decide where to live, and the duty of the wife is to live with him in the same house. If she refuses to do so, and lives apart without just cause, he is not bound to support her even with necessaries. If, however, she separates from him for just cause, the case is otherwise. Though the husband is bound to maintain his wife, there is, curiously enough, no direct means in England of enforcing this duty. There are circuitous means only. The wife, for example, cannot sue the husband herself, but she has an implied authority to order necessaries, and the tradesman so supplying these can sue the husband for the price. Hence it is that when a tradesman supplies a wife, who is living apart, with necessaries, before he can be sure of recovering the price from the husband, he must satisfy himself that the wife has just cause for living separately. There are several just causes for her living apart. If the husband, for example, treats her with what is deemed cruelty in the eye of the law—as keeping a mistress in the house, starving and assaulting her—she is entitled to leave him, and she can order necessaries at his expense from any tradesman willing to supply her. There are, however, many degrees of cruelty and ill-usage for which the wife has practically no remedy, and of which the law can take no cognizance; for the law cannot remedy a tithe of the ills of life. If the husband have the means, and yet refuses to support his wife, or what is the same thing, if he wilfully refuses to work, being able to do so, and she becomes chargeable to the parish, the parish authorities can seize the goods of the husband, if any, and sell them for her support; or he may be imprisoned by justices of the peace, as an idle and disorderly person, for a month. But in such circumstances the husband more frequently deserts his wife. If he deserts her, and leaves her destitute, and a charge upon the parish, he may then be treated under the Vagrant Act as a rogue and vagabond, and imprisoned by justices of the peace in the house of correction for three months. If the desertion continue for a period however long, it is no ground in England for a divorce; but if it is coupled with adultery, and continues two years, it will be so. It sometimes happens that after a husband has deserted his wife, she maintains herself by her own exertions, and acquires property; in such a case, her earnings (unless the marriage took place after 1870) belong to him, though the wife might in all cases get a protection order from justices of the peace, which excludes him and his creditors. Stats. 20 and 21 Vict. c. 85, sect. 21; 21 and 22 Vict. c. 108, sect. 6, 7, 8; 33 and 34 Vict. c. 93, sect. 1.

As regards crimes committed by a wife, she is in general liable to be punished for these in the same way as if she were unmarried. But there is a peculiarity as regards crimes committed by the husband and wife jointly. If the crime be treason or murder, both are punished precisely as if they were unmarried. But in all the lesser crimes, the theory as well as the practice is, that if the wife was a party to the crime, and committed it in her husband's presence, she is presumed by the law to have so acted under the compulsion or coercion of her husband, and is acquitted as a matter of course. And so favourable is the law on this ground to married women who commit crimes, that, in the absence of any direct evidence one way or the other as to where the crime was committed, it will still be presumed that the wife acted under this marital coercion, and so she escapes punishment. Another curious anomaly arising from the maxim that husband and wife are one person, is, that a wife cannot be convicted of stealing her husband's goods. If she abscond with his property, however valuable, she cannot be punished. But this rule is again qualified by the circumstance, that if she commits adultery, and afterwards absconds with the adulterer, both taking away the husband's goods, the adulterer may be convicted of the larceny, though it is doubtful if she is in that case liable to any punishment. And where the third party has not in view any adultery with the wife, but joins her in taking away the husband's goods, in many cases neither he nor the wife can be punished criminally.

Husbands and wives may be witnesses for or against other parties in all civil cases, i. e., actions and suits relating to debts, contracts, and wrongs which are not crimes, and in all inquiries of a civil nature. So when the husband is himself a party in a civil action, his wife may be compelled by the opposite party to be a witness; but in all such cases neither husband nor wife can be compelled to disclose any communication made to him or her by the other spouse during the marriage. As regards all criminal proceedings instituted against either husband or wife, the other spouse is neither competent nor can be compelled to be a witness; but where the husband and wife are not the accused, but the prosecuting parties, then, inasmuch as the crown is presumed to be the prosecutor, and they are not parties, they may be both witnesses, subject to the qualification as to not being bound to disclose communications made by and to each other during marriage. There is an exception also to the rule that neither can be a witness against the other in criminal proceedings—viz., where the wife charges her husband with an assault or other crime of greater degree upon her person, she is in that case only a competent witness against him, for otherwise the crime might go unpunished. Moreover, in all proceedings instituted in consequence of adultery of the husband or wife, neither of the married parties is competent or can be compelled to be a witness.

2. As to the property of the married persons. As regards the husband, he still remains sole owner of his property, real and personal, and can do what he likes with it; and he may, as already stated, by will devise and bequeath it all to strangers, regardless of the wife. He can also sue and be sued as before, irrespective of his wife. But as regards the wife, the case is different. Owing to her incapacity to contract or even to hold personal property independently of her husband, she can neither sue nor be sued except where she has separate property settled upon her, as afterwards explained. If she had personal property before marriage, the whole, in marriages before 1870, was the sole and absolute property of the husband immediately after the marriage, if there is no marriage settlement. All debts which were due to her before marriage

also become after marriage debts due to him, provided he chooses to reduce them into possession, and sue for them. As a general rule, therefore, the wife could not, unless married after 1870, earn and enjoy her earnings separately; but this, as well as legacies coming to her, are now, by the act 33 and 34 Vict. c. 93, made the rule in all cases, and he is not liable for the wife's debts contracted before marriage, but a settlement may still vary the rule. As regards persons married before 1870, the old rule remains, that she could not sue in her own right. Hence, in cases where a debt was due to her before marriage, or the money claimed has been earned by her during marriage, both she and her husband may sue for it, or he alone must sue for it, according to circumstances. In like manner, when the wife was in debt before her marriage, the husband, who in effect married her debts also, must be sued jointly with her; and so, if she committed some wrong, as a slander or assault, the husband must be sued jointly with her; but where she merely ordered goods which were supplied to the husband, he alone is liable, and he alone can be sued. When the wife was once sued along with the husband, both of them could be imprisoned; but the wife was immediately discharged, as a matter of course, on application to a judge, provided she had no separate property of her own out of which the debt was payable. The old rule as to the wife's personal property becoming the husband's absolutely after marriage, suffered qualification when such property consisted not of money or chattels, but of what are called chattels real, such as leases and mortgages. In such a case, they become so far the property of the husband, that he can sell them during his life, but he cannot bequeath them by will; and on his death they remain hers, while on her death they become his. Again, where the wife's personal estate before marriage consisted of mere rights of action or debts due to her, they were so far his that he could at any time sue for them, and so reduce them into possession, and make them his own absolutely, but could not bequeath them by will; and if he did not sue for them in his lifetime, they survived to the wife after his death. As regards the wife's real estate—i. e., her lands and houses held in freehold—the husband does not acquire these absolutely by the marriage, but he thereby becomes entitled to a life-estate in them. He cannot sell the property, though he may sell his own life-estate in it. On the other hand, though the real estate still continues to belong to the wife, she cannot sell it, like an ordinary owner, unless she separately acknowledges the deed of sale, which is done by her going before a commissioner or a judge, who examines her in private, and explains the nature of the deed, and sees that she understands its purport, and that she acts freely, without the coercion of the husband.

On the death of one of the married parties, the property is disposed of as follows: if the husband dies, his will may, as already stated, dispose of his whole property to strangers, irrespective of the wife, and she may be left entirely destitute in consequence. But there are some things his will cannot take away from her, as, for example, her leases, separate property, &c., and her real estate. To these may be added her paraphernalia, which consists of her personal apparel and jewels; but even these will be taken by her husband's creditors, if there is a deficiency of assets. If the husband die without a will, the law is more liberal to the widow: she is entitled to one-third of the husband's personal estate absolutely, and not merely to a life-interest; she is also entitled to dower out of her husband's real estate, i. e., to a life-interest of one-third of the whole real estate which belonged to him. This right of dower, however, can in general be defeated by the husband's will. When the wife dies before the husband, he becomes entitled to nearly all her personal estate, of whatever description, even though she left children of the marriage; and it must be recollected that she can in general make no will which has any effect, if the husband chooses to repudiate it. As regards the wife's real estate, if a child has been born, who might by possibility have inherited her real estate, then the husband has, by the courtesy of England, an estate for life in the whole of such real estate; but if no child has ever been born, the real estate goes to the wife's heir-at-law, or if none, to the crown.

The common law of England has been often considered, especially of late years, as unjust towards women, in subjecting them too much to the caprice of their husbands. There are, however, several ways of avoiding this, but they are only available, as will at once be seen, to the rich. The most effectual way of preventing the husband having powers so absolute as the law gives him, is by executing a marriage settlement before marriage. By means of a settlement, not only all the property which the wife has before marriage, but also all which she expects to have during marriage, may be settled upon her to her separate use, and put entirely out of the power of the husband. This is done by the agency of trustees, who hold and manage her property as their own, keeping the husband at arms' length, and yet she has almost the same power of acting independently as if she were not married: she can draw her rents, keep her bank-account, enter into contracts, and bond her separate property, and also execute her will, as if she were a man. Sometimes the husband and wife both settle their property by the same settlement; or if the wife has no property, the husband may settle his upon her in the same way. She is in that case generally allowed a certain sum per annum as pin-money, to spend upon her personal adornment; and by means of her trustees, she can sue her husband for this sum, if not punctually paid. Sometimes, by the marriage settlement, if the husband had no money, the wife's money is settled partly upon him, so that he has a certain allowance per annum; but in the event of his becoming insolvent or bankrupt, the money is not to go to his creditors, but to remain for the wife's use. In short, there is practically no limit to the variety of mutual arrangements, by means of a marriage settlement, for providing against the possible hardships of the common law. It is on the same principle that, in some cases, the Court of Chancery has interfered to prevent the husband acquiring so absolute an interest in the wife's property as the common law gives him. But a great step towards emancipating married women's property from their husband's power was achieved in 1870 by the act 33 and 34 Vict. c. 93, which, as already stated, made the wife's earnings and legacies her separate property, and enabled her to make deposits in savings-banks, and in the funds, and to insure her own or her husband's life for her own exclusive benefit, and so that she can sue in her own name for her separate property. This act had some defects which the legislature must sooner or later remedy and extend, for the better protection of women, and unremitting efforts have been used for this purpose.

When a marriage is once contracted, the parties cannot of themselves, or by any arrangement they can enter into, put an end to it; nothing can do this but a divorce, or the death of one of the parties. It is a delusion not uncommon among the working-classes, that if one of the parties runs away or disappears, the marriage is at an end, and the party left behind may, at least after a time, marry again. This is, however, not the case. It is true, that if one of the parties has not heard of the other for seven years, and has reason to believe that that other is dead, the former cannot be convicted and punished for bigamy in marrying again. But this is merely an excuse for escaping the usual punishment; the second marriage only remains good if the lost party is really dead, or never turns up again. If at any time, however remote, the party supposed to be dead returns, the first marriage still remains good, and the second bigamous marriage becomes a nullity, and the children born of it, if any, are bastards, so that so long as both parties live, the only way of dissolving the marriage, so as to permit either to marry again, is a divorce, which can be obtained only on certain grave grounds. There is an intermediate state, called *Judicial Separation* (q. v.), which can be brought about for certain grounds less than what would warrant divorce. But though a wife judicially separated may enter into contracts, and is, as regards her dealings, much the same as an unmarried woman, she is still a wife, and cannot marry again; and if the parties are living separate by mutual agreement, they are nevertheless married, and have most, though not all, of the rights of married persons.

Scotland.—The law of husband and wife in Scotland as regards their personal rights and disabilities, and the property during the marriage, does not substantially differ from the law of England and Ireland, but the following points may be noticed. As regards their persons and personal rights, and crimes, the law is the same. It is often said that in Scotland the movable property of both husband and wife become a kind of joint-stock property, called *Goods in Communion* (q. v.); but this phrase has no meaning except with reference to the principle of the division of the property after the death of one of the parties, and the dissolution of the marriage. As long as the parties live, the husband is, as in England, entire master, except that he cannot on deathbed bequeath more than a share of the property away from the wife. The same rule exists that the wife's movable property becomes the husband's, and her heritable property remains her own, subject to the husband's life-rent. When she disposes of her heritable property by deed, she must also judicially ratify the deed by going before a magistrate, and acknowledging that she acts of her own free will. When the husband deserts her, the wife may now in Scotland, as in England, obtain a judge's order to protect her earnings and monies; and when a wife succeeds to property, neither her husband nor his creditors can take this until a reasonable provision has been made for her out of such property. (Conjugal Rights Act, 24 and 25 Vict. c. 86, and Conjugal Rights Amendment Act, 37 and 38 Vict. c. 31). A wife has, in Scotland, the same implied power to bind her husband for necessaries; but in Scotland the husband can, by a process of inhibition, give a general notice to tradesmen not to supply her at his expense, and this notice will be binding on all the Queen's subjects. No such notice in England would have so strong an effect; but even in Scotland such a notice as inhibition does not prevent the wife ordering necessaries, if not otherwise supplied. A rich wife is bound, in Scotland, as in England, to maintain her husband out of her separate estate. In Scotland, as in England, the rights of the parties may be varied by an ante-nuptial contract or marriage settlement; but there is less need for it, for the common law makes a provision for the wife in spite of her husband, since he cannot by will bequeath away from her more than ⅓ or ½ of his movable property respectively, according as there are children or no children. See Goods in Communion, Will. In Scotland, as in England, the married parties may also execute a post-nuptial contract, which will be binding if the husband was solvent at the time of executing the deed; but though in England it will be in that case valid both as against wife and children and creditors, yet in Scotland it will bind the wife and children only if they thereby get a better provision than they would have been entitled to independently of any deed, or at least something which they accept as equivalent. And, as a general rule, nothing can be done after marriage by the parties so as to settle the property on either party, if the effect is to defeat their then creditors. The Scotch widow's terce corresponds to the English widow's dower, and the rule as to the paraphernalia is not substantially different. The law as to the dissolution of the marriage and bigamy is the same in Scotland, though the grounds of divorce are more liberal in Scotland. See Divorce. Paterson's *Compendium of English and Scotch Law.*

HU'SBANDRY, Servant in, a description of agricultural servant. Such a servant differs from ordinary domestic servants in this, that if the servant in husbandry leave his or her work without cause, &c., he or she can be punished by imprisonment on proceedings before a justice of the peace. This is so in all parts of the United Kingdom.

HUSKISSON, William, an eminent English statesman, was born at Birch Moreton, in Worcestershire, 11th March 1770, and in 1783 was sent to Paris to study medicine. He took part in the storming of the Bastile, and as a member of the Club of 1789, attracted attention by a number of speeches on subjects of political economy. In 1792, he returned to England, received a subordinate appointment under the Tory government, and formed an intimate acquaintance with Pitt and Canning. In 1795, he was selected by Dundas, the war minister, to be first under-secretary; and sat in parliament for Morpeth. He subsequently held several offices under Pitt, with whom he retired in 1801, and on the dissolution of parliament in 1802, lost his seat in the House of Commons. In 1804, he was returned for Liskeard, and was appointed secretary of the treasury in the new Pitt cabinet. On Pitt's death, however, in 1806, he lost this office, but was restored to it by Mr Percival in 1807. He sat for Harwich, 1807—1812; Chichester, 1812—1823; and Liverpool, 1823—1830. In 1814, he was chief Commissioner of the Woods and Forests; in 1822, president of the Board of Trade; in 1827, secretary of state for the colonies; and in 1828, secretary of state for foreign affairs. But this office he resigned, and retired from the ministry the same year. Through his exertions the old restrictions on the trade of the colonies with foreign countries were removed. He also obtained the removal or reduction of many import duties, considerable relaxation of the navigation laws, and is allowed to have been the great pioneer of free trade. He received fatal injuries at the opening of the Liverpool and Manchester Railway, 15th September 1830, and died the same evening. A collection of his speeches was published in 1831. Both from the comprehensiveness of the views which they exhibit, and their fulness of accurate details, they are interesting to the student of political economy.

HUSS, John, the Bohemian reformer, whose name is associated with that of Jerome of Prague (q. v.), both on account of the work which they wrought, and the death which they suffered, was born in 1373 at Hussinecz, near Prachatics, in the south of Bohemia. He studied at the university of

Prague, where he soon made great progress in the branches of learning most valued in that age, took his degree of Master of Arts in 1396, and began to lecture publicly in 1398. In 1402, he became preacher in the Bethlehem Chapel in Prague, and laboured with the greatest earnestness for the instruction of the people, and in the discharge of all his clerical functions. As a preacher, he was greatly esteemed both by the common people and by the students; whilst as confessor to Queen Sophia, he obtained access to the court. At this time he became acquainted with the writings of Wickliffe, which exercised a great influence over him. The monks and clergy were of course violent enemies to H., as he denounced, with continually increasing boldness, their corruptions. Archbishop Sbinko burned the writings of Wickliffe in 1410, in compliance with a brief of Pope Alexander V., and complained to the pope of H. as a Wickliffite. Hereupon he was summoned to Rome; but he did not go, and the combined influence of the people, the court, and the university, compelled the archbishop to remove a prohibition which he had issued against his preaching. But in 1412, Pope John XXIII. having published a bull of indulgence in order to a crusade against Ladislaus, the excommunicated king of Naples, whose kingdom the pope claimed as a papal fief, H. boldly raised his voice against the whole procedure as unchristian, whilst Jerome of Prague also stood forth to condemn, in the strongest manner, both the bull and the vendors of indulgences. An interdict against H., in 1413, was the consequence. H., however, appealed from the pope to a general council and to Christ, and wrote a book, *On the Church*, in which he condemned the abuses of the papacy, and denied the unconditional supremacy of the Roman pontiff. Thinking himself no longer safe in Prague, he now retired to his native place, where he preached the gospel with great power. In 1414, he went to Constance to the general council, summoned thither, indeed, on a charge of heresy, but under the protection of King Wenceslaus, and having a safe-conduct from the Emperor Sigismund. Having reached Constance on the 3d of November, he was, on the 28th of the same month, apprehended in spite of the remonstrances of the Bohemian and Polish nobles. His trial was conducted with little regard even to the appearance of equity. On the 6th of July 1415, thirty-nine charges were exhibited against him, some of which he acknowledged as exhibiting his doctrine, whilst others he utterly denied. Being required to recant his alleged errors, he refused to do so till they should be proved to be errors. He and his writings were now condemned to the fire, and in spite of his safe-conduct, the sentence was carried out on the same day, and the ashes of the martyr were thrown into the Rhine.

HUSSA'R, a light-cavalry trooper, dressed in a loose jacket, with other articles of attire easy in set, and a fur cap; armed usually with a sabre and pistol. The idea of these troops, now in every army, came originally from Hungary. There were 13 regiments of Hussars in the British army in 1873—1874.

HU'SSITES, the followers of Huss (q. v.). Honouring him and Jerome of Prague as martyrs, they despised the decrees and anathemas of the Council, and took terrible revenge on the priests and monks. The symbol of their confederacy was the cup, the use of which in the Lord's Supper they extended to the laity, as James de Misa had already done with the approbation of Huss. In 1417, King Wenceslaus was constrained to grant them the use of many churches. After his death, 13th August 1419, the majority of the states refused to acknowledge his brother, the Emperor Sigismund, who had broken his safe-conduct to Huss. And the papal instructions to the Cardinal Legate, John Dominico, requiring him to employ violent measures for the conversion of the Hussites, an insurrection ensued, and the war began which is known in history as the Hussite War. Convents and churches were reduced to ashes, and priests and monks were slain. The Hussites divided into two parties—the more moderate known by the name of *Calixtines* (q. v.), and the more extreme by that of *Taborites* (q. v.).

HUSTINGS (of doubtful derivation), a place or temporary platform where members of parliament are formally proposed or nominated for election.

HU'SUM, a small town of Prussia, in the province of Slesvig-Holstein, and 22 miles west of the town of that name, is situated on the coast of the North Sea, at the mouth of a small river. It was formerly strongly fortified, and possessed many ships. Pop. (1871) 4986, who manufacture leather and tobacco, and carry on distilleries and breweries, and some trade in wool and cattle.

HUT, in army affairs, is a wooden structure, more or less rough in its details, for the housing of troops. It is substituted very often for the tent, when the sojourn in a camp or cantonment is likely to be of consideration, as, for instance, through a winter—a hut, however rude, which is wind and water tight, being as superior in comfort to a tent as the latter is to the open air. Huts may be made of almost any size, and are sometimes for one officer; at others, for as many as 100 men. The principal hut encampments at present in the United Kingdom are at Aldershot, Shorncliffe, Colchester, and the Curragh of Kildare; in British North America, hut-camps are situated at intervals of a day's march on the route from New Brunswick to Quebec, and the troops who made that winter-march in 1861—1862, found their shelter truly welcome.

As the hut is as useful to the settler in a wild country as it is to a soldier, we give some of the particulars of their manufacture in different forms. Huts are of four sorts: 1. The *log* hut; 2. The *framed* hut; 3. The *pisé* hut (of tempered clay).

The *log hut* is formed of rough logs or trunks of trees, laid crosswise in tiers to the required height, as in fig. 1, the angles being formed, as in fig. 2, by a notch on each side of the log, about one-third of its diameter in depth, and a few inches from the extremity. The space between the logs is then made water-tight and air-tight

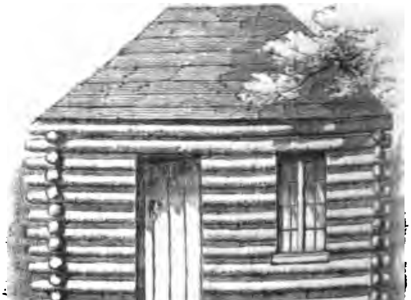


Fig. 1.

by a stuffing of clay, wattles, sallows, or small bundles of twigs. Within, the joints should be lined with laths, or the whole interior may be boarded with inch-planks, if such are attainable. The roof should be supported by a scantling (see ROOF), and may consist of overlapping boards, or boards laid flush and shingled, or laths and shingles, or even birch-bark alone. The door is usually ledged, and there are one or two windows, with glazed sashes and shutters. These should be made by regular carpenters, and taken to the place of building ready for use. A hut thus formed makes a snug habitation, and will last for many years; exclusive of the sashes, two men can erect, in about a week, a hut of rough logs which shall be sufficiently large for their residence—that is, with an interior area of about 15 feet by 10 feet.

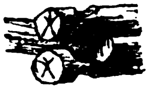


Fig. 2.

When circumstances permit, the logs are occasionally squared, which enables them to be fitted more accurately to each other, and adds, of course, to the solidity and finish of the whole structure, as well as to its durability. In this case, the corner logs, instead of crossing each other, are joined by a dove-tail, or by cutting the end of each to an angle of 45°.

The *framed* hut has the advantage over the log hut of allowing more exactness of finish, and from its lightness and portability being easily transported to any place where logs for hut-building might not be forthcoming. It consists of a strong framework of squared wood, properly fitted together, and covered with overlapping planks or weather-boards. The side of a framed hut is shewn in fig. 3. The pieces should be sawn to the proper size, fitted to each other, and numbered; then packed together in small compass for conveyance to the intended site, where the structure can soon be erected. No one piece need exceed 11 feet in length, 6 inches in breadth, and 2 inches in depth. The uprights should not be more than from 15 inches to 18 inches apart, and should be firmly held by diagonal tie-rods, as in the illustration. The first step is to carefully level the ground on which the hut is to stand, and if a dwarf-wall of stone or brick, 8 or 10 inches high, can be built round, so much the better. On this ground or wall a rectangular frame of thick wood (say 6 inches by 3) must be laid as a basis for the framework; on this latter the uprights are placed, the binding tie-rods fixed, and the cap-sill, corresponding to the frame below, placed above all, every joint being carefully mortised and tenoned. The weather-boards can now be nailed on the outside, and when the roof is put on, the hut is complete. The breadth should not, for stability, exceed 16 feet; and when the hut is of any considerable length, cross-beams should be thrown from side to side at the top. The roof should be made of ordinary scantling, as described under ROOF. It is usually estimated that one of these huts, 30 feet long, 16 broad, and 10 high, makes a good barrack-room for 20 soldiers. The camps at Aldershot and the Curragh are mainly formed of framed huts. Where extra warmth is desired, the spaces between the uprights are built up roughly with bricks, burned or unburned.

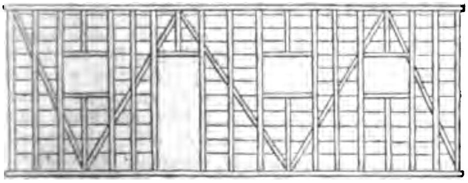


Fig. 3.—Side of a framed Hut.

Pisé huts, common in the south of France, and very useful where wood is scarce, as well as very comfortable, are walled with blocks of clayey earth, rammed with great pressure into wooden moulds until they assume the forms of stones. These are laid one above each other much as stones themselves would be by a mason, and the wall so formed is both durable and sightly.

The most critical operation for the non-professional hut-builder is roofing. This is usually of thatch, shingles, paper, or felt, if lightness be an object; and of stones, bricks, or tiles, if the walls be calculated to bear their pressure.

HUTCHESON, FRANCIS, a distinguished philosopher of last century, was the son of a Presbyterian minister in the north of Ireland, where he was born in 1694. He studied for the church at the university of Glasgow, but shortly after the completion of his theological course, he was induced to open a private academy in the city of Dublin, which proved highly successful. In 1720, he published his *Inquiry into the Original of our Ideas of Beauty and Virtue*, &c., which was the means of introducing him to the notice of many influential personages, such as Lord Granville, then lord-lieutenant of Ireland, Archbishop King, Primate Boulter, and others. This work was followed, in 1728, by his *Essay on the Nature and Conduct of the Passions;* and in the year after, he was appointed professor of moral philosophy in the university of Glasgow. Here he died in 1747. His largest and most important work, *A System of Moral Philosophy*, was published at Glasgow in 1755 by his son, Francis Hutcheson, M.D., with a Preface on the Life, Writings, and Character of the Author, by Dr Leechman, professor of divinity in the same university. As a metaphysician, H. may be considered a pioneer of the so-called 'Scotch school.' From the period of his lectures, according to Dugald Stewart, may be dated the metaphysical philosophy of Scotland, and, indeed, the literary taste in general, which marked that country during the last century, although, as Stewart acknowledges and Hamilton shews, traces of the Scotch philosophy appear in earlier writers. But it is as a moral philosopher, rather than as a metaphysician, H. shines. His system is, to a large extent, that of Shaftesbury, but it is more complete, coherent, and clearly illustrated. H. is a strong opponent of the doctrine, that benevolence has a selfish origin. The faculty by which moral distinctions are recognised, H. (after Shaftesbury) terms a *moral sense.* See ETHICS.

HUTCHINSON, JOHN, an English theological writer, born 1674 at Spennithorne, in Yorkshire. He was for some time steward of the household of the Duke of Somerset, and left his service to devote himself to his religious studies, the duke procuring for him a sinecure appointment of £200 a year from government. In 1724, he published the first part of a work called *Moses' Principia*, in which he defended what he regarded as the Mosaic cosmogony, and assailed Newton's theory of gravitation. He continued to publish a succession of works till his death, which took place on 28th August 1737. His religious system is best exhibited in his *Thoughts concerning Religion.* The leading principle of it is, that the Holy Scriptures contain the elements not only of true religion, but of all rational philosophy, which, however, was to be derived only from the original Hebrew; and it, for that purpose, was subjected to strange critical or rather fanciful processes.

His works at one time exercised a considerable influence. His followers were called HUTCHINSONIANS, and among them—strange as it may seem—were persons of considerable learning and celebrity.

HUTCHINSON, ANNE, a religious enthusiast, of American celebrity, emigrated from Lincolnshire, England, to Boston, Massachusetts, in 1636. Living in a community prone to religious excitement, she claimed to be a medium of divine revelations, and held meetings for women, in which she held forth Antinomian doctrines. Great controversies arose, and a synod was called, in which her teachings were condemned, and she was banished from the colony. She and her friends now obtained from the chief of the Narragansetts liberty to reside in Rhode Island, where they set up a community on the highly commendable principle, that no one was to be 'accounted a delinquent for doctrine.' After the death of her husband (who shared her opinions), she removed to a Dutch settlement, in the colony of New York, where, in 1643, she and her whole family of 15 persons were taken prisoners by the Indians, and all but one daughter barbarously murdered.

HUTTEN, ULRICH VON, famous in the history of the Reformation, was descended of an ancient and noble family, and was born at the family castle of Steckelberg, in the electorate of Hesse, April 1488. When he was ten years of age, he was placed in the monastery at Fulda; but disliking this mode of life, he fled to Erfurt in 1504, where he associated with scholars and poets. He then lived at various places in Northern Germany till about 1512, when he went to Pavia to study law. After passing several years in Italy, he returned to Germany, and made himself conspicuous by his publications, especially those concerning the affair of Reuchlin and the Dominican Hoogstraten, in Cologne, in which he came to the support of Reuchlin, and displayed no small learning and great power of satire. He again went to Italy in 1515, to take the degree of Doctor of Law, and returned to his native country in 1517. He was crowned with the poet's laurel crown at Augsburg, and the Emperor Maximilian conferred on him the honour of knighthood. In the same year he edited a work of Laurentius Valla, found in a convent, *De Falsâ Creditâ et Ementitâ Donatione Constantini Magni*, and in 1518 accompanied Albert, Archbishop of Mentz, to the diet of Augsburg, where Luther had his famous conference with Cajetan. Subsequently, he established a small printing-press of his own, and employed himself in writing and disseminating pamphlets fully exposing the arrogance and wickedness of the Romish clergy. The Archbishop Albert denounced him to Rome, whereupon he entered into an immediate and avowed connection with Luther, whom he had hitherto despised. At this time, also, he began to write in the German language, instead of Latin. Persecuted by his enemies, he availed himself of the protection of Franz von Sickingen, but was soon forced to flee. From this time H. was compelled to adopt a wandering life, and died 31st August 1523, in the Isle of Ufenau, in the Lake of Zürich. H. was bolder and more open in the expression of his opinions than almost any man of his age. He did much to prepare the way for the Reformation, and to promote it. It may be attributed to him as a fault, that he was too reckless of consequences, and not sufficiently tender in dealing with things that had become venerable in the eyes of many; but he was a man who feared nothing, even when almost all his friends trembled. He was a master of the Latin language. He left 45 different works, of which a collective edition was published at Berlin in 1821—1827, in 6 volumes. The best life of H. is that published at Leipsic, in 1858, by Dr David Friedrich Strauss (English translation, 1874).

HUTTON, CHARLES, an eminent mathematician, was the son of a superintendent of mines, and was born at Newcastle-upon-Tyne, 14th August 1737, and in 1755 became teacher in a school at Jesmond, and afterwards at Newcastle, till 1773. During this period, he published his *Treatise on Arithmetic and Book-keeping* (1764); *Treatise on Mensuration* (London, 1771); and *Principles of Bridges, and Mathematical Demonstration of the Laws of Arches* (Newcastle, 1772). In 1773, he was appointed to the professorship of mathematics at the Royal Military Academy, Woolwich, and in November 1774 was elected a fellow of the Royal Society. Soon after this, he was selected to perform the necessary calculations for determining the density of the earth from Dr Maskelyne's observations on Schiehallien, and his report was published in the *Philosophical Transactions* for 1778. In 1779, he received the degree of LL.D. from the university of Edinburgh. He died 27th January 1823. H.'s most important works are—*Tables of Products and Powers of Numbers* (London, 1781); *Mathematical Tables* (London, 1785); *Mathematical and Philosophical Dictionary* (London, 1795); *Course of Mathematics* (London, 1798—1801); and *Recreations in Mathematics and Natural Philosophy* (4 vols. London, 1803); the last being a most interesting and instructive work. Besides these, he regularly contributed mathematical papers to the *Ladies' Diary*, of which he was for some time editor, and also to the *Philosophical Transactions*. His biography has been written by Dr Olinthus Gregory.

HUTTON, JAMES, a celebrated geologist, was the son of a merchant in Edinburgh, and was born there 3d June 1726. He studied in his native city, and afterwards at Leyden, where he took the degree of M.D. He devoted himself, however, not to the medical profession, but to agricultural pursuits and to the science of chemistry, from which he was led to mineralogy and geology. He contributed much to the improvement of agriculture in Britain. He made some chemical discoveries, and is the author of a Theory of the Earth and of a Theory of Rain. His Theory of Rain has been since acknowledged by men of science as generally correct, although at first it met with some opposition. His Theory of the Earth has for its distinguishing feature the supposed agency of a central heat, by which the elevation of strata and many other phenomena are accounted for, and some parts of it may be regarded as now also substantially admitted by all geologists, although for a time it was combated by the followers of Werner, who sought to explain everything by aqueous solution and crystallisation. Dr H. was indeed too extreme in his theoretical views, and some of his followers were still more so. He was, however, not only a theorist, but an observer, and his discovery of granite veins is of no small importance in the history of geology. He died March 26, 1797.

HUXLEY, THOMAS. See SUPP., Vol. X.

HUY, a strongly fortified town of Belgium, in the province of Liege, is romantically situated amid lofty rocks on both banks of the Meuse, and in the immediate neighbourhood of the finest scenery of that river, 17 miles south-west of Liege. Its citadel, the works of which are partly excavated in the solid rock, commands the passage of the river. The church of Notre Dame, a graceful Gothic edifice, was begun in 1311. In the vicinity are ironworks and coal-mines, in the products of which the inhabitants carry on a lively trade by means of the Liege and Namur Railway. The principal manufactures are paper, leather, zinc, beer, spirits, and an inferior kind of wine. Pop. (1870) about 11,000.

Peter the Hermit, on his return from the first Crusade, founded here the former abbey of Neufmoustier (*Novum Monasterium*), and was himself interred within it. H. has been frequently taken during the wars, of which this region has been the seat. It was last captured by Marlborough and Coehoorn in 1703.

HUYGHENS VAN ZUYLICHEM, Christian, one of the great philosophers of the 17th c., was born at the Hague, April 14, 1629, and was the second son of Constantine Huyghens, secretary and counsellor to the princes of Orange. H. studied at Leyden and Breda. His first work, *Theoremata de Quadratura Hyperboles, Ellipsis, et Circuli, ex Dato Portionum Gravitatis Centro* (Leyden, 1651), is an example of that powerful geometrical talent which lay at the foundation of all his scientific achievements. Soon after this, he constructed the pendulum-clock, following out the idea first suggested by Galileo (q. v.). A complete description of H.'s instrument is contained in his great work, *Horologium Oscillatorium, sive de Motu Pendulorum* (Hague, 1658).

This work contains expositions of many of the cases of constrained motion, especially those applicable to the construction of time-keepers. H. has also developed and given precision to the investigations of Galileo upon accelerated motion under the action of gravity; and there is no doubt, that to the clearness of his demonstrations, his great successor, Newton, in preparing his magnificent development of the principle of accelerating force, was largely indebted. Newton was a student and admirer of his works, and assigns to him, along with Sir C. Wren and Wallis, the distinguished epithet of *hujus ætatis geometrarum facile principes*.

By means of an improved telescope of his own construction, H., in 1655, discovered the ring of Saturn and the fourth satellite of that planet. In 1659, he published an account of these discoveries in a work entitled *Systema Saturnium, sive de Causis Movandorum Saturni Phenomenon, et Comite ejus Planetâ Novo*. In the end of this work is described an invention of great importance in astronomy—namely, the Micrometer (q. v.), by which small angles between objects viewed by a telescope are accurately measured. In 1660, H. visited England, where he was admitted a member of the Royal Society. He discovered the laws of collision of elastic bodies about the same time with Wallis and Wren, and also made a material improvement in the air-pump.

In 1666, H. received an invitation to settle in France, with the promise of a pension from Colbert, then all-powerful in that country. He repaired to Paris, where he remained till 1681, having been admitted to the membership of the Royal Academy of Sciences; but alarmed at the danger which seemed impending over the Protestants, he returned to his own country. After his return, he still continued his favourite pursuits till his death at the Hague, 8th June 1693.

The optical works of H. lastly claim our attention. They are chiefly remarkable for his maintaining a theory of light, which, opposed as it was to the then more popular theory of Newton, is substantially the same with that which is now called the *undulatory theory*. By means of his theory, he explained the ordinary phenomena of reflection and refraction, and further succeeded in a satisfactory explanation of the phenomenon of double refraction, which Newton's theory failed to account for.

HUYSUM, Jan van, a celebrated Dutch painter of flowers and fruits, was born at Amsterdam in 1682, and acquired the rudiments of his art from his father, a landscape-painter of very considerable talent. H. surpassed all his predecessors in mellowness, purity, and delicacy of colouring; the exquisite disposition of his lights and shadows; and above all, in his miraculous rendering of dew-drops and the motions of insects. He died at Amsterdam in 1749. H.'s master-pieces are to be found in the galleries of Vienna, Munich, Dresden, and St Petersburg.

HWANG-HO, HOANG-HO, or YELLOW RIVER, one of the principal rivers of China, about 2400 miles in length, the area of its basin being not less than 700,000 square miles. It rises in a marshy plain lying between the Bayan-kara and Kwanlun Mountains, in a lake called Ala-nor, in lat. 35° 30′ N., long. 96° E. Its course is so crooked that, after it leaves Ala-nor, it turns first south 30 miles, then east 160, then westward 120, winding about the gorges of the Kwanlun, then north-east into the province of Kansuh, next it proceeds northward for 430 miles, till it is bent eastward by Inshan, on the edge of the table-land, where it encloses within its great bend the country of the Ortous Mongols. At the Peh-ling it is deflected south, where it divides the provinces of Shanse and Shense for 500 miles. At the south-western corner of Shanse, it receives its largest tributary, the Wei-ho, 400 miles in length; from this point the Yellow River flowed until recently eastward to the ocean, 650 miles distant, in lat. 34°. It is little used for navigation, Chinese vessels being unable to stem its impetuous current. In some parts of its eastern course, it is above the great plain through which it passes. The embankments requisite for averting inundations are a source of never-ending expense to the government, and their yielding to floods a frequent cause of desolation to extensive districts of country. Dr Macgowan announced, some years ago, in the *North China Herald*, that this wayward and turbulent stream had suddenly shifted its course, turning off near Kaifung-foo in a north-easterly direction, discharging its waters into the rivers of Chih-le, which disembogue in the Gulf of Pehchele, the mountainous province and promontory of Shantung intervening between its former and its present mouth, a distance by coast-line of about 500 miles. More recently, it was announced that the bed of the Yellow River, for more than two hundred miles from its mouth, was a belt of sand, which, since the spring of 1853, has been, to use the Chinese term applied to it, 'as dry as dust.' The change seems to have been gradual. As there were frequent slight shocks of earthquakes in the Great Plain of China in 1852—1853, Dr Macgowan suggests that these contributed to effect the phenomenon, another cause being neglect of the dykes by the imperial government. Its present channels are not precisely known, but they are probably the same as in ancient times; for it has shifted its bed at different periods of Chinese history. The vast quantity of sediment conveyed to the sea by this river, giving it its colour and name, is taken up in that part of its course which lies between the provinces of Shanse and Shense; beyond that region its waters are remarkably clear.

HY'ACINTH, a name given to the brilliantly coloured varieties of the gem called Zircon, also to fine red Cinnamon-stone (q. v.) or Pyrope (q. v.); and sometimes to ferruginous quartz of a blood-red colour, which, from its occurring abundantly in gypsum at Compostella, in Spain, is called *H. of Compostella*.

HYACINTH (*Hyacinthus*), a genus of plants of the natural order *Liliaceæ;* bulbous-rooted plants with corolla-like, bell-shaped, 6-cleft perianth, six stamens fixed in the tube of the perianth, and dry capsular fruit.—The *Oriental H.* (*H. orientalis*), one of the most favourite of florists' flowers, is a native of Asia Minor, Syria, and Persia. It is now naturalised in some parts of the south of Europe. It has broad linear leaves, and a scape with a raceme of many flowers pointing in all directions. The flowers in cultivation exhibit great variety of colour, chiefly blue, purple, and white. They are very beautiful and very fragrant. The fragrance is strongest about or after eleven o'clock at night. Among cultivated hyacinths, are many with double flowers. The H. has been cultivated from a remote period, but about the beginning of the 18th c., it attained almost the first place as a florists' flower. Great attention was bestowed on the production of new varieties, and enormous prices were given for bulbs of some of them. A price equal to £200 sterling was sometimes paid for a single bulb. The principal seat of the cultivation of hyacinths was and still is at Haarlem. At present, however, more than £10 is seldom asked for the finest new variety of H., but although the trade is considered as now much depressed, the Haarlem gardeners still sell bulbs to the value of £2000 or £3000 yearly. H. bulbs, planted in pots, readily produce beautiful flowers; and flowers almost equally beautiful are obtained—for one year, however, only—by placing them in water in *H. glasses*, in which they form a favourite ornament of apartments in winter and early spring. In cultivating the H. in this way, rain-water should be used for filling the glasses in preference to spring-water. The roots should never be disturbed, if possible, and therefore the water should not be changed, but the glass must be filled up occasionally till it almost touch the bulb. A piece of charcoal may be placed in it to purify it. The glasses ought to be kept in a dark cool place till the bulbs have sent out roots. Hot rooms are apt to make the stems long and the flower-spikes small. The cultivation of the H. in the open ground is much more difficult, if the varieties are to be preserved from degenerating. A light sandy and yet rich soil is requisite. A compost of cow-dung, rotten leaves, and fine sand is used at Haarlem. New varieties are raised from seed. Several other species of H. are natives of the south of Europe, Africa, &c.—The Grape-Hyacinth and Globe-Hyacinth, frequently cultivated as garden flowers, are now referred to the genus *Muscari*, of which the perianth is merely 6-toothed.—A common British plant, growing in woods and copses, with beautiful blue flowers very like those of the Oriental H., but all drooping to one side (*H. non-scriptus*, also known as *Scilla nutans*, *Endymion nutans*, and *Agraphis nutans*), is sometimes called the Wild H., and sometimes the Blue-bell. The bulbs were used in the time of Queen Elizabeth for starching the ruffs then worn, and the starch of them was otherwise used instead of paste or glue. The fresh bulbs are said to be poisonous.

Oriental Hyacinth.

HYÆNA, a genus of digitigrade carnivorous quadrupeds, included in the genus *Canis* by Linnæus, and by some naturalists referred to the family *Canidæ*, but now more generally to *Viverridæ*, whilst the dentition connects it even with *Felidæ*. Hyænas have six incisors and two canine teeth in each jaw, five molars on each side in the upper jaw, and four in the under. They seize an object with so firm a hold, that, among the Arabs, they are proverbial for obstinacy. The vertebræ of the neck sometimes become ankylosed in old hyænas. The hind-quarters are lower and weaker than the fore-quarters of the body, so that hyænas move with a shambling gait. The body is covered with rather long coarse hair, forming a mane along the neck and back. The feet have each four toes. The claws are strong, fit for digging, and not retractile. The tail is rather short. Beneath the anus is a deep glandular pouch, contributing much to the offensive odour by which hyænas are characterised. Hyænas eat carrion, as well as newly-killed prey, and are of much use, like vultures, as scavengers, clearing away the last remnants of carcases that if left to rot would greatly pollute the air. They sometimes attack cattle, especially if they flee, but rarely man, though they sometimes seize children. During the day, they hide themselves in caves, old rock tombs, ruined edifices, &c.; by night, they roam singly or in packs in quest of prey. They prowl about towns and villages, and often dig up corpses that have not been very deeply buried. This, together with their aspect and manners, has caused them to be generally regarded with horror, and very exaggerated accounts of their fierceness have been prevalent. Instead of being untamable, as was long the popular belief, they are capable of being very completely tamed, and shew an attachment to man similar to that of the dog; they have even been used as watch-dogs. Hyænas are found only in Africa and the south of Asia, not extending to the furthest east of the latter continent.—The Striped H. (*H. vulgaris* or *striata*) is found both in Asia and Africa, and there are several varieties considerably different in size, colour, &c. The smallest hyænas are of the size of a large dog.—The Spotted H. (*H. crocuta*) inhabits South Africa. It is rather smaller than the largest varieties of the Striped H., but is more fierce and dangerous. It is called Tiger-wolf by the colonists of the Cape of Good Hope. Besides its ordinary howling, which it emits very freely in its nocturnal roamings, this H. often indulges in an expression of gratification or of some passion, resembling hysterical laughter, whence it has acquired the name of the

Spotted Hyæna (*H. crocuta*).

LAUGHING HYÆNA. The general colour is ochry gray, with thinly scattered small round brown spots, and sooty muzzle and feet.—The WOOLLY H. (*H. villosa*) is a smaller South African species.

In consequence of the bones which hyænas eat, their dung forms solid yellowish-white balls, of compact earthy fracture, the *Album græcum* of the old materia medica.

HYA-HYA. See COW TREE.

HYBERNA'TION. See HIBERNATION.

HY'BODUS (Gr. *hump-tooth*), a genus of fossil fish, whose teeth and osseous fin-rays are found in all the Secondary rocks from the Trias to the Chalk inclusive. The genus, with the small family of Hybodonts to which it belongs, occupy a place between the Cestracionts, with their pavement of flat crushing teeth, and the sharks with their sharp-pointed cutting teeth. The teeth of the Hybodonts are conical, but broad and blunt; from the body of the tooth rises a large central cone, and several small lateral ones, decreasing in size as they recede from the principal cone. The enamel is strongly marked by longitudinal grooves and folds. The osseous rays of the dorsal fins are the only other preserved portions of these fossils. Like the Port Jackson shark, the H. had each of the two dorsal fins furnished with a large and strong spine, one-third of whose length was buried in the flesh. Nearly fifty species of this genus have been described.

HY'BRID (Gr. *hybrid*, from *hybris*, extravagance, licentiousness) is the term applied by naturalists to the offspring of different but generally nearly allied species of animals and plants, and must be distinguished from the word *mongrel*, which is applied to the offspring of different varieties of the same species.

M. Broca, whose memoir on Hybridity of Animals is the most complete that has yet appeared, remarks that this condition may be (1) natural, (2) excited (*provoquée*), or (3) artificial. The first variety is such as occurs spontaneously amongst animals in their wild state; the second includes those cases in which domesticated animals, which would not naturally cross with one another, do so under the influence of man, and in opposition to their natural instincts; while the third variety is due to the artificial admixture of the male and female generative elements, and as far as is yet known occurs only in fishes, and in the vegetable kingdom. The second variety is by far the most common and the most important.

When the male of the species A can impregnate the female of the species B, it may happen that the process can be inverted, and that the male B can impregnate the female A. In other cases, however, while the male A can readily impregnate the female B, the male B cannot impregnate the female A. In the first case, the hybridity is termed *bilateral;* in the second, *unilateral.* The former is rare, and even when it does occur, the cross in one direction is more common and more productive than in the other. Thus, the ordinary mule, the offspring of the male ass and the mare, is much more readily obtained, and, physiologically, is less imperfect than the corresponding animal, the hinny, which occasionally results from the union of the stallion and female ass. See MULE, HINNY. Our domestic sheep and goats afford an example of the latter (unilateral) kind of hybridity. The union of the he-goat and the ewe is frequently productive, while the union of the ram with the she-goat is always unproductive.

In the present state of our knowledge, it is impossible to predicate in what cases the crossing of different species will be productive, and in what cases it will be barren. While some closely allied species do not admit of a cross, other species, far more removed from one another, not only yield hybrids, but even fruitful hybrids. There is, however, a limit, beyond which the chance of offspring becomes reduced to zero, and, according to Broca: 'If the crossing of animals of different genera is now an incontestable fact, there is no authentic evidence that offspring has resulted from the crossing of animals of different orders.'

Cases have been referred to, as shewing that animals of different orders may cross, but none of them are satisfactorily established. The strongest apparent case of hybridity between different orders is that of the *Jumarts*, which were said to result from the union of the bull and the mare, or of the stallion and the cow. These jumarts were believed in from the time of Columella to that of Buffon, who fully investigated the subject, and found that they were merely hinnies—the offspring of the stallion and the she-ass. Among mammals, hybrids have been obtained between the different species of the genus *Equus*. So far as experiments go, the horse, the ass, the zebra, the quagga, &c., breed freely *inter se*, but the degrees of fertility among their offspring have not been fully determined. The dog has been made to breed with the wolf and the fox, the lion with the tiger, the he-goat with the female sheep, the ram with the female roe-deer (*Cervus Capreolus*), and the hare with the rabbit. (See Professor Owen's article, 'Hybrid,' in Brande's *Dictionary of Science, Literature, and Art.*) A case was recorded some time ago in *The Field* newspaper, in which a prolific union took place between a mastiff dog and a lioness that had been brought up together.

Among birds, hybridity is not uncommon. The swan will breed with the goose, the grouse with the blackcock, the pheasant with the common fowl, the goldfinch with the canary, &c. Among reptiles, hybrid offspring has been observed between the toad and the frog. Among fishes, hybrids have been obtained by artificial impregnation between different species of the genus *Cyprinus*.

Many hybrids have no propagative power, while in others it is so far limited as to admit only of reversion to the original specific form. When a hybrid possesses generative power, it breeds more readily with an individual of one of its parent stocks than with another hybrid like itself. The most remarkable example on record of generative power in hybrids is afforded by the experiments of M. Roux of Angoulême, who finds that he can cross hares and rabbits to any extent, and who has thus, by breeding *leporides*, established a new and lucrative department in agriculture. For a full account of these experiments, which are well deserving of a trial in this country, the reader may consult Brown-Sequard's *Journal de la Physiologie*, vol. ii. pp. 374—383. These experiments have inflicted a severe blow on the popular doctrine of the permanence of species.

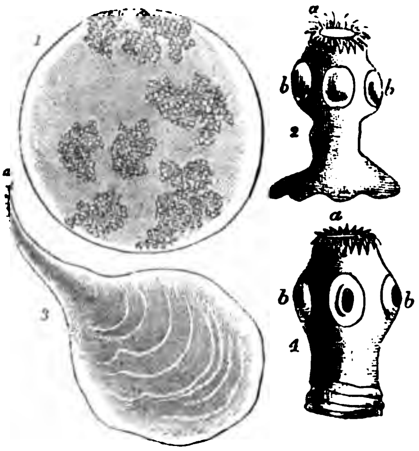
Experiments on the hybridisation of plants have been very far from confirming the hybrid origin of forms apparently intermediate between other species, and which were once regarded as probably hybrids produced in a state of nature. The interference of man is usually necessary to effect an intermixture, and in many cases in which it has been found possible, it is by no means of easy accomplishment. The predilection for pollen of the same kind appears to be very strong; and if pollen, both of the same and of another kind, is applied to the stigma of a flower, the result is the same as if its own pollen had been there alone. The hybridiser, therefore, must cut away the stamens of the flower of which the pistil is to be impregnated, and carefully prevent all access of pollen other than that which he brings to it. Even with these precautions, it is found impossible to produce hybrids between some plants of the same family, and not very dissimilar.

Hybrid plants are said to partake generally of the characters of the male more than of the female parent. It is more certain that valuable results are often obtained as to size and abundance of fruit, brilliancy of flowers, hardiness, and other qualities. The question of the continued fertility of true hybrids is one having most important relations to the great questions concerning species. Some assert that neither among animals nor among plants are hybrids fertile for more than one or two generations, if kept by themselves; although they are readily fertile with either of the parent species, to which they become again assimilated. But this opinion is controverted, and the question must, of course, be decided by observation of facts, in judging of which, however, questions of no little difficulty must often arise as to what are and what are not different species.

The subject of the hybridisation of plants was first investigated, and with great care and very numerous experiments, by Kölreuter, in the end of the 18th c., and has been more recently studied with much attention by Dean Herbert of Manchester, Van Mons, and particularly Gaertner.

HYDA'SPES. See Jhelum.

HY'DATID (from the Greek *hydatis*, a watery vesicle), a term indefinitely applied to several distinct objects of a vesicular or cyst-like character, which are found in the bodies of men and certain mammals. True hydatids were formerly regarded as cystic Entozoa (q. v.), such as Cysticercus, Cœnurus, and Echinococcus, but all these animal forms are now discovered to be larval stages of tænia or Tape-worm (q. v.). These hydatids may occur in almost any part of the body, and they have been observed in man, the ape, the ox, the sheep, the horse, the camel, the pig, the kangaroo, and some other vegetable feeders, but they apparently do not occur in carnivorous animals or in the rodents. They are generally enclosed in an external sac, which is attached to the tissue of the organ in which it is situated, and which is frequently common to many hydatids, each of which has a distinct envelope. The fluid in the interior of the hydatid itself is almost always colourless and limpid, but the fluid in the common cyst in which the hydatids float is often of a yellow colour. The *Cœnurus cerebralis* is found in the brain of various ruminants, and gives rise to the disease in sheep known as 'the staggers.' When the hydatid occurs in the fourth ventricle, the animal, instead of turning round and round in one direction, springs in the air, and this variety of the affection is hence distinguished by German veterinarians as *das Springen*. Whenever any of the above forms of hydatids are swallowed by man or the lower animals, they may proceed, under favourable circumstances, to be developed into the higher stages of tape-worm. Two species of Echinococcus are usually noticed, namely, the *E. hominis*, which has been occasionally met with in the brain and abdomen of man, and the *E. veterinorum*, which is of common occurrence in various parts of the body of the pig, and several other mammals, but it is by no means certain that they are really distinct. These Echinococci do not become developed into tape-worms unless they reach the intestinal canal of some animal, by being taken as food; and in ordinary cases of hydatids, consisting of Echinococci, the cysts and their contents undergo a kind of degeneration, becoming in some cases converted into fatty or calcareous matter, while in other cases the contents become granular, the peculiar hooklets (which will be described in the article Tape-worm) which occur in them, and which remain unaltered for a long time, revealing their true origin.



Hydatids:

Copied from Rymer Jones's *Animal Kingdom*.

1, Cœnurus Cerebralis, natural size; 2, one head magnified; *a*, oval circlet of hooks; *b*, suckers: 3, Cysticercus Tenuicollis, natural size; 4, head magnified; *a*, circlet of hooks; *b*, suckers.

The so-called acephalocyst, or common globular hydatid, which sometimes attains the size of a child's head, is probably a degenerated or abnormally developed echinococcus.

Hydatids sometimes occasion so little inconvenience, that persons, in whom they are discovered after death, have not suspected any disease in the organ in which they are found. On other occasions, they grow rapidly, and cause so much irritation that suppuration is excited in or around the common sac, which may either burst externally, or into a mucous canal or a serous cavity. In the first or second case, the hydatids will be discharged, and recovery may take place; in the third case, fatal inflammation will ensue. Little can be done for the treatment of this affection, except that occasionally, if the cyst is near the surface, it may be carefully punctured. The means of preventing the affection will be noticed in the article Tape-worm.

False hydatids are simple serous cysts, either occurring alone or in clusters, whose mode of origin is not distinctly understood. Structures of this kind, on a small scale, are common in the choroid plexus of the brain, while on a large scale they are found containing the fluid in ovarian dropsy. These false hydatids are also of comparatively common occurrence in the uterus, which they may distend to such a size as to simulate pregnancy.

HYDE, an important manufacturing town of England, in Cheshire, is situated seven miles east-south-east of Manchester, and about the same distance south-east of Oldham. Until a comparatively recent period, it was a mere village; but since the extension of the cotton-trade, on which it mainly depends, it has rapidly increased in size. Its population in 1871 was 14,223. Besides the numerous cotton-factories, iron, water, and print works are carried on. Coal abounds in the neighbourhood. The district in which H. is situated is densely peopled, and is furnished with abundant means of communication, by railway and canal, with all the important towns in the vicinity.

HYDE, Edward. See Clarendon, Earl of.

HYDE PARK, a noble enclosure of nearly 400 acres, extending from the western extremity of London to Kensington Gardens, which derives its name from having been the manor of the Hyde belonging to the Abbey of Westminster. It became the property of the crown on the dissolution of the monasteries, in the reign of Henry VIII. A canal or sheet of water, called the Serpentine, although in the form of a parallelogram, was made in H. P., between 1730 and 1733, by order of Queen Caroline. At the eastern end of it is an artificial waterfall, constructed in 1817. On the south side are the barracks of the Life-guards. It was in H. P. that the great International Exhibition of 1851 was held, in a Crystal Palace specially erected for the occasion. We do not clearly learn at what time the public began to have free admission to Hyde Park. But Ben Jonson speaks of the show of coaches which it presented in his time; and we know that it was constantly resorted to on the morning of May-day for the sports comprehended under the term Maying. Till the middle of the 17th c., there was a part of it which contained deer. About that time, it began to be a place for races and military reviews. It was also resorted to for duels. After the Restoration, it appears to have become the favourite promenade, which it has ever since continued to be. It has, however, undergone many changes of boundary and division; a large part of Kensington Gardens has been taken from it, also an angle at the south-east corner on which Apsley House now stands.

HYDER ALI, ruler of Mysore, and one of the greatest Mohammedan princes of India, was born in 1728. His father, who was a general of the Rajah of Mysore, afterwards obtained Bangalore in fief, and both of these honours descended to his son. H. A., in 1759, dispossessed his master, allowing him, however, to retain his title, while he himself took that of *dalva*, or regent. He then conquered Calicut, Bednor, Onor, Cananor, and other neighbouring states; and in 1766, his dominions included more than 84,000 square miles. He waged two wars against the British, in the first of which he was completely successful, and dictated terms of peace under the walls of Madras, but died before the termination of the second, in which he was aided by the French. He also joined in a native confederacy for the expulsion of the British from India. He, besides, withheld the customary tribute from the Mahrattas (q. v.), and waged a successful war against them. In his wars he displayed great resolution and perseverance. He died in 1782. H. A. was remarkable amongst Asiatic princes for the mildness of his character and government, and was much beloved by his people. He promoted agriculture, commerce, and the arts, and protected all religions, requiring only submission to his laws. His son and successor was Tippoo Sahib (q. v.).

HYDERABA'D, more properly Haidarabad (from *Haidar*, lion; and *bad*, town), the capital of the Nizam's Territories (q. v.), stands on the right bank of the Mussi, in lat. 17° 22′ N., and long. 78° 32′ E., at an elevation of 1800 feet above the sea, and contains, with suburbs, 200,000 inhabitants. On the opposite side of the river is the British Residency, the stream being here bridged by nine spacious arches of squared granite. Besides these erections and the palace of the native sovereigns, we may mention the principal mosque which has been fashioned after the model of the Kaaba at Mecca; while at the meeting of the four principal streets of the city rises another remarkable edifice, with four minarets resting on four connected arches, on which run the four converging thoroughfares. The neighbourhood abounds with huge tanks. One of them, close to the British cantonment of Secunderabad, measures three miles by two; and another, still larger, is said to be twenty miles round.

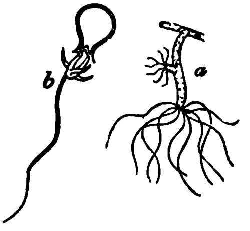
HYDERABAD, the chief city of Sinde, stands four miles to the east of the left bank of the Indus, in lat. 25° 22′ N., and long. 68° 28′ E. Pop. about 24,000. The place is famous for the manufacture of arms of various kinds, such as matchlocks, swords, spears, and shields. As against a native force, it is tolerably strong, occupying a somewhat steep height, and having a rampart flanked by round towers.

HY'DNUM, a genus of fungi (*Hymenomycetes*), having the under side of the *pileus* covered with soft spines which bear the spores. The species are pretty numerous, some of them British; among which is *H. repandum*, more common in some parts of the continent of Europe, and much used as an esculent in France, Italy, and Germany. It grows on the ground, chiefly in pine and oak woods, either solitary, or in clusters or rings.

Hydnum.

HY'DRA, The, or Fresh-water Polype, is the type of the class Hydrozoa, which, with the Anthozoa, form the sub-kingdom *Cœlenterata* of recent zoologists. See Zoophytes.

The H. possesses a gelatinous, sub-cylindrical body, which, from its contractility, undergoes various alterations of form. One end expands into a disc or foot, which adheres to a leaf, twigs, &c.; while a mouth, surrounded by a circlet of tentacles, varying from five to twelve or more in number, is situated at the opposite end. These tentacles are exceedingly contractile, at one moment thrown out as long delicate threads, at the next, drawn up into minute wart-like knobs. Numerous thread-cells project from their surface, the larger ones possessing a sheath and three recurved darts or barbs, and terminating in a long and extremely slender filament. The mouth leads into a capacious cavity, excavated throughout the whole length of the animal, which, exclusive of its tentacles, seldom exceeds three-fourths of an inch. On minutely examining the H., or any member of the class Hydrozoa, the body is found to be composed of two membranes, an ectoderm and an endoderm, the former constituting the outer layer of the animal, and having one side always in contact with the water, while the other side is in close contact with the endoderm, whose free surface forms the lining of the great internal cavity. The food of the H. consists of such minute living organisms as come within the reach of its tentacles, and by these apparently fragile threads, which the animal projects like a lasso, crustaceans, worms, &c., are seized, which



Hydra:
a, Hydra Vulgaris, attached to a piece of stick—a young polype is sprouting from the side of the parent animal; *b*, one of the larger thread-cells, with its three recurved barbs.

would be deemed at first sight superior to their captor in strength and activity. The tentacles appear, however, to possess, through the action of the thread-cells, a powerful benumbing or paralysing influence, for it has been observed that soft-bodied animals which have succeeded in escaping from the grasp of the H. frequently die very shortly. The prey, when mastered, but often when still alive, is thrust into the internal cavity, where the nutritive parts are absorbed by the H., while the indigestible portions are expelled through the mouth.

Although the H. is usually found adhering by its circular foot or disc to submerged leaves, twigs, &c., it is not permanently fixed. It often moves on surfaces under water somewhat after the manner of a leech, both ends taking a part in the movement, and occasionally the disc is protruded above the water, and thus acts as a float.

Sometimes, especially in the autumn, true reproductive organs may be observed, both male and female organs being usually situated on the same animal. Propagation by gemmation is, however, the most common mode of increase. Minute tubercles appear on the body of the parent animal, which, as they increase in size, gradually resemble it; becoming perforated at their free extremity, and tentacles gradually being formed. The pedicle by which they originate by degrees becomes thinner, and finally gives way, leaving the young H. perfectly independent. One of the most remarkable points in the history of this animal is its power of being multiplied by mechanical division. If a H. be cut into two, or even more pieces, every one will, in time, assume the form and functions of the original animal.

Several species of H., such as *H. viridis*, *H. vulgaris*, *H. fusca*, &c., have been described, which differ in size, colour, &c. When living hydræ are removed from the water, they appear like minute specks of jelly, which quickly recover their true form on being restored to their proper element. The great authority on these singular animals is Trembley, whose *Mémoires pour servir à l'histoire d'un Genre de Polypes d'eau douce* was published in 1744.

HYDRA, a fabulous monster of the ancient world, said to have inhabited the marshes of Lernæa, in Argolis, not far from the sea-coast. Accounts vary both as to its origin and appearance. Some make it the issue of Styx and the Titan Pallas, and others, of Echidna and Typhon. It is represented as having several heads, which immediately grew up again as often as they were cut off. The number generally ranged from seven to nine, though Simonides gives it fifty, and certain historians a hundred, and even more. Its mouths, which were as numerous as its heads, discharged a subtle and deadly venom. The destruction of this reptile was one of the twelve labours of Hercules (q. v.).

HYDRA, an island of Greece, is situated off the eastern shore of the Peloponnesus (now the Morea), about 5 miles distant from the coast of the department of Argolis and Corinth. It is about 13 miles long, and 3 miles broad, and has an area of 38 square miles. The shores are rocky and steep, and the interior, rising to about 1800 feet in height, is destitute of vegetation and of water. On the north-west coast is the town and seaport of Hydra, the white, flat-roofed houses of which, ascending from the harbour, climb up the side of a hill. The streets, owing to the irregularity of the site, are steep and uneven, but remarkably clean. This town, the only one in the island, is one of the most beautiful in the whole of Greece. Pop. (1871) 11,684, who are chiefly employed in cotton and silk weaving, in tanning, and in commerce.

The island of H. was uninhabited in ancient times. The nucleus of the town was formed by a few fishermen and peasants, who, suffering from the oppression of the Turks, crossed over from the neighbouring mainland, and were afterwards followed by crowds from Albania, Argolis, and Attica, in the 15th and 16th centuries. In the Grecian war of independence, the Hydriotes took a most active part; and none were more liberal in their contributions to the patriotic cause. In 1825, the population was estimated at 40,000, and about that time the islanders were considered the richest in the archipelago. They possessed exclusively the carrying-trade of the Black Sea and the Mediterranean, and traded to England, the Baltic, and even America. Since the revolution, however, more accessible ports have risen to be the centres of Greek commerce, and H. has considerably declined.

HYDRA'CIDS, or HYDROGEN ACIDS, a name given to acids in which the acidifying principle was supposed to be hydrogen. See ACIDS. The division of acids into *oxyacids* and *hydracids* belongs rather to a past than to the present state of chemistry.

HY'DRAGOGUES are those active purgatives which produce a great flux from the intestinal membrane, and which consequently give rise to very watery stools. They are of extreme use in some of the varieties of dropsy, being the most effectual means of diminishing the liquid poured into the cellular tissue and serous cavities of the body.

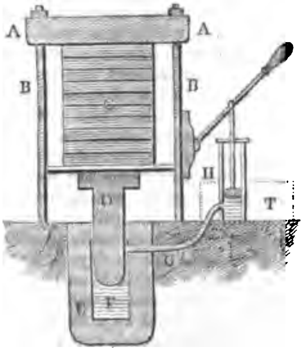
Jalap (especially when combined with bitartrate of potash) and elaterium, a medicine which, from its extreme power, must be given in very small doses (one-eighth to one-third of a grain), and with great caution, are perhaps the best examples of this class of purgatives.

HYDRA'NGEA, a genus of plants of the natural order *Hydrangeaceæ*, which many botanists make a sub-order of *Saxifrageæ*, distinguished by having 4—6 petals, 8—12 or many stamens, a more or less inferior ovary, and 2—5 styles. *Hydrangeaceæ* are shrubs with opposite, or sometimes whorled leaves, destitute of stipules. In the genus H. the flowers are in cymes, the exterior flowers sterile and dilated. Few species are known, and they are chiefly natives of the southern parts of North America, and of China and Japan. The species popularly known as the HYDRANGEA (*H. hortensia*), is a native of China and Japan, and has long been in cultivation there as an ornamental plant. It was introduced into Britain by Sir Joseph Banks in 1788, and speedily became very popular, being readily propagated by layers and cuttings, so as to be not only a favourite green-house plant, but a frequent ornament of cottage windows. In the south of England, it endures the open air. It seems almost impossible to water it too freely; a large plant has been known to receive with advantage one hundred gallons of water daily; and in favourable circumstances, it becomes a magnificent shrub. A plant in Devonshire has had 1000 large cymes of flowers expanded at once. The flowers, generally pink, are sometimes blue; the blue colour is owing to peculiarities of soil. Peat and iron ore are said to be productive of blue flowers in the Hydrangea.—*H. Japonica*, introduced into Europe from Japan by Siebold, is remarkable for its very large cymes of flowers.—*H. nivea* and *H. quercifolia*, American species, are not unfrequently to be seen in flower-gardens in North America.

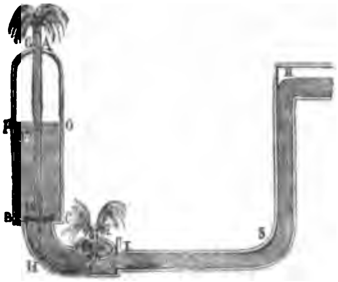
HYDRATES are substances in which a definite quantity of water is chemically combined with a definite quantity of some other constituent. Although water is a perfectly indifferent substance, possessing neither acid nor basic properties, yet it enters into combination both with acids and with bases, and thus forms the bodies termed hydrates. Thus, when an acid has once been allowed to combine with water, the entire separation of the water can usually only be effected by the presence of some strong base, which displaces the water. If, for example, we distil diluted sulphuric acid, water is expelled up to a certain point, when both acid and water are distilled together. The liquid now contains one equivalent of water, and one of acid (HO,SO_3), and is termed hydrated sulphuric acid, and this equivalent of water can only be displaced by an equivalent of potash, or some other base. Water which thus supplies the place of a base in combination with acids is termed basic water. Hydrate of baryta (BaO,HO), hydrate of lime or slaked lime (CaO,HO), hydrate of sesquioxide of iron ($Fe_2O_3,3HO$), and hydrate of oxide of copper (CuO,HO), are similar cases, except that here the water is displaced by an acid instead of a base. The above are examples of hydrates of acids and bases or oxides. Gypsum ($CaO\,SO_3,2HO$) is an example of a hydrate of a salt.

HYDRAU'LIC LIMES AND MORTARS. See CEMENTS.

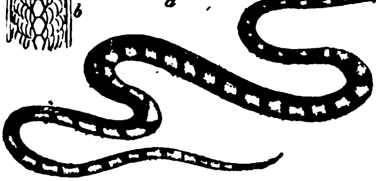
HYDRAULIC PRESS, called also Bramah's Press, from the name of its inventor, depends on the principle, that a pressure exerted on any part of the surface of a liquid is transmitted undiminished to all parts of the mass, and in all directions. See HYDROSTATICS. The annexed figure represents the essential parts of the machine, the details of construction being omitted. F is the cavity of a strong metal cylinder E, into which the piston, D, passes water-tight through the top. A tube, G, leads from the cylinder to a force-pump H; and by means of this, water is driven from the tank T into the cavity F, so as to force the piston, D, upwards. The piston supports a table on which are placed the bales, books, or other articles to be pressed; and the rising of the table presses them against the entablature AA, which is fastened to the pillars B, B. The power of the press is readily calculated. Suppose that the pump has only one-thousandth of the area of D, and that, by means of its lever-handle, the piston of the pump is pressed down with a force of 500 pounds, the piston of the barrel will rise with a force of one thousand times 500 pounds, or more than 200 tons. The rise, however, will be slow in proportion to the power. The enormous multiplying power given by this machine has been employed for a great variety of useful purposes, such as compressing bales of cotton, paper, &c., expressing oils, bending iron plates and bars, and raising weights. This was the means employed for launching the *Great Eastern* at Millwall, and for raising to their position the tubes of the Britannia Bridge.



HYDRAULIC RAM, a simple and conveniently applied mechanism, by which the momentum or weight of falling water can be made available for raising a portion of itself to a considerable height. In the annexed figure, which represents a section of Montgolfier's hydraulic ram, R is the reservoir from which the water falls, RS the height of the fall, and ST the horizontal tube which conducts the water to the engine ABHTC. E and D are two valves, the former of which closes its cavity by ascending, the latter by descending; and FG is a pipe reaching within a very little of the bottom CB. The valves are such that the water at its normal pressure cannot support their weight; the valve E is prevented from falling below a certain point by a knob above *mn*. When the water is allowed to descend from the reservoir, after filling the tube BHS, it rushes out at the aperture *mn*, till its velocity in descending RST becomes so great as to force up the valve E, and close the means of escape. The water being thus suddenly checked, and unable to find a passage at *mn*, will produce a great action on every part of the containing vessels, and by its momentum raise the valve D. A portion of water being admitted into the vessel ABC, the impulse of the column of fluid is expended, the valves D and E fall; the opening at D being thus closed, and that at *mn* opened. The water now rushes out at *mn* as before, till its motion is again stopped by its carrying up the valve E, when the operation is repeated, the fluid impulse opening the valve at D, through which a portion of the water passes into ABC. The valves at E and D thus alternately closing and opening, and water at every opening of D making its way into ABC, the air therein is condensed, for it has no communication with the atmosphere after the water is higher than the bottom of the pipe FG. This condensed air, then, exercises great force on the surface, *op*, of the water, and raises it in the tube, FG, to a height proportioned to the elasticity of the imprisoned air. The principles of the hydraulic ram are susceptible of a very extensive application. In well-constructed rams, the mechanical effect obtained has been found to be about ⅔ of the energy in the falling water. For raising comparatively small quantities of water, such as are necessary for the supply of single houses, farm-yards, &c.—where water at the lower level is plentiful and cheap—the hydraulic ram is a most useful piece of mechanism. Its details have been greatly improved since the time of Montgolfier.



HYDRIDÆ, a family of serpents, sometimes so defined as to include numerous fresh-water snakes which are not venomous, and sometimes limited to venomous sea-serpents, inhabiting the Indian,



Banded Sea Snake (*Chersydrus Fasciatus*): *a*, head; *b*, part of back.

Chinese, and tropical Australian seas. These sea-serpents, forming the genus *Hydrophis* (or *Hydrus*), and other genera recently separated from it, have the tail compressed and the belly keeled, so that they have the power of swimming like eels; they have small heads and small eyes; they are remarkable for the large size of their nasal shields; they are generally of a yellowish-green colour, varied with blackish rings or lozenge-shaped spots. Their lungs are often prolonged into a reservoir of air as far as the commencement of the tail. They are often from two to five feet long. They are frequently seen asleep on the surface of the sea, and are easily caught in this condition, in which, apparently, they often fall a prey to sharks. They are supposed to live on small fishes and crustaceans. They are sometimes found coiled up among sea-weed on the shore, and are much dreaded by fishermen. In some places, they are very numerous. One species, at least, is esteemed good food by the Tahitians. More than fifty species are known.

HY'DRIDES. This term is applied both to combinations of hydrogen with metals, and to similar combinations with organic or compound radicals. Hydrogen forms hydrides with at least four metals—viz., arsenic, antimony, copper, and potassium. The first two of these are the well-known gases, arseniuretted hydrogen (AsH_3) and antimoniuretted hydrogen (SbH_3). The hydride of methyl or marsh-gas (C_2H_3,H), and the hydride of ethyl (C_4H_5,H), are examples of the second variety of hydrides.

HYDROCA'RBONS. See CARBOHYDROGENS.

HY'DROCELE (Gr. *hydor*, water, and *kēlē*, a swelling) is the medical term for a dropsy of the tunica vaginalis, a serous membrane or sac investing the testis. Hydrocele occurs as a smooth, pear-shaped swelling, fluctuating when pressed, devoid of pain or tenderness, but sometimes causing a slight uneasiness from its weight.

The quantity of serous fluid in the sac is usually from six to twenty ounces, but it occasionally exceeds a hundred ounces. Hydrocele may occur as a result of acute inflammation, but it most commonly comes on without any apparent local cause. It is most frequently met with about or beyond the middle period of life, and generally in persons of feeble power, or with a tendency to gout; sometimes, however, it occurs in young children, either in the same form as in adults, or as what is termed *congenital hydrocele*, when the communication between the tunica vaginalis and the abdominal peritoneum is not obliterated, as it normally should be.

The treatment is divided into the *palliative* and the *curative*. By the former, the surgeon relieves the present annoyance of his patient, while by the latter he aims at the permanent removal of the disease. The palliative treatment consists in the use of suspensory bandages, evaporating and discutient lotions, and tapping with a fine trochar. Tapping seldom gives more than temporary relief, the swelling usually again regaining its former bulk in three or four months.

The curative treatment consists in setting up sufficient inflammation in the tunica vaginalis to destroy its undue secreting faculty. This is most commonly done by the injection of tincture of iodine into the sac, or by the passage of a fine seton or an iron wire (as proposed by Dr Simpson) through it.

HYDROCE'PHALUS. Under this term, which literally means *water in the head*, are included three distinct diseases—viz., acute hydrocephalus, chronic hydrocephalus, and spurious hydrocephalus, or, as Dr Marshall Hall termed it, hydrocephaloid disease.

By *Acute Hydrocephalus* is signified inflammation of the brain as it usually occurs in scrofulous children. The name is not a good one, because it merely refers to a frequent effect of the disease, and not to its cause or essence; and because, further, a similar effect may result from other morbid conditions: it is, however, so universally adopted, that it would be inexpedient to change it. The disease is one of so dangerous a nature, that it is of the greatest importance to detect it in its earliest stage, and even to look out for indications of its approach. The premonitory symptoms (which, however, do not occur in all cases) consist chiefly in a morbid state of the nutritive functions. The appetite is capricious, the tongue foul, the breath offensive, the belly enlarged, and sometimes tender, and the evacuations unnatural; and the child is heavy, languid, and dejected, and becomes either fretful and irritable, or drowsy and listless. Restless sleep, attended by grinding of the teeth or moaning, a frequent sudden scream, clenching of the fists, and a turning in of the thumb towards the palm of the hand, are also important premonitory warnings.

After these symptoms have lasted for some days, severe pain in the head comes on; it is generally of a sharp shooting character, recurring at intervals, and often during sleep, and causing the child to shriek in a very characteristic manner. Coma or morbid drowsiness now supervenes, and the shrieking is replaced by moaning. Vomiting is a frequent concomitant of this stage of the disease. In this first stage of hydrocephalus, which most commonly lasts two or three days, the pulse is rapid, and the symptoms generally are those of excitement. In the second stage, the pulse becomes irregular, variable, and often slow. General heaviness and stupor come on. The light, which annoyed the child in the first stage, is no longer a source of annoyance; the pupils become dilated, the power of sight becomes imperfect or lost, and squinting is almost always to be observed. The little patient now lies on his back in a drowsy condition; and at this period spasmodic twitchings, convulsions, or paralysis may come on. The excretions are passed unconsciously. This second stage may last a week or two, and is often attended by deceptive appearances of amendment, the child not unfrequently regaining the use of its senses for a day or two, but then relapsing into a deeper stupor than before. The symptoms in the third or last stage, which may last only a few hours, or may extend to a fortnight, are very similar to those in the second, except that the pulse again becomes very rapid, beating sometimes so quickly that it can scarcely be counted, and gradually gets more and more weak, till the patient expires. The characteristic appearances after death are softening of the central part of the brain, with the effusion of serous fluid, usually to the extent of several ounces, into the ventricles; and a tubercular deposit, in the shape of small granules, upon or between the membranes of the brain.

The only disorder with which acute hydrocephalus can easily be confounded is infantile remittent fever; but we have not space to notice the various points which enable us to discriminate between these two complaints. Acute hydrocephalus is essentially a disease of childhood; it scarcely ever occurs after the twelfth year. Half the cases that occur are in children between three and six years of age.

As the treatment should be left entirely to the physician, it is unnecessary to notice it further, than to state that strong antiphlogistic remedies—such as cold to the head, leeching, and active purging—applied in the first stage of the disease, yield the most satisfactory results; yet under this treatment, three cases out of four are lost.

Chronic Hydrocephalus is a perfectly distinct disease from acute hydrocephalus; while the latter is an inflammation, the former is a dropsy. In chronic hydrocephalus, a watery fluid collects within the skull, before the bones have united to form the solid brain-case, and by pressure outwards causes the bones to separate, and increases the size of the head sometimes to an enormous extent. Thus Dr David Monro relates the case of a girl six years old whose head measured two feet four inches in circumference. While the skull is rapidly enlarging, the bones of the face grow no faster than usual, and the great disproportion of size between the head and the face is at once diagnostic of the disease. This disorder sometimes commences before birth, and almost always in early childhood, before the fontanelles and sutures of the skull have closed. In some rare cases, it has occurred later, as, for example, at seven or nine years old, and the closed sutures have opened under the augmenting pressure. When the sutures will not yield, death from pressure on the brain speedily ensues. Most children with chronic hydrocephalus either recover or die in infancy; but a few survive, bearing their complaint to adult life, or even to old age. Blindness, deafness, palsy, and idiocy—one or more—are commonly associated with this disease, but occasionally the intellect and senses are sufficiently perfect for the ordinary requirements of social life.

The treatment may be attempted by internal remedies or by surgical appliances. The medical treatment most worthy of trial consists in the administration of diuretics, purgatives, and especially mercury, which may be given in the form of calomel in minute doses, and applied as ointment externally. The surgical expedients are bandaging and puncturing the head. The former has in some cases effected a permanent cure; the latter has in many cases certainly prolonged life, although the disease has finally conquered. Neither of these means is applicable after the bones of the skull have united.

This disease occasionally occurs in adult or in advanced life, after enlargement of the head has become impossible. Stupor, paralysis, and an inability or unwillingness to speak, are in these cases the most prominent symptoms. Dean Swift's death was due to this disease, and it is recorded that during the last three years of his life he remained in a state of silence, with few and slight exceptions.

Spurious Hydrocephalus—the *hydrocephaloid disease* of Dr Marshall Hall—resembles acute hydrocephalus in many of its symptoms, and has often been mistaken for it. Instead, however, of being an inflammatory disease, it is a disease of debility, and is due to a deficient supply of blood to the brain. The following are, according to Watson, the distinctive characters of this spurious hydrocephalus: the pale, cool cheek; the half-shut, regardless eye; the insensible pupil; the interrupted, sighing respiration; and the state of the unclosed fontanelle. If the symptoms are those of acute hydrocephalus, the surface of the fontanelle will be convex and prominent; while if they are due to spurious hydrocephalus, and originate in emptiness and want of support, the fontanelle will be concave and depressed. The remedies in this disease, which readily yields to treatment, are nourishing diet, small doses of wine or even of brandy in arrow-root, decoction of bark, ammonia, &c.

HYDROCHARI'DEÆ, or **HYDROCHARIDA'CEÆ**. See ANACHARIS and VALLISNERIA.

HYDROCHLO'RIC ACID (symbol, HCl; equivalent, 36·5) is one of the most important compounds in inorganic chemistry. If the two gases which enter into its composition (hydrogen and chlorine) be mixed in equal volumes, they will remain without action upon each other, if kept in the dark; but as soon as they are brought into direct sunlight, they unite with a loud explosion, and hydrochloric acid gas is the result. The principal characters of this gas are, that it is colourless, intensely acid, irrespirable, and even when largely diluted, is very irritating to the lungs and eyes, and very injurious to vegetation; that it is heavier than air (its specific gravity being 1·2474, air being taken at 1·000); that it can be condensed into a colourless liquid; that it is very soluble in water, and that it is neither combustible nor a supporter of combustion. When allowed to escape into the air, it produces white fumes, by condensing the atmospheric moisture. If the air be previously dried, no such fumes are apparent.

The solutions of this gas in water form the acid which was first known as *Spirit of Salt*, then as *Muriatic Acid*, and which is now termed *Hydrochloric* or *Chlorhydric Acid*. A saturated watery solution of this gas at 40° has a specific gravity of 1·21, and consists of 1 equivalent of the gas dissolved in 6 equivalents of water. It forms a colourless, fuming liquid, which acts as a caustic. On heating it, the gas is evolved abundantly until the temperature slightly exceeds 212°, when there distils over a diluted solution, having a specific gravity of 1·1, and consisting of 1 equivalent of the gas, and 16 equivalents of water. It is to these solutions of hydrochloric acid that the term *hydrochloric acid* is far more commonly applied than to the gas itself. They possess the ordinary characters of an energetic acid, and neutralise the strongest bases. The neutralisation is, however, not in consequence of the acid combining with the oxide, but is due to the simultaneous decomposition of the acid and of the oxide, water and a metallic chloride being formed. If M represents the metal, the reaction is expressed by the equation $MO + HCl = MCl + HO$. All metals which, at a red heat, decompose water, also decompose this acid, and cause an evolution of hydrogen, the reaction being expressed as follows: $M + HCl = MCl + H$.

Hydrochloric acid gas is a common gaseous volcanic product. Free hydrochloric acid, in a very dilute form, is also a constituent of the gastric juice of man and animals, and plays an essential part in the digestive process.

Commercial *muriatic acid*—to use the name employed by manufacturing chemists—is made by heating, in iron cylinders, common salt (chloride of sodium) and oil of vitriol (hydrated sulphuric acid), and condensing the evolved gas in water contained in a series of stoneware Wolfe's Bottles (q. v.), the reaction being explained by the equation:

$$\overset{\text{Chloride of Sodium.}}{ClNa} + \overset{\text{Oil of Vitriol.}}{HO,SO_3} = \overset{\text{Hydrochloric Acid.}}{HCl} + \overset{\text{Sulphate of Soda.}}{NaO,SO_3}$$

This commercial acid may contain various impurities—as, for example, iron (which gives it a bright deep yellow colour), the chlorides of sodium and arsenic—the latter being derived from the oil of vitriol—sulphuric and sulphurous acids, chlorine, &c.; from which it can be purified to a great extent by dilution and redistillation. 'If pure,' says Professor Miller, 'the acid should leave no residue when evaporated; on saturating it with ammonia, it should give no precipitate of oxide of iron; sulphuretted hydrogen should produce no turbidity in it, which would be the case if arsenic, free chlorine, or sulphurous acid were present; and on dilution with three or four times its bulk of water, no white cloud of sulphate of baryta should be produced by the addition of chloride of barium.'

The presence of hydrochloric acid, or of the soluble chlorides in solution, may be detected by the addition of a few drops of a solution of nitrate of silver, which occasions the formation of a white curdy precipitate of chloride of silver, which is insoluble in nitric acid, but dissolves in a solution of ammonia.

Liquid hydrochloric acid (under the name of spirit of salt) was known to the alchemists. Hydrochloric acid gas was discovered by Priestley in 1772; and Davy, in 1810, ascertained that it was composed of chlorine and hydrogen.

In many of their properties, the analogous acids, hydrobromic, hydrofluoric, and hydriodic acids resemble hydrochloric acid.

HYDROCO'TYLE, a genus of umbelliferous plants, having simple umbels, entire acute petals, and fruit of two flat orbicular carpels, with five more or less distinct threadlike ribs, and no vittæ. The species are numerous, generally more or less aquatic, widely distributed. One only is a native of Britain, *H. vulgaris*, which grows in marshy places, and is called **Marsh Pennywort** from the orbicular leaves, and sometimes White-rot, Sheepsbane, Flowk-wort, &c., from a notion that it is injurious to sheep which eat it, causing foot-rot or fluke-worm—effects rather to be ascribed to the marshy situations in which it grows.

Marsh Pennywort, or White-rot (*Hydrocotyle vulgaris*).

HYDROCYA'NIC ACID (C_2N,H or Cy,H), known also as Prussic Acid, from its having been first obtained by Scheele, in 1782, from the substance known as Prussian or Berlin Blue, is of almost equal interest to the chemist, the physician, and the toxicologist. We shall notice (1) its chemistry, (2) its medicinal value, and (3) its action as a poison, and its antidotes.

1. *Its Chemistry.*—Pure anhydrous hydrocyanic acid is a limpid volatile fluid, with a specific gravity of 0·697 at 64° F. It boils at 80°, and solidifies into a crystalline mass at 5° F. Its volatility is so great, that if a drop be allowed to fall on a piece of glass, part of the acid becomes frozen by the cold produced by its own evaporation. It possesses a very penetrating odour, resembling that of peach-blossoms or oil of bitter almonds. It burns with a whitish flame, reddens litmus paper slightly (its acid properties being feeble), and is very soluble in water and alcohol. Pure hydrocyanic acid may be kept unchanged if excluded from light, which occasions its decomposition, and the formation of a brown substance known as paracyanogen.

Hydrocyanic acid is readily obtained by distillation from the kernels of bitter almonds, and many kinds of stone-fruit, from the leaves and flowers of various plants, and from the juice of the tapioca plant (*Jatropha manihot*). Anhydrous hydrocyanic acid is obtained by the reaction of concentrated hydrochloric acid on cyanide of mercury.

The preparation of the dilute acid is, however, of much greater practical importance. The London, Edinburgh, Dublin, and United States pharmacopœias agree in recommending that it should be obtained by the distillation of a mixture of dilute sulphuric acid and ferrocyanide of potassium (known also as prussiate of potash). The distillate should contain nothing but hydrocyanic acid and water, so that, by the addition of more water, we can obtain an acid of any strength we please. Sometimes, however, a second, or even a third distillation is necessary. The dilute acid of the *Ph. Lond.* contains 2 per cent.; that of the *Ph. Dub.* rather more; that of the *Ph. Edin.* contains 3·3 per cent.; while what is known as Scheele's acid is very variable, but averages 4 per cent. of the anhydrous acid.

The ordinary tests for hydrocyanic acid are 1, the peculiar odour; 2, the nitrate of silver test—there being formed a white precipitate of cyanide of silver, which is soluble in boiling nitric acid; 3, the formation of Prussian blue, by adding to the fluid under examination a solution of some proto- and per-salt of iron, by then saturating with caustic potash, and finally adding an excess of hydrochloric acid; when, if hydrocyanic acid is present, we have a characteristic blue precipitate; 4, the sulphur test, which is the best and most accurate that has yet been discovered. Let the suspected liquid be acidulated with a few drops of hydrochloric acid; place it in a watch-glass, and let a second watch-glass, moistened with a drop of a solution of hydrosulphate of ammonia, be inverted over it; after a few minutes, let the upper glass be removed, and the moistened spot be gently dried. The whitish film which is left may consist merely of sulphur; when hydrocyanic acid is present, it consists of sulphocyanate of ammonia. Let this residue be treated with a drop of a weak solution of perchloride of iron, when, if hydrocyanic acid was present, a blood-red tint is developed, which disappears on the addition of one or two drops of a solution of corrosive sublimate. This is known as Liebig's test.

2. *Its Medicinal Uses.*—We are indebted to the Italians for the introduction of hydrocyanic acid in the materia medica; and it was first employed at the beginning of the present century. There are no cases in which it is so serviceable as in those affections of the stomach in which pain is a leading symptom, as in gastrodynia, water-brash, and in cases of intense vomiting. Hence it is often useful in English cholera, when opium has completely failed. In pulmonary diseases, it does not produce the good effects that were formerly ascribed to it; but it is sometimes useful in allaying spasmodic cough. It has been employed with advantage in chronic skin-diseases, to allay pain and irritation. A mixture of two drachms of the dilute acid (of 2 per cent. strength) with half a pint of rose-water, and half an ounce of rectified spirit, forms a good lotion. When given internally, the average dose is from 3 to 5 minims of the 2 per cent. dilute acid, three or four times a day; it must be administered in some milk vehicle, such as simple water, or orange-flower water.

3. *As a Poison.*—Hydrocyanic acid is one of our

most energetic poisons, and is frequently employed both in murder and suicide. When a *small* poisonous dose (about half a drachm of the 2 per cent. acid) has been taken, the first symptoms are, weight and pain in the head, with confusion of thought, giddiness, nausea (and sometimes vomiting), a quick pulse, and loss of muscular power. If death result, this is preceded by tetanic spasms and involuntary evacuations. When a *large* dose has been taken (as from half an ounce to an ounce of the 2 per cent. acid), the symptoms may commence instantaneously, and it is seldom that their appearance is delayed beyond one or two minutes. 'When,' says Dr A. S. Taylor, 'the patient has been seen at this period, he has been perfectly insensible, the eyes fixed and glistening, the pupils dilated and unaffected by light, the limbs flaccid, the skin cold and covered with a clammy perspiration; there is convulsive respiration at long intervals, and the patient appears dead in the intermediate time; the pulse is imperceptible, and the respiration is slow, deep, gasping, and sometimes heaving or sobbing.' The patient survives for a longer or shorter period, according to the dose. According to Dr Lonsdale, death has occurred as early as the *second*, and as late as the *forty-fifth* minute.

The parts specifically affected are, the brain and the spinal system. The affection of the respiratory system seems to be due to the influence of the acid on those parts of the nervous system from which the respiratory organs derive their nervous power. The immediate cause of death is, in most cases, the obstruction of the respiration; but in some cases, the stoppage of the heart's action.

Where the fatal action is so rapid, antidotes are of comparatively little value. Chlorine, ammonia, cold affusion, and artificial respiration are the most important agents in the treatment. The first two should be used with great caution, and only by the medical practitioner. Cold affusion on the head, neck, and down the spine is a valuable remedy, and it is asserted that its efficacy is almost certain when it is employed before the convulsive stage of poisoning is over, and that it is often successful even in the stages of insensibility and paralysis. Artificial respiration (see RESPIRATION, ARTIFICIAL) should never be omitted. Dr Pereira states, that he once recovered a rabbit by this means only, after the convulsions had ceased, and the animal was apparently dead.

HYDRODYNA'MICS treats of the laws of the motion of liquids; the flow of water from orifices and in pipes, canals, and rivers; its oscillations or waves; and its resistance to bodies moving through it. The term hydraulics is sometimes applied to the same subjects, from the Greek word *aulos*, a pipe. The application of water as a moving power forms the practical part of the subject.—In what follows, the illustrations are mostly taken from the case of water, but the principles established are true of liquids in general.

Efflux.—If three apertures, D, C, E, are made at different heights in the side of a vessel (fig. 1) filled with water, the liquid will pour out with greater impetuosity from C than from D, and from E than from C. The velocity does not increase in the simple ratio of the depth. The exact law of dependence is known as the theorem of Torricelli; the demonstration is too abstruse for introduction here, but the law itself is as follows: '*Particles of fluid, on issuing from an aperture, possess the same degree of velocity as if they had fallen freely, in vacuo, from a height equal to the distance of the surface of the fluid above the centre of the aperture.*' The jet from C, for instance, has the same velocity as if the particles composing it had fallen in vacuo from the level of the liquid to C. Now, the velocity acquired by a body in falling is as the time of the fall; but the space fallen through being as the *square* of the time, it follows that the velocity acquired is as the square root of the space fallen through. In the first second, a body falls 16 feet, and acquires a velocity of 32 feet. If E, then, is 16 feet below the level, a jet from E flows at the rate of 32 feet; and if D is at a depth of 4 feet, the velocity of the jet at D will be half the velocity of that at E, or 16 feet. In general, to find the velocity for any given height, multiply the height by 2 × 32, and extract the square root of the product. This rule may be expressed by the formula $v = \sqrt{2gh}$, in which v signifies the velocity of the issue, g the velocity given by gravity in a second, or 32 feet, and h the height of the water in the reservoir above the orifice. This last quantity is technically called the *head* or *charge*.

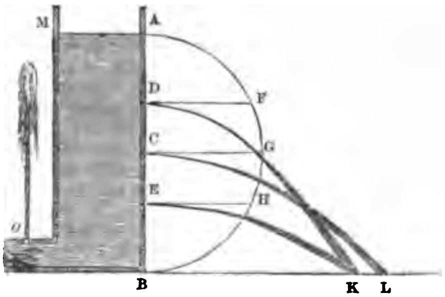


Fig. 1.

That this theory of the efflux of liquids is correct, may be proved by experiment. Let the vessel, MB (fig. 1), have an orifice situated as at o; the water ought to issue with the velocity that a body would acquire in falling from M to the level of o. Now, it is established in the doctrine of Projectiles (q. v.), that when a body is projected vertically upwards with a certain velocity, it ascends to the same height from which it would require to fall in order to acquire that velocity. If the theory, then, is correct, the jet ought to rise to the level of the water in the vessel at M. It is found in reality to fall short of this; but not more than can be accounted for by friction, the resistance of the air, and the water that rests on the top in endeavouring to descend. When the jet receives a very slight inclination, so that the returning water falls down by the side of the ascending, ten inches of head of water may be made to give a jet of nine inches. A stream of water spouting out horizontally, or in any oblique direction, obeys the laws of projectiles, and moves in a parabola; and the range of the jet for any given velocity and angle of direction may be calculated precisely as in projectiles. The range of horizontal jets is readily determined by practical geometry. On AB describe a semicircle; from D, the orifice of the jet, draw DF perpendicular to AB, and make BK equal to twice DF; then it can be proved by the laws of falling bodies and the properties of the circle, that the jet must meet BL in the point K. If BE is equal to AD, the perpendicular EH is equal to DF; and therefore a jet from E will have the same range as that from D. Of all the perpendiculars, CG, drawn from the middle point C, is the greatest; therefore, the jet from C has the longest possible range.

The area of the orifice and the velocity of the flow being known, it is easy to calculate the quantity of water discharged in a given time. Thus, suppose the area to be 1 square inch, and the velocity 20 feet a second, it is evident that there issues in a second a cylinder or a prism of water 1 square inch in section and 20 feet long, the content of which is 1 × 240 = 240 cubic inches. In any given time, then, as three minutes (= 180 seconds), the discharge is 240 × 180 = 43,200 cubic inches.

It has as yet been assumed that the water in the vessel or reservoir is kept constantly at the same height, and that thus the velocity is constant. We have now to consider the case of a vessel allowed to empty itself through an orifice at the bottom. As the surface of the water sinks, the velocity of the discharge diminishes or is retarded; and when the vessel is of the same area from top to bottom, it can be proved that the velocity is *uniformly* retarded. Its motion follows the same law as that of a body projected vertically upwards. Now, when a motion uniformly retarded comes to an end, the space described is just half what the body would have passed over, had it gone on uniformly with the velocity it had at the outset. Therefore, when the vessel has emptied itself in the way supposed, the quantity discharged is half what would have been discharged had the velocity been uniform from the beginning.

The 'Contraction of the Vein.'—When, by means of the area of the opening and the velocity thus determined, we calculate the number of cubic feet or of gallons that *ought* to flow out in a given time, and then measure the quantity that actually does flow, we find that the actual flow falls short of the theoretical by at least a third. In fact, it is only the central part of the jet, which approaches the opening directly, that has the velocity above stated. The outer particles approach from all sides, with less velocity; they jostle one another, as it were, and thus the flow is retarded. In consequence of this want of uniformity in velocity and direction among the component layers of the jet, as they enter the orifice, there takes place what is called a 'contraction of the vein' (*vena contracta*); that is, the jet, after leaving the orifice, tapers, and becomes narrower. The greatest contraction is at a distance from the orifice equal to half its diameter; and there the section of the stream is about two-thirds the area of the opening. It is, in fact, the section of the contracted vein that is to be taken as the real area of the orifice, in calculating by the theory the quantity of water discharged. If the wall of the vessel has considerable thickness, and the orifice is made to widen gradually inwards, in the proportions of the contracted vein, the stream does not suffer contraction, and the area of the orifice where it is narrowest may be taken as the actual area of discharge.

Adjutages.—It has as yet been supposed that the issue is by means of a simple opening or hole in the side or bottom of the vessel; but if the flow takes place through a short tube, the rate of discharge is remarkably affected. Through a simple opening, in a thin plate, the actual discharge is only about 64 per cent. of the theoretical; through a cylindrical conducting-tube, or *adjutage*, as it is called, of like diameter, and whose length is four times its diameter, the discharge is 84 per cent. The effect is still greater if the discharge-tube is made conical both ways, first contracting like the contracted vein, and then widening. The effect of a conducting-tube in increasing the discharge is accounted for by the adhesion of the water to its sides, which widens out the column to a greater area than it would naturally have. It has thus a tendency to form a vacuum in the tube, which acts like suction on the water in the reservoir, and increases the quantity discharged. The flow is more free if the orifice is in the bottom of the vessel, than in the side on a level with the bottom. If the discharge-tube is made to project inwards beyond the thickness of the walls of the vessel, the velocity is much impeded, owing to the opposing currents produced by the water approaching the opening.

Pipes.—When a conduit pipe is of any considerable length, the water issues from it at a velocity less than that due to the head of water in the reservoir, owing to the resistance of friction. With a pipe, for instance, of 1½ inch in diameter, and 30 feet long, the discharge is only one half what it would be from a simple orifice of the same diameter. The rate of reduction depends upon the diameter of the tube, its length, the bendings it undergoes, &c. The resistance to the flow of water in pipes does not arise properly from friction, as understood of solids, but from the adhesion of the water to the sides of the pipe, and from the cohesion of the watery particles among themselves; it makes little difference, therefore, whether an earthenware pipe, for instance, be glazed or not. Large projections form an obstacle; but mere roughness of surface is filled up by an adhering film of water, which is as good as a glaze. The resistance increases greatly with the narrowness of the pipes. Engineers have formulas, deduced in great part from experiment, for calculating the discharge through pipes of given length and diameter, and with a given head; but the subject is too complicated for introduction here. If water flowed in a conduit pipe without friction or other obstruction, so that its velocity were always equal to that due to the head of water, there would be no lateral or bursting pressure on the walls of the pipe; and if the pipe were pierced, the water would not squirt out. Accordingly, with a short tube or adjutage, which, instead of obstructing, increases the flow, there is not only no lateral outward pressure on the walls of the tube, but there is actually a pressure inwards. If a hole is made in the wall of a cylindrical adjutage, A (fig. 2), and the one end of a small bent tube, *bc*, is inserted in the hole, while its other end is dipped in a vessel of water, *V*, the water will be sucked up the tube, shewing the tendency that the adjutage has to form a vacuum. But when the velocity of discharge is diminished by the friction of a long pipe, or by any narrowing, bending, or other obstruction in the pipe, then that portion of the pressure of the head of water that is not carried off in the discharge, becomes a bursting pressure on the walls of the pipe. This pressure is unequal at different parts of the pipe. At the end *e*, where the water issues free and unobstructed, it is next to nothing, and gradually increases towards the reservoir at *d*, where it is equal to the difference between the head of water in the cistern, and the head due to the velocity with which the water is actually flowing in the pipe. The principle now explained accounts for the fact, that pipes often burst or begin to leak on the motion of the water in them being checked or stopped.

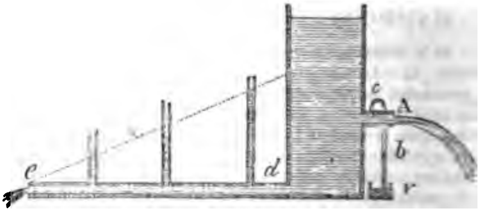


Fig. 2.

Resistance of Water to Bodies moving through *it.*—This is greatly affected by the shape of the body, which ought to have all its surfaces oblique to the direction of the motion. When a cylinder terminates in front in a hemisphere, the resistance is only one-half what it is when the cylinder terminates in a plane surface at right angles to the axis; and if instead of a hemisphere, the termination is an equilateral cone, the resistance is only one-fourth. If a globe is cut in halves, and a cylinder, whose length and the diameter of whose base are each equal to the diameter of the globe, is fixed between them; this cylinder with hemispherical ends experiences less resistance than the globe alone, the diminution being about one-fifth of the resistance to the globe. Also the resistance increases in a higher ratio than the simple one of the velocity. One part of the resistance arises from the momentum that the body has to give to the water it displaces. Moving at a certain rate, it displaces a certain quantity; moving at twice that rate, it displaces twice the quantity in the same time. But not only does it displace twice the number of particles of water; it also has to displace them with twice the velocity; the pressure of the resistance is thus not merely doubled, but quadrupled or squared. Similarly, when the velocity is tripled, the resistance arising from the simple displacement of water becomes nine times as great. Another part of the resistance of liquids to bodies moving in them is owing to the cohesion of the particles, which have not to be thrown aside merely as separate grains, but to be torn asunder. In addition to this, when the velocity is considerable, the water becomes heaped up in front, and depressed at the other end from not having time to close in behind, thus causing an excess of hydrostatic pressure against the direction of the motion. Owing to the combination of these causes, the real law of the increase of resistance is difficult to investigate, and the results of experiments are not a little discordant. See WATER-POWER, WAVES.

HYDRO-FLUO'RIC ACID. See FLUORINE.

HY'DROGEN (symbol H, equiv. 1), so called from the Greek words *hydōr*, water, and *gennāo*, to generate, is an elementary substance, which exists in the form of a permanent, colourless, and inodorous gas. One of its most striking peculiarities is its specific gravity, it being the lightest of all known bodies. Assuming the weight of a given volume of atmospheric air to be 1, the weight of the same volume of hydrogen under similar conditions is 0·0692; hence hydrogen is 14¼ times lighter than atmospheric air; while, on the other hand, it is 241·573 times lighter than platinum, the heaviest body known. Its refractive power is greater than that of any other gas, and is more than 6 times as great as that of atmospheric air. It is combustible; that is to say, it is capable of combining with oxygen, and developing light and heat. When a lighted taper is passed up into an inverted jar of hydrogen, the gas burns quietly with a pale-blue, scarcely visible flame, and the taper is extinguished. The flame only occurs at the line of junction of the hydrogen and the external air. If the hydrogen be mixed with air or oxygen prior to the application of the taper, the whole mixture is simultaneously inflamed, and there is a loud explosion, which is most violent when 2 volumes of hydrogen are mixed with 1 volume of oxygen, or with 5 volumes of atmospheric air. The hydrogen and oxygen in these cases combine to form watery vapour or steam, which suddenly expands from the high temperature attendant on the combustion, but immediately afterwards becomes condensed; this condensation causes a partial vacuum, into which the surrounding air rushes, and by the collision of its particles, produces the report. At ordinary temperatures, water dissolves rather less than 2 per cent. of its volume of hydrogen. It is one of the few gases which has never yet been liquefied. Pure hydrogen, though it cannot support life, is not poisonous, and when mixed with a sufficient quantity of atmospheric air or oxygen, may be breathed for some time without inconvenience.

Hydrogen does not possess very marked chemical properties. The only substances with which it combines directly at ordinary temperatures are chlorine and oxygen. Hydrogen and chlorine, mixed together, and exposed to direct sunlight, combine with explosion; in diffused daylight, they gradually unite; but in the dark do not act on one another. Hydrogen and oxygen do not combine spontaneously even in direct sunlight, but require the presence of a red-hot solid, of flame, or of spongy platinum.

It is generally stated that hydrogen does not exist naturally in a pure or uncombined state, but Bunsen recognised its presence in variable proportions in the gases evolved from the solfataras of Iceland, and it will probably be detected in other localities where similar geological relations hold good. In combination with oxygen, as water, it not only forms a very considerable part of the earth, and of the atmosphere, but enters largely into the structure of every animal and vegetable organism. It is an essential ingredient of many inflammable minerals, such as coal, amber, and petroleum; and of certain gases, such as marsh gas, ammonia, and hydrosulphuric acid (or sulphuretted hydrogen). It likewise enters into the composition of a large number of manufactured substances and products used in the arts, medicine, &c., as for instance, sal-ammoniac, starch, sugar, vinegar, alcohol, olefiant gas, aniline, indigo, morphia, strychnia, hydrocyanic acid, &c.

There are numerous ways in which hydrogen may be prepared, but the usual and most convenient process is by the action of diluted sulphuric acid on zinc. About half an ounce of granulated zinc is placed in a retort, and a dilute acid, prepared by gradually mixing an ounce of oil of vitriol with six ounces of cold water, is poured on the zinc. Hydrogen gas is rapidly evolved in great abundance, but the first portions should not be collected, since they are mixed with the atmospheric air which was contained in the retort. The rest of the gas may be collected in the ordinary way over water. In this process the zinc takes oxygen from the water, and forms oxide of zinc, which combines with the sulphuric acid, forming sulphate of zinc, which remains in solution, while the hydrogen of the decomposed water escapes. The reaction is shewn in the formula, $Zn + HO,SO_3 = ZnO,SO_3 + H$. A precisely similar reaction ensues if we use iron in place of zinc, but in this case the gas is generally less pure.

Hydrogen gas, under the name of combustible air, was obtained in the 16th c. by Paracelsus by treating certain metals with dilute acids, and was more or less known to Boyle and others; but Cavendish, in his paper on 'Factitious Airs,' published in the *Transactions of the Royal Society* for 1766, was the first to describe accurately the properties of this gas, and the methods of obtaining it; hence he is usually mentioned as its discoverer.

HYDROGEN, BINOXIDE OF (symb. HO_2, equiv. 17), is a colourless liquid of a syrupy consistence, with a specific gravity of 1·45 (water being 1), and a peculiar odour, something like that of very dilute chlorine. It bleaches vegetable colours, and when applied to the tongue or the skin, produces a white spot, and excites considerable pain. From the readiness with which it gives off its oxygen, it is a powerful oxidising agent. The method of preparing it is complicated and difficult. This substance was discovered in 1818 by Thenard, who termed it oxidised water. Dr B. W. Richardson, an eminent London physician, has lately examined its value (in solution) as a therapeutic agent, and has found it to be of extreme use in hooping-cough, in certain forms of rheumatism, and (as a palliative) in the last stages of consumption.

HYDRO'GRAPHY (Gr. *hydōr*, water, *graph-*, to write) is a description of the surface waters of the earth, particularly of the bearings of coasts, of currents, soundings, islands, shoals, &c., and of anything the knowledge of which may be useful for purposes of navigation. It, consequently, includes the construction of charts, maps, &c., in which these particulars are detailed. It is, in fact, to the sea what geography is to the land. The first step in the erection of hydrography into a science, was made in the 15th c. by Henry the Navigator, who was the first to construct a sea-chart worthy of the name. Among the maritime nations of Europe, it is now made a matter of prime concern; the hydrographic office being an important branch of the naval administration. The head of the hydrographic department in the British service is usually a captain in the royal navy. The officers surveying in different parts of the world send their observations, soundings, &c.; and it is the business of the hydrographer to consolidate these into available maps. The hydrographer receives £800 a year in addition to his half-pay. In proof of the value attached to these Admiralty charts among the marine of England and even of foreign nations, it may be mentioned that many thousand charts, besides books of sailing directions, are sold annually.

HY'DROMANCY. See Divination.

HYDROMA'NIA. See Pellagra and Suicide.

HYDRO'METER. See Areometer.

HY'DROMYS, a genus of rodent quadrupeds, of the family *Muridæ*, of which there are only two known species, very similar to one another, natives of Van Diemen's Land. They have two incisors and four molars in each jaw. They are called Beaver Rats in Van Diemen's Land; are nocturnal and very shy; inhabit the banks both of fresh and salt water, and swim well. The largest species is twice the size of a common rat. One of them has the belly white, the other yellow.

HYDRO'PATHY, or HYGIE'NIC MEDICINE, popularly termed the Water Cure. Under the head of Baths and Bathing (q. v.), an account has been given of the bath in general, as a means of preserving health. We have here to speak of water in its manifold uses as an engine in the cure of disease, and as forming a principal element in that combination of hygienic appliances which goes to make up hydropathy as at present practised. (In accordance with the plan followed in other cases of the kind, the view exhibited is that of an adherent of the system.)

The efficacy of water, in the cure of numerous forms of disease, has long been recognised. Water was largely employed by Hippocrates, the 'Father of Medicine,' more than 2300 years ago, in the treatment of many kinds of disease; and along with a regulated diet, and an implicit belief in the *vis medicatrix naturæ*, it appears to have formed the chief element in his medical armoury. Horace has enshrined the memory of Antonius Musa, the hydropathic physician of the Emperor Augustus (Epist. i. 15). Both Celsus and Galen—who flourished, the one about 50 years B.C., and the other in the 2d c.—speak favourably in their writings of the use of water in the cure of disease, regarding it as of high value in the treatment of acute complaints, particularly of fevers. Throughout the Middle Ages, likewise, many physicians of name, including Aetius and Paulus Ægineta, and the more celebrated Paracelsus, were advocates of the remedial virtues of water; all of them, however, having faith in its uses in the treatment rather of acute than of chronic disorders. In 1723, Nicolo Lanzani, a Neapolitan physician, published a learned treatise on the subject. In our own country, about the beginning of the 18th c., Sir John Floyer and Dr Baynard made a large use of water. Their conjoint work, denominated *Psychrolousia*, or the 'History of Cold Bathing, both Ancient and Modern,' is replete with quaint learning and practical shrewdness and sagacity. But the most able and scientific among the older treatises that have appeared in England on the subject of the water treatment, is the work of the well-known Dr Currie (q. v.), the biographer of the poet Burns, published in 1797, and entitled *Medical Reports on the Effects of Water, Cold and Warm, &c.* In this work, Dr Currie recommends the cold affusion in typhus and other fevers, and gives practical directions in regard to the cases and the times when it may be used with advantage. Eminent physicians of the present day have admitted that these views, so far as they went, were as scientific in principle as they were novel in their application; but the practice founded on them was considered too dangerous by Currie's contemporaries, and fell into speedy neglect. It is worthy of remark, that Currie appears to have limited his use of water to acute ailments exclusively.

We have thus seen that up to the beginning of the present century, by some of those who employed it as a curative agent, water was used in the treatment of acute, and by others of chronic diseases; by some as an internal agent alone, by others as an external application in the various forms of the bath, but never in all the manners combined. This combination was first effected by the original genius of Vincent Priessnitz, a Silesian farmer, with whom began a new era for the water-cure. It was owing, we are told, to his successful treatment of more than one bodily injury which he had sustained in his own person that, about the year 1820, Priessnitz became so fortified in his convictions as to the curative powers of water as to devote himself to employ it medically in the cure of others. Beginning with the external application of water for trifling diseases among the poor of his neighbourhood, he gradually undertook an extended range of cases, and multiplied the modes of administration, introducing the wet compress, the douche bath, partial baths of all kinds, the sweating process, the wet sheet, together with copious drinking of pure water. In addition to water in all these forms, he insisted on the value of exercise, diet, fresh air, and mental repose, in the cure of disease; thus practically calling to his aid the entire resources of hygiene, and establishing by a simple, yet thoroughly original combination, nothing less than a new system of medical treatment. As to the success which attended Priessnitz's practice, it is a historical fact that of 7500 patients who had gone to Gräfenberg for advice and treatment, up to the year 1841, or within the space of about 20 years, there had been only 39 deaths, and some of these, according to the registry of the Austrian police, 'had died before commencing the treatment, while some others were reported in a forlorn state before anything was attempted.' It is to be regretted, however, that the founder of the new system was not himself an educated physician, so that he could have understood better the philosophy of his own practice, and explained it more correctly. He would not have called his system the

'Water-cure,' a name scientifically one-sided and incomplete, and therefore misleading. It is equally to be regretted that many of the immediate followers of Priessnitz, while destitute of his remarkable sagacity and genius, should have been no better furnished than himself with a scientific knowledge of disease and general professional culture.

In spite of all drawbacks, however, the undoubted merits of hydropathy at length called to its defence many men of standing in the profession, who, allowing for some of its early extravagances, stepped forth to explain it scientifically, and pressed it on the acceptance of their brethren; and from their advocacy has sprung up in England a school of hydropathic physicians, the philosophy of whose plan of treatment we shall now briefly describe.

Physiology teaches us, that the various organs of our bodies cannot be kept in a healthy state without the observance of certain regulations called the primary 'Laws of Health.' When these are broken, the result to the offender is disease in one of its many forms. Until the appearance of hydropathy, physicians attempted to correct the evil thus caused—and the great majority do so still—by the administration of one or other of the drugs which go to form the medical repertory known as the pharmacopœia; and the argument on which this practice has been based is the very simple one, that experience has proved the medicine or medicines to be efficacious in a large proportion of similar cases. Hydropathy proceeds according to a very different method. Taking as his central maxim the principle first propounded by Hippocrates, that it is nature's own strivings after health (*vis medicatrix naturæ*) that really cure the patient when he is cured, the function of art being mainly to remove obstacles, the hydropathic physician avoids using all means with whose effects he is not thoroughly conversant, or which may, at least, interfere with nature's own operations. Hence, as a rule, he eschews the use of drugs, and betakes himself to those more simple natural agents which, in their totality, receive the name of hygiene. The conditions of health, as unfolded by physiology, may be briefly stated to consist of five necessary requirements—air, exercise, water, diet, and nervous repose. These are undeniably essential to the preservation of health; no human being can possibly continue in a fair state of health when deprived of the just proportion of any one of them. This proposition, which may be regarded as axiomatic, forms the starting-point of hydropathy in the cure of disease. Admitted that certain agencies are necessary to the preservation of health, the hydropathic principle is simply this, that the very same agencies, infinitely modified of course according to the requirements of each particular case, and generally much intensified, are not only the safest, but by far the surest means of curing chronic disease; or, to put it more correctly, are the best means which can be brought to nature's assistance for enabling her to effect a cure herself.

Here it is proper to explain what is meant by saying that the natural agents of health are *intensified* when they are used, not for the preservation of health, but the cure of disease; or, in other words, when we pass from natural hygienics to natural therapeutics. Take the element of exercise, for instance, one of the most powerful hydropathic agencies. Every one knows, although but few act systematically on the knowledge, that a certain amount of exercise is necessary to maintain the body in health; the hydropathic doctrine, accordingly, is, that in the cure of chronic disease, this exercise must be intensified—increased to the full extent which the patient's strength will warrant. So, again, as to the use of water: a certain amount of pure water, used externally and internally, is also necessary to the maintenance of health; hydropathically, a much more liberal use of the same element in both ways is necessary to the cure of disease. The reader's special attention is called to this, which in fact is the very kernel of the hydropathic theory.

Let us now explain more in detail how and in what cases hydropathy employs the agents on which it relies. Diseases may, for general purposes, be divided into two great classes: those in which the physician is called on to lower or *reduce* to the standard of health; and those in which the object of his endeavours is, on the other hand, to assist in *elevating* to the same standard. In the former category, range themselves all those diseases which are marked by a plethoric or inflammatory type—by an overplus of mal-directed strength in the economy; in the latter, those distinguished by a corresponding diminution in the vital powers. It may be truly affirmed, that to rectify both these abnormalities, and to restore the equilibrium of health, is the great object of medical treatment. The ordinary practice seeks to achieve this object mainly, in both instances, by means of drugs, respectively adapted to the two classes, and tending to lower in the one case and to exalt in the other. The hydropathic practice, with the same object in view, employs, as already stated, the natural remedies—air, exercise, water, diet, and repose.

Thus, in dealing with acute and plethoric complaints, and the whole order of diseases ranging themselves under the former of the divisions just indicated, water is the element which enacts by far the most conspicuous part, and the application of it most serviceable in these cases is the *wet sheet* or *pack*. Indeed, the discovery by Priessnitz of this application of water was perhaps the most important contribution which he made to the new system of which he was the practical founder, inasmuch as it at once supplied one of the most powerful and at the same time one of the safest methods of combating almost every form of acute disease. This, the most distinctive of hydropathic appliances, may be thus described: Over the mattress of a bed or sofa is extended a stout blanket, and on this is spread a linen sheet, well wrung out of cold water, so that it is only damp. On this the patient is laid, and immediately enveloped tightly with a heavy weight of blankets upon him, tucked in so closely as to completely exclude all air. The body's natural heat, acting on the damp linen, generates vapour almost immediately, and the patient forthwith finds himself, not in a cold, but in a comfortably warm vapour bath—in a novel, but by no means unpleasant form of body poultice. The effects of this process on the economy seem to be plain enough. It is clear, in the first place, that the pores of the skin, so numerous and performing so important a function, must thereby be thoroughly cleansed, and the blood itself depurated; with the equalisation of temperature over the entire surface of the body, will follow a corresponding equalisation in the distribution of blood throughout the system, thereby relieving internal congestions wherever occurring; and lastly, from the soothing effects on the nervous system, and the allaying of all irritation, must result not only the alleviation of pain, but that lowering of the heart's action, and with it of the circulation of the blood, of such incalculable importance in the treatment of many forms of disease, and especially of fevers. Such is the wet sheet.

Of the same order of remedy, although in many respects very different from it, is the Turkish bath, recently introduced into England, and now fairly established throughout the country. In this bath, the hydropathic procedure has received a most important auxiliary in the treatment of many forms of disease, but in an especial manner of the kind more particularly under consideration at present, such as gout, rheumatism, bronchitis, and other complaints of an inflammatory or febrile character. The same end of diaphoresis, or sweating, is secured, although not so efficiently, by means of the vapour bath as used by the Russians, and by hot air as generated by the spirit-lamp. The latter has the advantage of being less expensive, and the bather not being required to breathe the heated air, many persons can use it who would be quite unable to respire, without faintness, the highly heated atmosphere of the Turkish bath. In addition to the above, must be mentioned the use of warm fomentations, in the form of flannels wrung out of boiling-water—a kind of application much relied on for subduing local pain proceeding from whatever cause, for relieving congestion, and abating and checking inflammation. So much for the principal hydropathic operations employed to treat acute and inflammatory diseases—processes corresponding in their aims and effects to antiphlogistic, diaphoretic, and sedative drugs.

We have now to speak of the hydropathic agents brought to bear on the second great division of maladies, wherein the object is not to lower, but to elevate, to the standard of health. In the former class of cases, it was stated that water was the agent most prominently brought forward, and it is in such diseases alone that the term 'water cure' is at all appropriate. In those we are at present dealing with, water certainly plays an important part, but it is only in its combination with good air, exercise, regulated diet, and nervous repose, that diseases are cured as they are. As an illustration: A cold bath is given in the usual way as a tonic. Its effects are admirable under certain conditions—the first and chief of these being that a good reaction takes place; that the blood, which had been driven by the constringent effects of the cold water from the surface of the body into the inner parts, should return in increased force when the stimulus of cold is withdrawn. But to this end, in all but very strong persons, exercise immediately after the bath is indispensably necessary, and must follow it as a matter of course, or the bath cannot be administered with comfort, or even with safety. As much might be said for the co-operative importance of pure air, of diet, and of nervous repose, all of them, if necessary to the preservation of health, of tenfold importance in the cure of disease. Thus the highly tonic properties of the bath, administered in its various forms, and followed by a due proportion of exercise, more especially in strong bracing air, produce at once a marvellous effect in sharpening the appetite and improving the powers of digestion, so that, if simple and nourishing diet is administered, better blood will be elaborated, and, consequently, every tissue of the body be more highly nourished and invigorated. It is scarcely necessary to say, that, in all cases, this is and must always be a gradual process, for it is evident that the treatment pursued, whether in reference to exercise, diet, or the use of the stimulus of water, must bear an accurate relation to the invalid's strength. Little by little, however, and in most cases much more rapidly than might be imagined, improvement begins to take place. From the great action brought to bear on the skin by means of the different applications of water, the prudent use of the Turkish bath, and the effects of full exercise, a rapid change of the particles of the body takes place—so rapid, that, according to Liebig, 'by means of the water-cure-treatment, a change of matter is effected in a greater degree in six weeks, than would happen in the ordinary course of nature in three years'—while, at the same time, the effete matter thrown off is replaced by the healthier materials supplied to the economy by an improved quality of blood, itself the result of an improved digestion, and this, again, resulting from the heightened *vis vitæ* which the combined hydropathic agencies have produced. The forms of the bath may of course be varied *ad infinitum*, as well as its power according to the temperature of the water. The baths most in vogue in daily practice are technically denominated the *Wash down*, *Dripping sheet*, *Shallow*, *Sitz bath*, and *Douche*, together with the *Pack*, or *Wet sheet* before mentioned; in addition to which there is a catalogue of local applications, too extensive to enumerate. These various appliances of water are capable of producing extraordinary effects on the economy, constituting, as they do, especially when conjoined with exercise, the most powerful tonics, and, at the same time, the most safe and agreeable, that can be brought to bear on the body. It might truly be added that, in the treatment of chronic disease, this same element, water, is capable of becoming, according to the manner and quantity of its use, internally and externally, an alterative, derivative, diuretic, and diaphoretic. It is as a tonic and stimulant, however, that its virtues are most conspicuous, and most called into requisition for the cure of chronic ailments.

From a variety of circumstances, the system of hydropathic medicine has been greatly misunderstood and misjudged by the general public. For one thing, the name of 'water cure,' or 'hydropathy,' adopted by Priessnitz, has been very prejudicial, as leading to the false inference that the one element of water alone constitutes the bone and marrow of the system, playing the part of a panacea for every form of human ailment. Such a notion has never been maintained by the practitioners of scientific hydropathy, and it is matter of regret that some more comprehensive and catholic title, as that of 'hygienic medicine,' has not long since been adopted. As it is, the prejudice against the system is gradually giving way; it is no longer treated as heresy by the orthodox profession; and many enlightened practitioners are in the habit of sending certain classes of their patients to hydropathic establishments, and even subject themselves to the treatment. In fact, the tendency of ordinary medical practice has of late years been towards the principles on which hydropathy is based. A manifest disposition exists on the part of the more enlightened members of the profession to rely much less on art and much more on nature in the treatment of diseases of every type, but especially those of a chronic character, than was formerly the case; and as the practitioners of scientific hydropathy by no means exclude the use of drugs, when they appear to be necessary, it would seem that a convergence of opinion is really coming about.

Hydropathy, hitherto, has been almost exclusively practised in large establishments, presided over by competent medical men, and dedicated to a thorough and systematic carrying out of the principles on which the system of cure is founded. There can be no question that this is by far the most complete and satisfactory arrangement when it can be accomplished. But the power of leaving their daily work for the purpose of seeking health, is what falls to the lot of very few; and if the hydropathic treatment were to be absolutely limited to its chosen retreats in the country, and incompatible with the business and work of town-life, it would be shorn of half its utility as a remedy, and be a luxury to which only the rich and disengaged could aspire. But exercise, morning and evening, can usually be had by most persons. The same applies to the systematic and persistent use of the bath, to the regulation of diet, and the observance of early hours. By these means, even without country air and other hygienic adjuncts, no doubt a vast deal might be done both for the cure of disease and the preservation of health. Towards effecting the latter object, at least, no one will deny the immense value of hydropathy. No one, having any practical acquaintance with it, can doubt its influence in the promotion of those habits of temperance, cleanliness, self-denial, and general obedience to the laws of health, which, while they tend so much to the happiness of the individual, go no less to secure the strength and prosperity of nations. To those who would inquire further into the subject, we may recommend the work of Dr Gully, entitled *The Water-cure in Chronic Disease;* that of Dr James Wilson, called *Principles and Practice of the Water-cure;* the several works of Dr Edward Johnson; and Dr Lane's treatise, *Hydropathy, or Hygienic Medicine.*

HYDROPHO'BIA (derived from *hydōr*, water, and *phŏbos*, fear) is one of the diseases that are produced by animal poisons. A person is bitten by a mad dog or other animal. The wound gradually heals in the ordinary manner. After an uncertain interval, usually ranging from six weeks to eighteen months, which is termed the period of *incubation*, the following symptoms appear: The patient experiences discomfort or pain at the seat of the bite. The cicatrix tingles, or feels stiff or numb; sometimes becomes swelled and livid, and occasionally reopens, and discharges a peculiar ichor. The morbid sensations gradually extend from the original seat of injury towards the trunk. This period is termed the stage of *recrudescence.* Within a few hours, or, at longest, a very few days after the exhibition of this local irritation, during which time the patient has a sense of general discomfort and illness, the specific constitutional symptoms begin to manifest themselves; he complains of pain and stiffness about the neck and throat, finds himself unable to swallow fluids, and every attempt to do so—often even the sight or the sound of fluids—brings on a terrible paroxysm of choking and sobbing; and this continues for two or three days, till the patient dies from pure exhaustion. The passage of a gust of wind across the face, or the waving of a mirror before the eyes, is often sufficient to excite these paroxysms. The mental condition in the last stage of this disease varies; the patient may be calm and tranquil; generally he is irritable and apprehensive, and suspicious; and in most cases, a certain degree of delirium, or even mania, is associated with the irritability. Death most commonly takes place on the second or third day after the commencement of the specific symptoms.

Some medical writers have maintained that hydrophobia may occasionally be spontaneously developed in man, as is undoubtedly the case occasionally in the lower animals (the dog and wolf, for example); but even if this ever occurs, the instances are so extremely rare as not to affect the general statement, that in man the disease is the result of an animal poison, which is most commonly communicated by the bite of the dog, but which has also been produced by the bite of the wolf, the jackal, the racoon, and the cat. The poisonous saliva is perfectly innocuous when applied to the unbroken skin; to produce its effects, there must be some abrasion of the cuticle; but according to the late Mr Youatt, it may enter the system by mere contact with mucous membranes.

The disease is said to have been caused by the mere *scratch* of a cat; but as both cats and dogs frequently apply their paws to their mouths, the poisonous saliva may be introduced in this way by the claws.

There has been much discussion as to what becomes of the poison. Is it immediately taken into the system generally, or does it remain imprisoned in the wound or cicatrix for a time? In the latter case, we might successfully remove the poison any time between the infliction of the bite and the period of recrudescence; and that the poison is thus locally retained seems more than probable from the fact, that at this period morbid phenomena of various kinds exhibit themselves at the seat of the wound, and that these phenomena are speedily followed by the characteristic symptoms of the disease.

Little need be said of the treatment of hydrophobia, for there is no well-authenticated case of recovery on record. The most distressing symptoms may, however, be alleviated by chloroform, opiates, the hot-air bath, &c. But although the disease cannot be cured, its development may be prevented by the early and complete excision of the bitten part, provided the situation of the bite allows of the free use of the knife. 'If,' says Dr Watson, 'the injury be so deep or extensive, or so situated that you cannot remove the whole surface of the wound, cut away what you can; then wash the wound thoroughly and for some hours together, by means of a stream of warm water, which may be poured from a tea-kettle; place an exhausted cupping-glass from time to time over the exposed wound; and finally apply to every point of it a pencil of lunar caustic. If you cannot bring the solid caustic into contact with every part, you had better make use of some liquid escharotic; strong nitric acid, for example.' Early excision is the only sure preventive, but if, for any reason, the operation has been omitted in the first instance, it is advisable for the reasons already given regarding the probable latency of the poison, to cut out the wound at any period before symptoms of recrudescence appear. The reason why many neglect to have immediate recourse to excision probably is, that hydrophobia by no means follows, as a matter of certainty, the bite of a rabid animal. John Hunter states that he knew an instance in which, of twenty-one persons bitten by a mad dog, one alone was infected. On the other hand, we have evidence that of one hundred and fourteen persons who were bitten by rabid wolves, sixty-seven, or more than one-half, were victims to this disease. Although we have no very trustworthy evidence on a large scale, there is no doubt that the majority of persons who are bitten by a mad dog do escape the disease, even without taking any precaution. In many of these cases, the virus is probably removed by the teeth passing through the clothes.

The nature of the disease in the dog or other animal whose bite causes hydrophobia, is considered under RABIES.

HYDROPHYLLA'CEÆ, a natural order of exogenous plants, containing about 80 known species, natives chiefly of the colder parts of America. None of them are of importance for any use to which they are applied, although *Hydrophyllum Canadense* has been reputed in North America a remedy for snake bites, and the leaves of *H. Virginicum*, or Shawanese Salad, are eaten by the Indians, both raw and boiled; but some of them are favourite ornaments of our flower-borders, particularly different species of *Nemophila.* The order includes some small trees and bushes as well as herbaceous plants. They are often hispid, like the *Boraginaceæ.*

HYDROSTATICS treats of the equilibrium of liquids, and of their pressures on the walls of vessels containing them; the science depends on the way in which the molecules of a liquid form a mass under the action of gravity and molecular attraction, the latter of which is so modified in liquids as to give them their state of liquidity. While the particles of a liquid cohere, they are free to slide upon one another without the least apparent friction; and it is this perfect *mobility* that gives them the mechanical properties considered in hydrostatics.

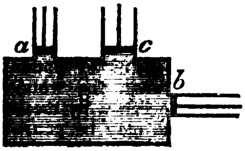


Fig. 1.

The fundamental property may be thus stated: WHEN A PRESSURE IS EXERTED ON ANY PART OF THE SURFACE OF A LIQUID, THAT PRESSURE IS TRANSMITTED UNDIMINISHED TO ALL PARTS OF THE MASS, AND IN ALL DIRECTIONS. Most of the other propositions of hydrostatics are only different forms or direct consequences of this truth. This is a physical axiom, but its truth may be experimentally proved. Suppose a close box B filled with water, and having a tube *a* inserted into the upper cover, of an inch in area, and with a plug or piston fitting into it. If the piston *a* is now pressed down upon the water with a force equal to a poundweight, the water, being unable to escape, will react upon the piston with the same force; but it obviously will not press more against *a* than against any other part of the box, therefore every square inch of the interior surface of the box is pressed outward with the force of a pound. If, then, there is another tube inserted in any part of the box with a plug of the same area, as at *b*, it will require a force of a pound to keep this plug in its place. (We leave out of account at present the pressure upon *b* arising from the *weight* of the water in the box above it, and consider only the pressure propagated by the forcing down of the plug *a*.) However many plugs of the same size there were, each would be pressed out with the same force of a pound; and if there were a large plug of four times the area, as at *c*, it would be pressed out with a force of four pounds. We have only, then, to enlarge the area of the piston *c* to obtain any multiplication of the force exerted at *a*. If the area of *c* is 1000 inches, that of *a* being one inch, a pressure of one pound on *a* becomes a pressure of 1000 pounds on *c*; and if we make the pressure on *a* one ton, that on *c* will be 1000 tons. This seemingly wonderful multiplication of power has received the name of the *hydrostatic paradox*. It is, however, nothing more than what takes place in the lever, when one pound on the long arm is made to balance 100 pounds on the short arm.

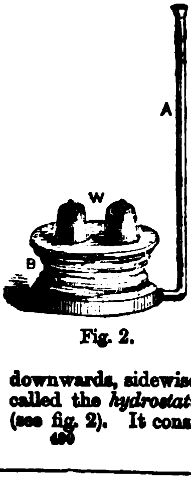


Fig. 2.

If the pressure we have supposed exerted on the piston *a* arose from a pound of water poured into the tube above it, it would continue the same though the piston were removed. The pound of water in the tube is then pressing with its whole weight on every square inch of the inner surface of the box—downwards, sidewise, and upwards. The apparatus called the *hydrostatic bellows* acts on this principle (see fig. 2). It consists of two stout circular boards connected together by leather in the manner of a bellows, B. The tube A is connected with the interior; and a person standing on the upper board, and pouring water into the tube, may lift himself up. If the area of the upper board is 1000 times that of the tube, an ounce of water in the tube will support 1000 ounces at W. It is on the same principle that the Hydraulic Press (q. v.) depends.

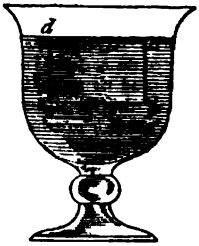


Fig. 3.

1. *Equilibrium of Liquids.*—After this explanation of the fundamental properties of liquids, it may be enough to state the two conditions of fluid equilibrium which directly flow from it. (1.) Every molecule of the liquid must be solicited by equal and contrary pressures in every direction. This is a corollary from liquid mobility. (2.) The upper molecules of a liquid, which are free, must form a surface perpendicular to the impressed force. The truth of this will sufficiently appear from the proof, that the surface of a liquid at rest under gravity must be what is called horizontal. It can be shewn to be a consequence of the primary property of 'pressing equally in all directions.' For let *da* and *cb* be vertical lines, or lines in the direction of gravity; and *ab* a plane at right angles to that direction, or horizontal. A particle of the liquid at *a* is pressed by the column of particles above it from *a* to *d*; and the like is the case at *b*. Now, since the liquid is at rest, these pressures must be equal; for if the pressure at *b*, for instance, were greater than at *a*, there would be a flow of the water from *a* towards *b*. It follows that the line *ad* is equal to *bc*, and hence that *dc* is parallel to *ab*, and therefore horizontal. The same might be proved of any two points in the surface; therefore the whole is in the same horizontal plane.

2. *Pressure of Liquids on Surfaces.*—The general proposition on this point may be stated thus: *The pressure of a liquid on any surface immersed in it, is equal to the weight of a column of the liquid whose base is the surface pressed, and whose height is the perpendicular depth of the centre of gravity of the surface below the surface of the liquid.* See article CENTRE OF PRESSURE. The pressure thus exerted is independent of the shape or size of the vessel or cavity containing the liquid.

3. *Buoyancy and Flotation.*—As a consequence of the proposition regarding the pressure of liquids on surfaces, it can be shewn that when a solid body is immersed in a liquid, it loses as much weight as that of an equal bulk of the liquid weighs. It follows that, if a cubic foot of the liquid and of the solid have equal weights, the solid will lose all its weight, or will remain in the liquid wherever it is put; if a cubic foot of the liquid weigh more than one of the solid, the solid will not only lose all its weight, but will rise up, and that with a force equal to the difference; if a cubic foot of the liquid weigh less than one of the solid, the solid will lose weight, but will sink.

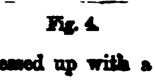


Fig. 4.

When a solid swims, or rises and *floats* on the surface of a liquid, the next problem of hydrostatics is to determine how much of it will be below the surface. We have already seen that any solid in a liquid is pressed upward with a force equal to the weight of the water whose room it occupies. Now, a floating body must be pressed up with a force equal to its own weight, otherwise it would sink lower; hence, *a floating body displaces its own weight of the liquid.* A solid, as AB in fig. 4, sinks until the space occupied by the part B immersed would contain an amount of water equal in weight to the whole solid AB.

As the buoyancy of a body thus depends on the relation between its weight and the weight of an equal bulk of the liquid, the same body will be more or less buoyant, according to the density of the liquid, in which it is immersed. A piece of wood that sinks a foot in water, will sink barely an inch in mercury. Mercury buoys up even iron. Also a body which would sink of itself, is buoyed up by attaching to it a lighter body; the bulk is thus increased without proportionally increasing the weight. This is the principle of life-preservers of all kinds. The heaviest substances may be made to float by shaping them so as to make them displace more than their own weight of water. A flat plate of iron sinks; the same plate, made concave like a cup or boat, floats. It may be noted that the buoyant property of liquids is independent of their depth or expanse, if there be only enough to surround the object. A few pounds of water might be made to bear up a body of a ton weight; a ship floats as high in a small dock as in the ocean.

4. *Stability of Floating Bodies.*—Conceive *abd* (fig. 5) to be a portion of a liquid turned solid, but unchanged in bulk; it will evidently remain at rest, as if it were still liquid. Its weight may be represented by the force *cg*, acting on its centre of gravity *c*; but that force is balanced by the upward pressure of the water on the different parts of the under surface; therefore, the resultant of all these elementary pressures must be a force, *cs*, exactly equal and opposite to *cg*, and acting on the same point *c*, for if it acted on any other point, the body would not be at rest. Now, whatever other body of the same size and shape we suppose substituted for the mass of solid water *abd*, the supporting pressure or buoyancy of the water around it must be the same; hence we conclude, that *when a body is immersed in a liquid, the buoyant pressure is a force equal to the weight of the liquid displaced, and having its point of application in the centre of gravity of the space from which the liquid is displaced.* This point may be called the *centre of buoyancy*.

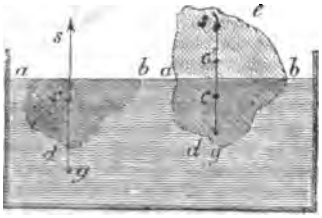


Fig. 5.

We may suppose that the space *abd* is occupied by the immersed part of a floating body *aebd* (fig. 5).

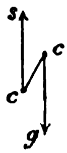


Fig. 6.

The supporting force, *cb*, is still the same as in the former case, and acts at *c*, the centre of gravity of the displaced water; the weight of the body must also be the same; but its point of application is now *c′*, the centre of gravity of the whole body. When the body is floating at rest or in a state of equilibrium, this point must evidently be in the same vertical line with *c*; for if the two forces were in the position of *cs*, *c′g* (fig. 6), they would tend to make the body roll over. The line passing through the centre of gravity of a floating body and the centre of gravity of the displaced water, is called the *axis of flotation*.

The equilibrium of a floating body is said to be *stable*, when, on suffering a slight displacement, it tends to regain its original position. The conditions of stability will be understood from the accompanying figures. Fig. 7 represents a body floating in equilibrium, G being its centre of gravity, B its centre of buoyancy, and AGB the axis of flotation, which is of course vertical. In fig. 8 the same body is represented as pushed or drawn slightly from the perpendicular. The shape of the immersed portion being now altered, the centre of buoyancy is no longer in the axis of figure, but to one side, as at B. Now, it is evident, that if the line of direction of the upward pressure—that is, a vertical line through B—meets the axis above the centre of gravity, as at M, the tendency of the two forces is to bring the axis into its original position, and in that case, the equilibrium of the body is stable. But if BM meet the axis below G, the tendency is to bring the axis further and further from the vertical, until the body get into some new position of equilibrium. There is still another case; the line of support or buoyancy may meet the axis in G, and then the two forces counteract one another, and the body remains in any position in which it is put; this is called *indifferent* equilibrium. In a floating cylinder of wood, for instance, B is always right under G, in whatever way the cylinder is turned. When the angles through which a floating body is made to roll are small, the point M is nearly constant. It is called the *metacentre;* and its position may be calculated for a body of given weight and dimensions. In the construction and lading of ships, it is an object to have the centre of gravity as low as possible, in order that it may be always below the metacentre. With this view, heavy materials, in the shape of ballast, are placed in the bottom, and the heaviest portions of the cargo are stowed low in the hold. See SPECIFIC GRAVITY and AREOMETER.

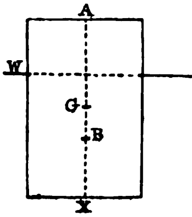


Fig. 7.

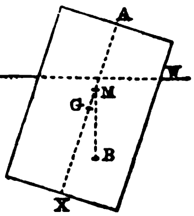


Fig. 8.

HYDROSULPHU'RIC ACID (HS), known also as *Sulphuretted Hydrogen*, *Sulphydric Acid*, and *Hydrothionic Acid*, is a natural gaseous constituent of many mineral waters, as, for example, those of Aix-la-Chapelle in Germany, Barèges in France, Abano in Italy, and Harrogate in England, and is evolved from fumaroles and volcanoes. It is formed spontaneously wherever sulphurous organic matters are undergoing putrefaction, as, for instance, in stagnant sewers and cess-pools, and in waters charged with organic matter and sulphates, especially sulphate of lime.

There are several ways of preparing this gas, which is very extensively used in laboratory operations. The following is that which is most commonly employed. Sulphide (the old sulphuret) of iron, in small fragments, is placed in a bottle, and dilute sulphuric acid is added. Water is decomposed, its hydrogen combining with the sulphur of the sulphide to form hydrosulphuric acid, which escapes as a gas, while its oxygen enters into combination with the iron, forming oxide of iron (FeO), which unites with the sulphuric acid to form the ordinary protosulphate of iron or green vitriol, which remains in solution. The reaction is expressed by the equation:

$$\overset{\text{Sulphide of Iron.}}{FeS} + \overset{\text{Sulphuric Acid.}}{HO,SO_3} = \overset{\text{Hydrosulphuric Acid.}}{HS} + \overset{\text{Sulphate of Iron.}}{FeO,SO_3}$$

Hydrosulphuric acid is a colourless gas of a strong and very nauseous odour, resembling that of rotten eggs. It consists of two volumes of hydrogen and one volume of sulphur vapour condensed into two volumes, which form its combining measure. It is about seventeen times heavier than hydrogen. By pressure, it is liquefied, and by the additional application of cold, it may be obtained in the solid form (see GASES). Water dissolves, at 59°, 3·23 volumes of this gas, but the solution soon becomes milky when exposed to the air, in consequence of the oxygen of the air combining with the hydrogen of the gas, and sulphur being precipitated. It is highly combustible, and burns with a pale blue flame, producing water and sulphurous acid, and, generally, a deposit of sulphur. It has a weak acid reaction, and forms one of the hydracids. Although a feeble acid, it combines readily with bases.

Its use as a reagent is dependent on the fact, that many of the sulphides which it forms with metallic oxides are insoluble in water, and are thrown down from solutions as precipitates with characteristic colours. Thus the gas, or a watery solution of it, gives an orange precipitate with the compounds of antimony—while with those of arsenic it gives a yellow—with those of lead and of silver, a black—and with those of zinc, a white precipitate.

The air of a room slightly impregnated with this gas may be breathed with impunity, but a small quantity of the undiluted gas inspired produces faintness, and its respiration, in a very moderate proportion, was found by Thenard to prove fatal—birds perishing in air which contained $\frac{1}{1500}$th, and a dog in air containing $\frac{1}{800}$th part of this gas. Its poisonous effects are best counteracted by the inhalation of very diluted chlorine gas, which may be readily obtained from a little chloride of lime placed in the folds of a napkin moistened with vinegar.

A very minute trace of this gas may be detected by placing a piece of paper, moistened with a strong solution of sugar of lead, over the vessel or aperture—as, for instance, over an opening in a drain—from which we think it is escaping. If it be present, a more or less black—often only a brown—tint is developed after a few minutes, in consequence of the formation of sulphide of lead.

HYDROTHO'RAX (derived from *hydōr*, water, and *thorax*, the chest) is the term applied to dropsical collections in the Pleura (q. v.), a closed serous sac enveloping the lung on either side. When it exists to any extent, the pressure which it exerts on the lungs impedes the passage of the blood through them, and occasions difficulty of breathing, lividity of countenance, &c.; and more or less dropsy in the face, ankles, &c., soon appears. The physical signs by which the disease can be detected are too purely professional for these pages.

The causes of hydrothorax are various. It may depend upon inflammation of the secreting membrane, or it may be a consequence of organic disease of the heart or lungs. With regard to treatment when the disease seems to depend upon inflammation of the pleura, great advantage may often be derived from occasional cupping and repeated blistering. The most popular internal remedy is a combination of squill and either calomel or blue pill, which must be continued till slight symptoms of salivation manifest themselves.

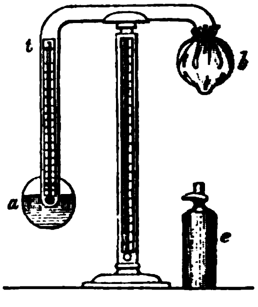
HYDROZO'A. See ZOOPHYTES.

HYÈRES, or HIÈRES, a small town of France, in the department of Var, is situated 3 miles from the Mediterranean, and 8 miles east of Toulon. It is celebrated for the beauty of the situation and the mildness of the climate, and is therefore much resorted to by foreigners suffering from chest or nervous complaints. Pop. (1872) 5197. Near the coast lie the Iles d'Hières, called by the ancients the Stœchades, which, with the exception of the military garrisons of a few forts, are uninhabited. Here, the heat of the climate is tempered by the sea-breezes, and the season seems an eternal spring.

HYGIEI'A—in the classical mythology, the goddess of Health—the daughter of Æsculapius. She was worshipped at Athens, Corinth, Argos, and other important cities, and in works of art is usually represented as a blooming virgin, with a snake, the symbol of health, which drinks from a cup held in her hand.—HYGIEIA is the name of one of the newly-discovered Planetoids (q. v.).

Hygieia.

HYGRO'METER (Gr. *hygros*, moist, *metron*, measure), an instrument for measuring the quantity of moisture in the atmosphere. The earlier forms of hygrometer depended upon the property possessed by some substances of readily absorbing moisture from the air, and being thereby changed in dimensions or in weight. Of this kind was the hair hygrometer of Saussure, in which a hair, which expands and contracts in length according as the air is more or less moist, was made to move an index; a similar instrument was the whalebone hygrometer of Deluc; but as other causes as well as moisture affect such instruments, they afford no accurate indications. The most perfect hygrometer, theoretically, is that of J. F. Daniell (q. v.). It consists of two bulbs connected by a bent tube, as represented in the figure, and enclosing a thermometer, together with some ether and vapour of ether, the air having been expelled. The bulb, *b*, is covered with muslin, and *a* is either blackened or coated with metal. The observer's hand is placed for a short time on *b*, to drive the ether into *a*, leaving *b* and the tube filled with vapour of ether. A little ether is then dropped from a flask, of the form *e*, on the muslin-covered bulb; evaporation instantly takes place, and produces a cooling of *b*, which condenses the vapour inside; a fresh evaporation from *a* fills the vacuum, which is again condensed by dropping ether on *b*, and the process is repeated till the temperature of *a* is so reduced by successive evaporations (see EVAPORATION), that *dew* begins to be formed on the outside of the bulb. At



the instant this occurs, the height of the mercury in the two thermometers is accurately noted, the one giving the dew-point temperature, and the other the temperature of the air. The actual quantity of moisture contained in a cubic foot of air can now be readily found from the following empirical formula: weight of moisture in grains $= \frac{5656 \cdot 2}{448 + t} \times p$; where t is the temperature of the air at the time of observation, and p (found from tables) the elasticity of vapour at the temperature of the dew-point. The evident defects of this instrument are, first, its rapidity of operation, so that no time is allowed for the glass, ether, and thermometer to come to the same temperature, and, in consequence, the dew-point is given higher than it actually is; secondly, its costliness, owing to the great consumption of ether; and, thirdly, its uselessness in tropical countries, owing to the difficulty of preserving the ether in a fluid state. Daniell's hygrometer was used at the Royal Observatory, Greenwich, from 1840—the commencement of meteorological observations—till 1847, when it was superseded by the more convenient instrument, the WET AND DRY BULB THERMOMETERS. This instrument consists of two ordinary thermometers—one has its bulb bare, and thus shews the temperature of the air; the other has its bulb covered with muslin, which is kept wet by a cotton wick dipping into water. The evaporation from the muslin, and consequent cooling of the bulb, being in proportion to the dryness of the air, the difference between the readings of the two thermometers is greatest when the air is driest, and zero when it is completely saturated. The readings of the thermometers being taken, the elastic force of vapour at the dew-point is calculated by the formula of Dr Apjohn (*Proceedings of the Royal Irish Acad.*, 1840):

$$(1)\ F = f - \frac{d}{88} \cdot \frac{h}{30}; \quad (2)\ F = f - \frac{d}{96} \cdot \frac{h}{30};$$

the first formula to be used when the wet thermometer is above, and the second when it is below, the freezing-point (32°). In these formulæ, F is the elastic force of vapour at the dew-point, which has been determined for different temperatures by Regnault from carefully conducted experiments; f, the elastic force at the temperature of evaporation (or reading of wet bulb); d, the difference between the dry and wet bulbs; and h, the height of the barometer. From this the quantity of moisture in a cubic foot of air, &c. can be found as before. To dispense with these troublesome calculations, the *Hygrometric Tables* of Mr Glaisher may be used.

HY'KSHOS, the name of an Egyptian dynasty, generally known as the Shepherd Kings, derived from *hyk*, a ruler, and *shos*, a shepherd; or, according to another version, from *hyk*, a captive, and *shos*, a shepherd. According to Josephus and Africanus, they consisted of six or eight kings, named (1), Salatis, Silitis, or Saites, who reigned 19 or 15 years; (2), Beon, Banon, or Bnon, who reigned 43 or 44; (3), Apachnas, Apachnan, or Pachnas, who reigned 36 or 61 years; (4), Apophis, Aphosis, who reigned 61; (5), Anas, or Anan, who reigned 50; (6), Archles, who reigned 49; (7), Assis, or Asseth, who reigned 49 years and 2 months; and (8), Apobis, who reigned 61 years. The greatest discrepancy exists in the names and their arrangement, and as to the total number of years of the dynasty. Manetho, according to Josephus, states that they reigned 511 years, but the total of the reigns he cites amounts to only 259 years 10 months; while Africanus makes their duration 284 years, and Eusebius 103. Africanus makes the Shepherds consist of the 15th, 16th, and 17th dynasties, and to have ruled 953 years, but only gives the names and reigns of one, which he calls the 15th; while Eusebius makes them more correctly the 17th dynasty. They are stated in the Egyptian annals to have been a race of conquerors sprung from the East, who, under Salatis, their first king, took Memphis, and rendered tributary the whole of Egypt, and fortified the city of Avaris, on the east of the Bubastite arm of the Nile, where he maintained a garrison of 240,000 soldiers. Their oppression, however, drove the Egyptians to revolt, and under Taakan, the predecessor of Aahmes or Amasis I. of the 18th dynasty, a religious quarrel about the temples of Ra or the sun, and of Set, the god of the H., seems to have commenced, when a long war broke out, which ended under Aahmes, with the siege of Avaris, and a king who is called Misphragmuthosis, supposed to be a Thothmes, finally drove them out. The monument of an officer, named Aahmes-Penneben, at El Kab, recounts this siege and his exploits. Finally, according to Manetho, they departed under treaty. The great interest attaching to the H. is, that they were confounded with the Hebrews, or supposed to be the monarchs under whom Joseph entered Egypt, by the old ecclesiastical writers. In the monuments and the papyrus of Turin, in which portions of their names occur in the list of the kings, they bear the full titles of monarchs, although the papyri state that there were no kings in Egypt at the time, and that Taakan was only himself a *hek*, or prince of the south. The H., on a contemporary inscription remaining at El Kab, are called *Mena*, or Shepherds. The H. were by no means the devastating conquerors described by the historian. They entered Egypt, it appears from the monuments, about the 14th Egyptian dynasty, and were content with inscribing their names and titles on the monuments of their predecessors, the name of Appapus having been found on a colossus of Sebakhetp III. of the 13th dynasty, and on that of a king of the 14th dynasty at San. Traces of that of Saites or Salatis have been also found at Tel-Mokdam or Cynopolis. The greatest divergence of opinion has prevailed amongst authors as to their race and origin. Josephus calls them Hebrews or Arabs; the Syncellus, Phœnician shepherds. They have also been supposed to be Idumæans, Ishmaelites, or Scythians. Their physiognomy seems to indicate a Semitic origin, while their worship of Set connects them with the Khita, a people to the north of Palestine, on the confines of Mesopotamia. The names of the kings exhibit no foreign peculiarities; some are purely Egyptian. As regards the date of the H. dominion, the most conflicting opinions have prevailed amongst scholars. Bunsen makes their rule end 1639 B.C.; Lepsius, 1842 B.C. Placing, however, the discovered date of Thothmes III., 1445 B.C., in his 16th year, the close of H. dominion must have ended about 1500 B.C.

Bunsen, *Egypt's Place*, vol. ii. pp. 405, 578; Lepsius, *Königsbuch;* Bolkh, Manetho, p. 231; De Verria, *Rev. Arch.* (1861), vol. iv. p. 249; Mariette, *Rev. Arch.* (1861), vol. iii. pp. 97, 247, 337.

HYLÆOSAU'RUS (Gr. forest-lizard), a huge dinosaurian reptile, found in the Wealden strata of Kent and Sussex. Fragments of different individuals have been found sufficient to give an approximate notion of the affinities and great size of this reptile. The bones of the head have not yet been observed; its teeth were comparatively small, and close set; they seem to indicate that it was a vegetable eater. The body was broader than high, and terminated in a long slender flexible tail; the limbs were relatively short; the skin was covered with scutes and tubercles; and a row of very large thin angular bony spines extended down the back, and formed a serrated dermal crest, like the horny spines of the modern iguana. It is supposed to have attained a length of 25 feet. The remains of only one species have been found; it has been named *H. Oweni*.

HY'MEN, or **HYMENÆ'US**, in Grecian mythology, the god of marriage; but originally, the word seems to have denoted only the bridal-song which was sung by the companions of the bride as she went from her father's house to that of the bridegroom. The god H. is first mentioned by Sappho. The legends concerning him are various; but he is generally said to be a son of Apollo and some one of the Muses. He is represented as a boy with wings and a garland, a bigger and graver Cupid, with a bridal-torch and a veil in his hands.

HYMENO'PTERA (Gr. membrane-winged), an order of insects, containing a very great number of species, estimated at about one-fourth of the whole class, and of which some, as ants and bees, are singularly interesting and important. They have the mouth furnished with mandibles for cutting and tearing, but the other parts of the mouth are adapted for suction, and are generally narrow and elongated, often united into a kind of proboscis, as in bees. See BEE. The antennæ are generally slender, but often exhibit differences in the sexes of the same species. The wings are four in number, the first pair larger than the second, the wings of the same side united in flight by little hooks. The wings, when at rest, are laid one over another horizontally over the body. The wings are entirely membranous, not reticulated as in the *Neuroptera*, but with comparatively few nervures, the arrangement of which is so constant in the whole order, that particular names have been given to them and to the spaces between them, and their diversities have been made use of in classification. The wings are wanting in the imperfectly developed females (*neuters*) of some. Besides the ordinary eyes, all the H. have three small simple (or *stemmatic*) eyes on the top of the head. The abdomen is generally united to the thorax by a slender pedicle. The abdomen of the females is generally furnished with an organ capable of being protruded, but for different purposes in different sections of the order, it being in some of the hymenopterous tribes an ovipositor or borer, and in others a sting. The H. in their perfect state generally feed on honey, but some of them prey on other insects, which are the food of the larvæ of a greater number; whilst the larvæ of some feed on various vegetable substances. The metamorphoses of the insects of this order are perfect; the larvæ are generally—although not in all the families—destitute of feet; the pupæ take no food. The H. are remarkable for the dilatation of the *tracheæ* or air-tubes into vesicles, and the general perfection of the respiratory system. The instincts, and even apparent intelligence, displayed by some of them—particularly the *social* kinds, which live in communities—have excited admiration from the earliest times.—The order is divided into two sections—*Terebrantia*, having an ovipositor; and *Aculeata*, having a poison-reservoir and sting. To the former belong saw-flies, gall-flies, ichneumons, &c.; to the latter belong ants, bees, wasps, &c.

Wing of Honey Bee.

HYME'TTUS, a mountain in Attica, now called Trelo Vouni, situated to the south-east of Athens, and famous among the ancients for its honey and its marble. The honey still retains its reputation.

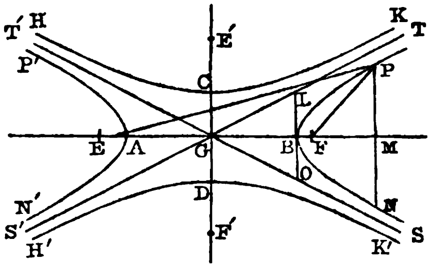
HYMN, a canticle of praise or of prayer addressed to the divine honour. The word in its strict acceptation supposes a certain metrical structure, or at least some kind of rhythmical cadence. The use of hymns dates from the earliest days of Christianity (Matt. xxvi. 30; Col. iii. 16); but our information as to the hymns of the early ages, and still more as to their authors, is extremely imperfect. The *Te Deum* is variously ascribed to St Ambrose, St Hilary, to Abundius, and to a monk named Sissabul. To Prudentius, with greater certainty, are assigned the *Hymn of Holy Innocents*, *Salvete Flores Martyrum*, and the *Ales Diei Nuntius*. Even the names of the authors of the more modern hymns are often involved in mystery; but some of the most esteemed hymns are known as the productions of Sedulius, of Fortunatus, of Paul the Deacon, of St Bernard, and St Thomas. The number of hymn-writers in the modern languages is so great as to preclude the possibility of any enumeration. The most complete modern collection of medieval Latin hymns is Mone's *Hymni Latini Medii Ævi*, 3 vols. 8vo. Friburg, 1856.

HYOSCY'AMUS. See HENBANE.

HYPA'TIA, daughter of Theon, an astronomer and mathematician of Alexandria, and head of the Neo-Platonic school in that city, was born in the latter part of the 4th century. She was equally remarkable for her beauty, her wisdom, and her tragic fate. From her earliest youth, she exhibited an amazing intelligence, in consequence of which, her father, one of the most erudite savans of his time, resolved to give her genius a thoroughly philosophic culture. She succeeded her father in the chair of philosophy at Alexandria; and the fame of her lectures drew round her students from all parts of the East where the influence of Greek thought and knowledge was felt. H. seems to have been worthy of the lofty eulogies she has received. Amid the widespread corruptions of Alexandria, she lived as spotless as a vestal; and if her teaching was not one that could lay a strong hand on the vices of heathenism, and arrest their course, it was at least sufficient not only to preserve herself from pollution, but also to inspire her with a love of beauty, truth, and goodness, that was Christian in its spirit and earnestness, if heathen in its form and limitations. The citizens of Alexandria were proud of her; and such reliance was placed on her judgment and sagacity, that the magistrates used frequently to consult her on important cases. Among those who were most intimate with her was Orestes, prefect of the city. At this time, the Bishop of Alexandria was Cyril (q. v.), a fierce hater of heathens and heretics. Detesting Orestes, whom he suspected of being no true Christian, and who had drawn up an accusation against him for exciting a tumult, he soon cast an evil eye on H., whom he regarded as a Satanic enchantress, and the grand obstacle to his reconciliation with the prefect. His hatred communicated itself to the lower clergy, and especially to certain savage monks from the Nitrian deserts, who, headed by one Peter, a reader, attacked H. in the streets as she was returning from her lecture-room. The maiden was dragged from her chariot, hurried to the Cæsarian Church, where she was stripped naked, and murdered with tiles, after which she was torn to pieces, and her limbs carried to a place called Cinaron, and there burned to ashes, 415 A. D.

HYPERÆSTHE'SIA (derived from *hyper*, over, and *aisthēsis*, a sensation) include those affections which have this property in common—viz., an exalted irritability and increased irritation of the nerves. Hyperæsthesia of the cutaneous nerves is manifested by pain in its various modifications, which is sometimes intensely severe, as in Tic Douloureux (q. v.), while hyperæsthesia of the nerves of special sense is manifested by phantasms, illusions, &c. The following points are common to the whole class of these affections: 1. Periodicity, or the alternations of paroxysms and intermissions; 2. Uniformity and persistence of the symptoms, however long the duration of the disease; 3. No danger to life; 4. Freedom from this class of diseases in early life. Of the diseases predisposing to hyperæsthesia, hysteria is far the most frequent; but it is sometimes induced by rheumatism, gout, skin-diseases, &c.

HYPE'RBOLA. If two similar cones be placed apex to apex, and with the lines joining the apex and centre of base in each, in a straight line; then if a plane which does not pass through the apex be made to cut both cones, each of the two sections will be a *hyperbola*, as PBN, P'AN'. It is, viewed analytically, the locus of the point to which the straight lines EP, FP differing by a constant quantity are drawn from two given points, E and F. These given points are called the *foci*, one being situated in each hyperbola. The point G, midway between the two foci, is called the *centre*, and the line EF the *transverse axis* of the hyperbola. A line through G perpendicular to the transverse axis is called the *conjugate axis;* and a circle described from centre B, with a radius equal to FG, will cut the conjugate axis in C and D. If G be taken for the origin of co-ordinates, and EM and EF' for the axes, the hyperbola is expressed by the equation $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. ($GB = a$, $GC = b$). The hyperbola is the only conic section which has Asymptotes (q. v.); in the figure these are GT, GT'; GS, GS'. It also appears that if the axes of co-ordinates be turned at right angles to their former position, two additional curves, HCK, H'DK', will be formed, whose equation is $\frac{x^2}{b^2} - \frac{y^2}{a^2} = 1$. These two are called *conjugate hyperbolas*, and have the same asymptotes as the original hyperbolas. These asymptotes have the following remarkable property: If (starting from G) the asymptotes be divided in continued proportion, and from the points of section lines be drawn parallel to the other asymptote, the areas contained by two adjacent parallels and the corresponding parts of the asymptote and curve are equal; also lines drawn from the centre to two adjacent points of section of the curve, enclose equal areas. The equation to the hyperbola when referred to the asymptotes is $xy = ab$; which shews that as the ordinates decrease in geometrical progression, the abscissæ increase in the same ratio.



HYPE'RBOLÉ (Gr. *hyper*, over, and *ballein*, to throw) is the name given to a figure of rhetoric, by which expressions are employed that, taken literally, signify more than is really meant. The use of the figure is to arrest the attention. Hyperbole is the basis of many metaphors. Thus, we call Nero a 'monster;' Tamerlane, a 'tiger;' and so on.

HYPERBO'REANS (that is, dwellers beyond Boreas or the North Wind), a name given by the ancients to all the unknown peoples of the West and North. The Greeks imagined the country north of the Rhipæan (generally supposed to be the Ural) Mountains to be inhabited by the H., and their residence was gradually referred to more distant regions; but it was universally supposed that, as the favourites of Apollo, they enjoyed a terrestrial paradise, a bright sky, and a perpetual spring, a fruitful land, and everlasting youth and health.

HYPERICA'CEÆ, or **HYPERICI'NÆ,** a natural order of exogenous plants, containing about 300 known species, trees, shrubs, and herbaceous plants, widely distributed over the world, and in very different climates, but particularly numerous in North America. The leaves are generally covered with pellucid dots, and the edges of the leaves, sepals, and petals bordered with black glands. The stamens are united at the base, and grouped in from 3 to 5 bundles.—The species of *Vismia* yield a substance resembling gamboge. Many of the H. belong to the genus *Hypericum*, or St John's Wort, of which some species are common natives of Britain, adorning woods, heaths, &c., with their bright yellow flowers. *H. calycinum*, a spreading shrubby species, naturalised in some places in Britain, has flowers more than two inches in diameter. *H. perforatum*, the common or true St John's Wort, has astringent properties, and is used for gargles and lotions, and internally in dysentery, &c., although not recognised in the pharmacopœia. Superstitious notions are connected with it in many parts of Europe, particularly when gathered on the day of St John the Baptist.—*H. Androsæmum* (or *Androsæmum officinale*), commonly called Tutsan, a pretty common native of Britain, with berry-like fruit, was once in great esteem as a vulnerary. Its English name is *Tutsan*, from the French *tout saint*, all whole.

HYPE'RION. See TITANS.

HY'PERSTHENE, a mineral closely related to augite and diallage. It is a bisilicate of iron and magnesia. It is crystalline, but often found granular or disseminated. Viewed in one direction, with reference to its cleavage planes, it is copper-coloured, in another it is dark brown. When cut and polished, it is cherry-red, with a pearly lustre, and is valued for rings, brooches, &c. The finest specimens are brought from the coast of Labrador, although it is found in Norway, Sweden, Germany, Scotland, &c. It is sometimes found in connection with felspar, forming *Hypersthene rock*, a rare kind of trap rock.

HYPE'RTROPHY (Gr. over-nourishment) is the term applied in medicine to the enlargement of certain organs of the body. The best examples of this change are seen in the muscular system, where it may occur altogether independently of disease. The huge bosses of flesh that stand prominently forward in the arm of a blacksmith or of a pugilist, and in the leg of an opera-dancer, are illustrations of hypertrophy, where the general health may be perfect. In double organs, such as the kidneys and lungs, if the organ on one side degenerates through disease, the organ on the opposite side is often found to enlarge, and carry on double work. In these cases, hypertrophy is an effect of disease, but is at the same time a resource of nature to preserve life.

There are, however, cases in which the hypertrophy has a hurtful instead of a conservative effect, as, for example, hypertrophy of the thyroid gland, constituting the disease known as goitre or bronchocele, hypertrophy of the prostate gland, of the spleen, &c. The following are, according to Mr Paget, the conditions which give rise to hypertrophy: 1. The increased exercise of a part in its healthy function; 2. An increased accumulation, in the blood, of the particular materials which a part appropriates in its nutrition or in secretion; 3. An increased afflux of healthy blood. In hypertrophy of the muscular tissue, the first and third of these conditions are present. In hypertrophy of the fatty tissue, constituting obesity, there is an excess of fat or of its chief elements in the blood.

HY'PHASIS. See Sutlej.

HY'PHEN (Gr. together, in one), the name given to a mark in writing, thus (-), indicating that two words or syllables are to be connected; e. g., bull-fight.

HY'PNOTISM (from the Greek word *hypnos*, sleep) is a term invented by the late Mr Braid, of Manchester, to designate certain phenomena of the nervous system which in many respects resemble those which are induced by animal magnetism, but which clearly arise from the physical and psychical condition of the patient, and not from any emanation proceeding from others. The following are his directions for inducing the phenomena, and especially the peculiar sleep-like condition of hypnotism. Take a silver lancet-case or other bright object, and hold it between the fingers of the left hand, about a foot from the eyes of the person experimented on, in such a position above the forehead as to produce the greatest strain on the eyes compatible with a steady fixed stare at the object. The patient must be directed to rivet his mind on the object at which he is gazing. His pupils will first contract, but soon dilate considerably; and if, after they are well dilated, the first and second fingers of the operator's right hand, extended and a little separated, are carried from the object towards the eyes, the eyelids will most probably close with a vibratory motion. After ten or fifteen seconds have elapsed, it will be found that the patient retains his arms and legs in any position in which the operator places them. It will also be found that all the special senses, excepting sight, are at first extremely exalted, as also are the muscular sense and the sensibility of heat and cold; but after a time the exaltation of function is followed by a state of depression far greater than the torpor of natural sleep. The patient is now thoroughly hypnotised. The rigidity of the muscles and the profound torpor of the nervous system may be instantly removed, and an opposite condition induced by directing a current of air against the muscles which we wish to render limber, or the organ we wish to excite to action; and then by mere repose the senses will speedily regain their original condition. If a current of air directed against the face is not sufficient to arouse the patient, pressure and friction should be applied to the eyelids, and the arm or leg sharply struck with the open hand.

From the careful analysis of a large number of experiments, Mr Braid is led to the conclusion, that by a continual fixation of the mental and visual eye upon an object, with absolute repose of body and general quietude, a feeling of stupor supervenes, which renders the patient liable to be readily affected in the manner already described. As the experiment succeeds with the blind, he considers that 'it is not so much the optic, as the sentient, motor, and sympathetic nerves, and the mind, through which the impression is made.'

Many of the minor operations of surgery have been performed on patients in the hypnotised state without pain, and hypnotism has been successfully employed as a therapeutic agent in numerous forms of disease, especially such as have their seat in the nervous system. An interesting memoir *On Hypnotic Therapeutics* was published by Mr Braid in the 17th volume of *The Monthly Journal of Medical Science* (1853).

HY'POCAUST, a form of furnace much used by the Romans, for the purpose of heating baths and apartments. The fuel is placed in a chamber under the floor, and the smoke and heated air are made to circulate round the walls and under the floor, by means of hollow tubes, or a hollow lining. The full benefit of the fire is thus obtained, in place of a large portion of the heat being allowed to escape, as it does, in the case of an open fireplace, up the chimney. The Romans invariably used this form of furnace for heating their dwelling-houses, and in all the Roman houses which have been discovered in this country, remains have been found of the hypocaust. It is now coming again into use for heating the so-called 'Turkish Baths.'

HYPOCHÆ'RIS, a genus of plants of the natural order *Compositæ*, sub-order *Cichoraceæ*, of which one species, *H. radicata*, or Long-rooted Cat's-ear, is extremely common in meadows and pastures in Britain. Its leaves are all radical, and spread on the ground, resembling in form those of the dandelion, but rough; the stem is branched, the flowers not unlike those of the dandelion, but smaller. Cattle eat this plant readily, and its abundance is not deemed injurious to pasture or fodder.

HYPOCHLO'ROUS ACID (ClO) is a dark red fluid, which, at a temperature of about 70°, becomes converted into an orange-coloured gas, which very readily explodes into its ultimate constituents. A watery solution of this gas has a penetrating, chlorine-like odour, a caustic action on the tongue, colours the skin brown, and if applied for any length of time, causes it to ulcerate. It is the active ingredient of the different bleaching-powders and salts. Its salts—the hypochlorites—present very much the same odour as the acid. Their solutions bleach organic pigments, such as litmus and indigo, and are employed largely as bleaching agents.

HYPOCHO'NDERS (Gr. *hypo*, under; *chondros*, a cartilage) are the two lateral and superior regions of the Abdomen (q. v.) under the cartilages of the false ribs, and to the right and left of the epigastrium.

HYPOCHONDRI'ASIS (so called from its supposed connection with the hypochondriac regions of the abdomen), a disease characterised by extreme increase of sensibility, palpitations, morbid feelings that simulate the greater part of diseases, exaggerated uneasiness and anxiety, chiefly in what concerns the health, &c. In extreme cases it becomes a species of insanity (see below). The disease is intimately connected with, if not caused by, disorder of the digestive functions. See Indigestion.

Hypochondriacal Insanity.—When sombreness of disposition and anxiety concerning personal comfort become exaggerated, and attention is directed chiefly to the state of the health, it amounts to common hypochondriasis. When it passes beyond the control of the will, when the whole mind is directed to the state of the system, or to particular organs, and exalts and misinterprets sensations, the condition is designated hypochondriacal insanity. The disease may be described as the engrossment of the attention by false impressions conveyed, or conceived to be conveyed, from internal organs. These sensations may, in many instances, be real, and proceed from actual alterations in the structure or functions of the parts supposed to be affected; but they may likewise consist of ordinary sensations, excited and intensified by the act of attention which makes them known to the patient. Neither the experience nor the sufferings of the victims are imaginary, however absurd their errors, and however groundless their apprehensions may be; the disease consists in the exaltation of sensibility and attention, and in the delusions which originate in that morbid state. A man lives in constant fear of death; he is firmly convinced that he labours under cancer, consumption, disease of the heart, and lives upon drugs; that his stomach, or bowels, are contracted, or the abode of frogs, a fœtus, or an army of soldiers; that his legs are transformed into glass or ice; that his whole body has assumed the shape of a teapot, or the magnitude of a hippopotamus. It is often a precursor of melancholia, as in the case of Cowper the poet, and other kinds of alienation; but it must likewise be regarded as a distinct and independent affection, traceable, generally, to dyspepsia, or disorder of the digestive and assimilative apparatus. It is probable that shades and degrees of this malady may constitute those links which connect partially healthy from absolutely unsound minds. In females, there are often added to the phenomena already described many of the symptoms of hysteria and great impressionability, and even convulsive affections; there is likewise encountered the simulation of diseases, the tendency to deceive others after having deceived themselves into the belief that they are invalids, and labouring under grievous and incurable disorders. They crave sympathy and support, as subject to affections of the spine, the joints, the lungs. They abstain from food, or devour inedible and disgusting substances; they writhe in what appears excruciating pain, and they voluntarily sustain great suffering during the treatment of their fancied ailments. A patient of Dr Page, Carlisle, underwent amputation of the finger, wrist, forearm, and ultimately of the arm, in order to be relieved of sores which she produced. Certain of the maladies which are pretended, or feared, or fancied, appear to be called into existence under the morbid influence of volition: and there are strong grounds for believing that the concentration of attention upon a particular function, not merely interferes with its exercise, but disturbs the physical condition, and leads to degeneration of the tissue of the organ with which it is connected by capillary congestion, or evolution of nerve-force. —Falret, *De l'Hypochondrie et du Suicide* (1822); Andrew Combe, On Hypochondriasis, *Phrenological Journal*, vol. iii. p. 51; Cheyne, *The English Malady* (1733); Arnold, *Observations on Nature, Kinds, &c., of Insanity* (1782).

HYPO'STASIS (Gr. *Hypostasis*, subsistence), the term employed by Greek theological writers to designate the distinct subsistence of the three persons of the Trinity. Originally, the meaning of the word was unsettled. It was used by the Fathers of the council of Nice, in the sense of *ousia*, essence or substance, and this confusion of phraseology supplied the most formidable weapon to the semi-Arians in the controversy about the Homoousian (q. v.). The use of the word hypostasis, however, was settled at a synod held by Athanasius in 357, in which it was fully distinguished from *ousia*, and explained as synonymous with *prosopon*, which the Latins rendered by *persona*, person. From this time, the word was adopted into the theological language of the Latin Church, in which it is used indiscriminately with *persona*.

HYPOSTA'TIC UNION (Gr. *Hypostasis*, person), a union of natures or substances so intimate as to constitute one undivided person. The term is used to describe the mysterious union of the divine and human natures in Christ, in virtue whereof, while each nature is complete, even after union, yet each merges its separate personality in the undivided person of the God-man, to which all the actions, whether divine or human, are ascribed. This form of expression was devised for the purpose of excluding the doctrine of a mere moral union held by Nestorius. See MONOPHYSITES, NESTORIANS, TRINITY.

HYPO'TENUSE, or HYPO'THENUSE, the name of that side in a right-angled triangle which is opposite to the right angle. The well-known property of the hypotenuse, that the square described on it is equal to the sum of the squares described on the other two sides, is proved in the famous 47th proposition of the first book of Euclid's *Elements*, and has, in the sixth book, been generalised into the following form: The figure described on the hypotenuse is equal to the similar figures described on the other two sides. It is said that the 47th proposition was discovered by Pythagoras, who was so overjoyed at his good fortune, that he sacrificed a hecatomb to the Muses. Camerer, in his edition of Euclid, gives seventeen different demonstrations of this proposition.

HY'POTHEC, a term in the law of Scotland, but not used in England, to denote a lien or security over goods in respect of a debt due by the owner of the goods. Thus, a landlord has a hypothec over the furniture or crops of his tenant in respect of the current rent; so a law-agent or attorney has a hypothec over the title-deeds of his client in respect of his account or bill of costs. In England, these rights are called liens, and are not so liberally allowed. See Paterson's *Comp. of E. and S. Law*, s. 594. There is also a hypothec in favour of seamen over the freight in respect of their wages.

HYPOTHECA'TION is the pawning of a ship for necessaries, or to raise money in some critical emergency.

HYPO'THESIS. In endeavouring to explain natural phenomena, we have often to assume or imagine a cause, which, in the first instance, we do not know to be the real cause, but which may be established as such when we find that its consequences agree with the phenomenon to be explained. Every genuine theory was at one stage a mere conjecture, and became a true theory in consequence of being proved or verified by the proper methods. Thus, when it occurred to Newton that the force of gravity on the earth, as exemplified in falling bodies, might extend to the distance of the moon, and might be the power that compelled it to circle round the earth, instead of going off in a straight line through space, the suggestion was only an hypothesis, until such time as he was able to shew that it accounted exactly for the facts, and then it became a theory.

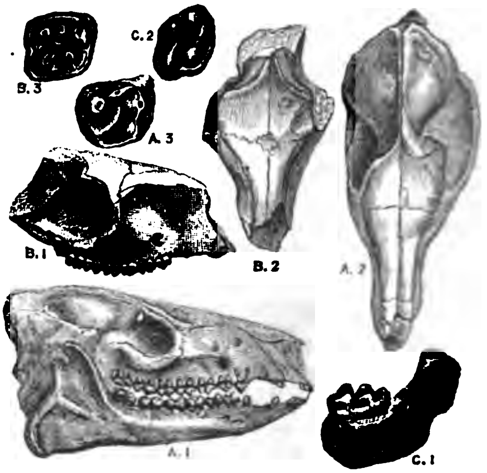
A difference of opinion has arisen as to what constitutes a legitimate hypothesis, there being manifestly some necessary limits to the process of imagining possible causes. The case that has chiefly contributed to make this a question is the celebrated undulatory theory of light, a theory, or hypothesis rather, remarkable not only for the extent to which it explains the facts, but for having led to the discovery of new facts by way of inference from the theory itself. Notwithstanding all this amount of coincidence, the ethereal substance whose undulations are supposed to constitute light in its passage from the sun to the earth, is not known to have a real existence. It is an imaginary element, so happily conceived as to express with fidelity a series of extremely complicated phenomena. This was not the character of Newton's hypothesis as to the motion of the moon; the power supposed by him (the earth's gravity) was an actual or existing force, and all he did was to suggest that it extended as far as the moon. Accordingly, M. Auguste Comte and Mr J. S. Mill have laid it down as the condition of a sound scientific hypothesis, that the cause assigned to the phenomenon in question should be either a real cause, or capable of being ascertained to be a real cause, and that the liberty given to the scientific inquirer should be confined to imagining its operation in a particular sphere, and the law and amount of its operation, since both these could be verified by experiment and calculation. On the other hand, Dr Whewell has contended, that an amount of agreement with observed facts, such as has been exemplified by the undulatory hypothesis, is sufficient to establish not merely an hypothesis, but a theory, at least until such a time as some discordant facts arise, when the theory must be modified or abandoned. But whatever name be given to this class of suppositions, it is evident that they must be deemed inferior in scientific value to the other class of suppositions, where no cause or agent is assumed but what is actually known to exist, and where the only question is, the presence of that agent in such manner and amount as to tally with the observed facts. Gravity, heat, electricity, magnetism, are established natural agents, and when we assume any one of these as the cause of some phenomena, we are on safe ground so far, that if it be once shewn that they are actually operative in the case we are dealing with, and that their calculated effect exactly coincides with the observed effect, the explanation is complete and final; no subsequent discovery can disturb a conclusion established in this way. But if we have to assume the very agency itself, or to imagine a power that we have no experience of, the coincidence between the laws of the assumed agency and the laws of the phenomena produces at best but a temporary or provisional evidence, which is liable to be superseded whenever a still better imagined machinery shall be brought forward. Thus, in the case of light, the first hypothesis, that of Newton himself, was a stream or shower of corpuscles; this gave way to the undulatory ether, whose merit lay in embracing the facts more closely; but we have no security against the ultimate preference of some third supposition which shall displace the second, as that did the first; while, perhaps, a day may come when an agency shall be proved to exist capable of explaining the phenomena. Even granting that we must sometimes assume an unknown agent (when an effect seems to be beyond the power of all the recognised forces), yet, in ordinary researches, it is considered a grave objection if the assumed agent be of such a subtle or occult nature, or so far removed from observation, that its existence does not admit of being proved. Such was the doctrine of the Cartesian vortices, and such are any hypotheses as to the shapes, sizes, and distances of the ultimate atoms of matter. Such also is the doctrine of nervous fluids, whereby the impulses of mind are supposed to be propagated between the brain and the other parts of the body.

HYPOXA'NTHINE, a substance found in the spleen and muscles of the heart of man, and in the spleen and blood of the ox. It is a white crystalline powder, almost insoluble in cold hydrochloric acid, very slightly soluble in boiling alcohol, and requiring for solution in water 1090 equivalents of cold, or 180 of boiling water. Its solution has a neutral re-action.

HYPSILANTIS. See YPSILANTI.

HYRA'CEUM, a peculiar substance found in the crevices of the rocks of Table Mountain, Cape of Good Hope. It is one or more of the excrements of the Cape Hyrax (*Hyrax Capensis*). Hyraceum is a blackish-brown viscid material, not unlike soft pitch, having a strong and offensive taste, not unlike castoreum, for which it has been used as a substitute in medicine. At one time, so large a quantity was found as to suggest the idea of its being used as a manure, but the supply was soon exhausted, and only a small quantity is now imported to meet the demand of the curious pharmaceutist.

HYRACOTHE'RIUM, a genus of fossil Pachydermata, belonging to the division Perrysodactyla, the animals of which are characterised by having an odd number of toes. The genus was founded by Owen on the fragmentary remains of two species found in Lower Eocene strata; a third species from the same beds has been since described by him from more complete materials, under the name *Pliolophus vulpiceps;* he considers it only a subgenus, and as we can see no characteristics to separate it generically from the other two, we place it here as a true hyracothere. The fossil was discovered in a nodule from the Roman cement bed of the London Clay near Harwich. It is the most complete Eocene mammalian fossil of the London Clay. It consists of an entire skull and a portion of the rest of the skeleton, including the right humerus and femur, a great part of the left femur, the left tibia, and three metatarsal bones, apparently of the same foot, besides fragments of pelvis, ribs, and vertebræ. The head (fig. A 1 and A 2) is 5 inches long, and 2 inches 2 lines broad; it is slender, tapering gradually from the zygomatic region to the muzzle; the upper outline is straight; the bony rim of the orbit is incomplete behind for about one-fifth of its circumference. The narrow skull and incomplete orbit ally it to the Palæothere; the same form of orbit occurs also in the rhinoceros, and more exactly in the tapir. The straight contour of the skull, and the structure of the nasal aperture, shew affinities with the horse and hyrax. The third molar of the upper jaw (fig. A 3) shews the structure



Hyracotherium :

A 1, A 2, skull of *Hyracotherium* (*Pliolophus*) *vulpiceps* (one third natural size). A 3, molar tooth (natural size).

B 1, B 2, skull of *H. leporinum* (one-third natural size). B 3, molar tooth (natural size).

C 1, portion of lower jaw and tooth of *H. cuniculus* (natural size). C 2, molar tooth (natural size).

of the teeth. The teeth, as well as the form of the lower jaw, tell plainly of the herbivorous character of the hyracothere. The bones of the leg exhibit ungulate affinities, and their form and proportions are between those of the hyrax and the tapir. The second species was founded on a mutilated cranium (fig. B 1, B 2), rather larger than a hare's, found in the cliffs of London Clay near Herne Bay. It shews a skull very like the first species, though broader at the orbital region. The third molar tooth (fig. B 3) has a larger number of cones than the same tooth in the first species. The third species was founded on several teeth which belonged to a smaller animal than either of the others, found in the Eocene sand underlying the Red Crag at Kyson, in Suffolk. The molar (fig. C 2) exhibits a structure similar to that of the others figured. From the same deposit were obtained two teeth belonging to a lower jaw, one of them, the third molar, still in its socket, and having a fragment of the jaw attached to it (fig. C 1). These teeth were considered by Owen to belong to a quadrumanous animal, and were described by him as *Macacus Eocænus*, 'at once the first terrestrial mammal which has been found in the London Clay, and the first quadrumanous animal hitherto discovered in any country in Tertiary strata so old as the Eocene period.' Since its publication, speculative geologists have made good service of this 'monkey.' Owen has, however, since stated (*Ann. Nat. Hist.*, Sept. 1862), that the two teeth belong to the third species of hyracothere.

HYRAX. See DAMAN.

HYRCA'NIA, a district of ancient Asia, bounded on the N. by the Caspian Sea and the Ochus (sometimes called, in consequence, *Hyrcanum Mare*), on the E. and S. by the Elburz Mountains, which separated it from Parthia, and on the W. by Media. It corresponds with the modern Mazanderân and Asterabad. With the exception of the coast districts, and the valleys among the hills, which produced corn, oil, and wine, it was not a fertile region; dense forests prevailed, through which roamed multitudes of savage animals, the Hyrcanian tiger in particular being celebrated. The inhabitants were of the same stem as the Parthians, and were noted for their wild and rude character.

HYRCA'NUS, the name of two Jewish high-priests and princes of the Asmonean family.—1. JOANNES H., son of Simon Maccabeus, who ruled 136—106 B. C., was at first tributary to the Syrians; but on the death of Antiochus, made himself independent, subdued the Samaritans on the north, and forced the Idumæans on the south to adopt the laws and customs of the Jews. He also concluded an alliance with the Romans, or rather confirmed that which his father Simon had previously made; built the strong fortress of Baris on the north-eastern angle of Mount Moriah, and extended his territories almost to the ancient limits of the Davidian monarchy. He is also supposed to have founded the Sanhedrim (q. v.). Originally a Pharisee, he subsequently attached himself to the party of the Sadducees, who were anxious to keep on good terms with the Romans, and who discountenanced the turbulent religious patriotism of the Jewish masses. H. was, comparatively speaking, a just and enlightened ruler, and the country enjoyed great prosperity during his reign. He left five sons, two of whom, Aristobulus and Alexander, governed with the title of king.—2. HYRCANUS II., son of Alexander, and grandson of the preceding, was a feeble prince. On the death of his father (78 B. C.), he was appointed high-priest by his mother Alexandra, who ruled Judæa herself for the next nine years. After her death (69 B. C.), his younger brother, Aristobulus, a braver and more energetic man, seized the government, and forced H. to withdraw into private life. Induced by the Idumæan, Antipater, and aided by Aretas, king of Arabia Petræa, he endeavoured to win back his dominions, but was not successful until Pompey began to favour his cause. After some years of tumultuous fighting, Aristobulus was poisoned by the partisans of Ptolemy (49 B. C.), and H., who had for some time possessed, if he had not enjoyed, the dignity of high-priest and ethnarch, was now deprived of the latter of these offices, for which, in truth, he was wholly incompetent. Cæsar (47 B. C.), on account of the services rendered to him by Antipater, made the latter procurator of Judæa, and thus left in his hands all the real power, H. busying himself only with the affairs of the priesthood and temple. Troubles, however, were in store for him. Antipater was assassinated, and Antigonus, son of Aristobulus, with the help of the Parthian king, Orodes I., invaded the land, captured H. by treachery, cut off his ears, and thus disqualified him for the office of high-priest, and carried him off to Seleucia on the Tigris. Some years later, Herod, son of his old friend Antipater, obtained supreme power in Judæa, and invited the aged H. home to Jerusalem. He was allowed to depart, and for some time lived in ease and comfort, but falling under suspicion of intriguing against Herod, he was put to death (30 B. C.).

HYRTL, JOSEPH, a distinguished anatomist, was born in 1811 at Eisenstadt, in Hungary, studied at Vienna, and early acquired eminence both as a scientific anatomist, and upon account of the extreme beauty of his anatomical preparations. He became Professor of Anatomy in Prague in 1837, and at Vienna in 1845. Whilst yet a student, he enriched the Anatomical Museum of Vienna with many preparations. He has contributed not a little to the progress of comparative anatomy, especially that of fishes, and has made the anatomy of the ear a subject of very particular investigation. He has written many books and articles on the subjects above indicated, of which the two principal are *Lehrbuch der Anatomie des Menschen* (1847; 9th edit. 1865), and *Handbuch der Topographischen Anatomie* (1847; 5th edit. 1865). The former is a text-book in all German universities, and has been translated into various languages. H. formed a museum of comparative anatomy at Vienna, and is rector of the academy there.

Common Hyssop
(*Hyssopus officinalis*).

HY'SSOP (*Hyssopus*), a genus of plants of the natural order *Labiatæ*, distinguished by four straight diverging stamens, and a calyx with 15 ribs. The known species are few. The Common H. (*H. officinalis*) is a native of the south of Europe and the East. It is found on the Alps of Austria. It is a half-shrubby plant, about 1½ feet high, the upper part of the stems quadrangular, the leaves evergreen and lanceolate, the flowers in one-sided whorled racemes. The flowers are generally of a very beautiful blue. It has an agreeable aromatic odour. It has long been in cultivation for the sake of its leaves and young shoots, which are sometimes used for culinary purposes as a seasoning, but more generally in a dried state as a stomachic and carminative. A syrup made with them is a popular remedy for colds. The virtues of H. depend on a volatile oil.—It is very doubtful what plant is the H. of the Bible. It has been supposed to be some species of *Phytolacca* (q. v.), as *P. acinosa*, a native of the Himalaya; but of late, strong arguments have been advanced in favour of the common Caper (q. v.).—HEDGE H. is *Gratiola officinalis*. See GRATIOLA.

HYSTE'RIA (so called from the Greek word *hystera*, the womb) is a disease which simulates so many other diseases, that it is not easy to describe it with the brevity which the limits of this work necessitate.

The hysterical fit or paroxysm—the most marked form or manifestation of the disorder—is almost, though not exclusively, confined to women, and chiefly to young women. In a severe case, the trunk and limbs are strongly convulsed; the patient struggles violently, retracting and extending her legs, and twisting her body with such force that the aid of three or four strong persons is often required to prevent a slight and apparently feeble girl from injuring herself or others. 'The head,' says Dr Watson in his Lectures, 'is generally thrown backwards, and the throat projects; the face is flushed; the eyelids are closed and tremulous; the nostrils distended; the jaws often firmly shut; but there is no distortion of the countenance. If the hands are left at liberty, she will often strike her breast repeatedly and quickly, or carry her fingers to her throat, as if to remove some oppression there; or she will sometimes tear her hair, or rend her clothes, or attempt to bite those about her. After a short time, this violent agitation is calmed; but the patient lies panting, and trembling, and starting at the slightest noise or the gentlest touch; or sometimes she remains motionless during the remission, with a fixed eye; till all at once the convulsive movements are renewed; and this alternation of spasm and quiet will go on for a space of time that varies considerably in different cases; and the whole attack frequently terminates in an explosion of tears, and sobs, and convulsive laughter.'

In another less frequent form of the affection, the patient suddenly sinks down insensible and without convulsions: after remaining for some time in this state, with flushed cheeks, a turgid neck, and irregular breathing, she recovers consciousness, but remains for some time depressed in spirits and fatigued.

During the attack, especially in the first variety, the patient complains of uneasiness in the abdomen, and of a sensation as if a ball were rolling about, and rising first to the region of the stomach, and then to the throat, where she feels as if she were being choked. The abdomen is distended with wind, which moves with a loud rumbling sound along the intestinal canal, and is often discharged by eructation. Towards the close of the fit, but more commonly after it is over, a large quantity of pale limpid urine is discharged.

In many respects, this affection resembles Epilepsy (q. v.). According to Dr Marshall Hall, the most essential difference is this: that in hysteria, much as the larynx may be affected, it *is never* closed; while in epilepsy, it *is* closed. Hence, in the former, we have heaving, sighing inspiration; and in the latter, violent, ineffectual efforts at expiration.

The hysterical fit varies in duration from a quarter of an hour or less to many hours.

The persons who suffer from hysteria are commonly young women in whom the process of menstruation is disordered, and who are either naturally feeble, or have been debilitated by disease or want; and in patients of this kind, the hysteria, or the hysterical tendency, is apt to shew itself in mimicking so faithfully many of the most important diseases, that the physician has often great difficulty in determining the true nature of the case. Among the disorders that may be thus simulated by hysteria are, inflammation of the peritoneum (or Peritonitis, q. v.), various forms of palsy, inflammation of the larynx (or Laryngitis, q. v.), inability to swallow (or Dysphagia), painful affection of the breast, disease of the hip and knee joints, and disease of the spine. Many of these cases of pseudo-disease come to a sudden favourable termination under some strong mental or moral emotions. Those who are old enough to recollect the morbid religious excitement that prevailed at the time when Irving and his followers believed in the 'unknown tongues,' can hardly fail to remember the remarkable, or, as many regarded it, the miraculous cure of a young paralytic lady, who was made to believe that if, on a certain day, she prayed for recovery with sufficient faith, her prayer would be answered, and she would recover at once. She did so, and her palsy instantly disappeared. This case, which was regarded by the believers in the movement as a direct answer to prayer, and as inaugurating a new era of miraculous cures, admits of easy and rational explanation by some psychologists. There are various instances on record where, in a similar way, an alarm of fire has instantly cured an hysterical paralysis that had lasted for years.

In the cases already noticed, the patient is not guilty of wilfully deceiving the physician; but in other instances they are found to practise the most remarkable impositions, pretending by various frauds to be suffering from spitting of blood, from stone in the bladder, &c., or to be living without food of any kind.

Hysteria is a very troublesome affection to deal with, because it is very readily induced by example, or, as Dr Watson terms it, is propagable by moral contagion. If, in a hospital ward or in a factory where many young women are congregated, one girl goes off in a fit, all the others who may happen to have a hysterical tendency will probably follow her example. In such cases, a decided order that the next girl who is attacked shall be treated with the actual cautery, or even with the cold affusion, will often have a marvellous effect in checking the spread of the disorder.

During the fit, the treatment to be adopted is to prevent the patient from injuring herself, to loosen her dress, and to admit an abundance of fresh cool air; to dash cold water upon the face and chest; and, if she can swallow, to administer a couple of ounces of the asafœtida mixture, or a drachm of the ammoniated tincture of valerian in a wine-glass of water. After the paroxysm is over, the patient should have an active purge, and the bowels should be kept properly open by aloetic aperients; and the shower-bath, preparations of iron, and tonic treatment generally should be adopted, and all abnormal bodily and mental excitement, such as late parties in hot rooms, novel-reading, &c., should be carefully avoided.

HY'STRIX AND HYSTRI'CIDÆ. See PORCUPINE.

HYTHE SCHOOL OF MUSKETRY. See MUSKETRY, SCHOOL OF.

I

I, THE ninth letter in the alphabets of Western Europe, was called by the Greeks *Iota*, after its Shemitic name (Heb. *Jod*), which signifies 'hand.' The oldest forms of the letter, as seen in the Phœnician and Samaritan, have a rude resemblance to a hand with three fingers; but by gradual simplification, the character came to be the smallest in the alphabet, and 'iota' or 'jot' is a synonym for a trifle. The original sound of the letter, and that which is considered its proper sound in all languages except English, is that given to Eng. *e* in *me;* with this power, it forms one of the fundamental vowels *i*, *a*, *u* (see A and LETTERS). What is called the long sound of *i* in Eng. is really the diphthong *ai* rapidly pronounced. The power that the vowel *i*, followed by another vowel, has of turning the preceding consonant into a sibilant, has been noticed in regard to the letter C (q. v.); further instances may be seen in such French words as *rage*, *singe*, from Lat. *rabies*, *simia*. In Lat., there was but one character for the vowel *i* and the semi-vowel now denoted by the character *j*. See J.

IA'MBIC VERSE, a term applied, in classic prosody, and sometimes in English, to verses consisting of the foot or metre called *Iambus*, consisting of two syllables, of which the first is short, and the second long (⏑ –). Archilochus (q. v.) is the reputed inventor of iambic verse. The English language runs more easily and naturally in this metre than in any other. See METRE, VERSE.

Thĕ stăg | ăt ēve | hăd drūnk | hĭs fīll.

Lady of the Lake.

IA'MBLICHUS, the proper name of several persons in classical antiquity, as—1. A king of Emesa, who, in the civil war, took the part of Antony.—2. A Syrian freedman, who flourished at the end of the reign of Trajan and beginning of that of M. Aurelius (117—169 A. D.). He was instructed by a Babylonian in the language, manners, and literature of Babylon, and wrote the *Babylonica*, or Loves of Rhodanes and Sinonis, in 16 or 39 books, which has been preserved by Photius, c. xciv., and Leo Allatius. It is the oldest of the novels of antiquity which has reached the present day, but is not of any great merit either as to style or plot. 3. A philosopher who flourished under Constantine about 310 A. D., born of an illustrious and wealthy family at Chalcis, in Cœle-Syria, pupil of Anatolius and Porphyry, and of the Neo-Platonic school of Plotinus, whose doctrines he extended. Little is known of his life; but he was followed by a numerous school, who listened with enthusiasm and respect, and who thought that he was inspired, had intercourse with the gods, and could divine and perform miracles. This gave him immense credit. His doctrines were a syncretic mixture of Pythagorean and Platonic ideas, mixed with superstition and magic, and the supposed manifestation of God by ecstasies, and a communication with the spiritual world by ceremonies. One of his great works; On the Choice of Pythagoras (*Peri Aireseos Pythagorou*) consisted of 10 books, of which there remains the 1st, A Life of Pythagoras, filled with prodigies, and evidently written against Christianity. 2d, An Exhortation to Philosophy (*Protreptikoi Logoi eis Philosophian*), an ill-arranged introduction to Plato. 3d, On the Common Knowledge of Mathematics (*Peri Koines Mathematikes Epistemes*), full of fragments of Pythagoras, Philolaus, and Archytas. 4th, On the Arithmetical Introduction of Nicomachus. The 5th and 6th books are lost. The 7th, The Theology of Arithmetic (*Ta Theologoumena tes Arithmetikes*); the 8th, The History of Music; the 9th, Geometry; the 10th, On the Study of Heavenly Bodies. He also wrote a work on the Soul, commentaries on Plato and Aristotle, another on the complete Chaldæan Philosophy, another on Beginnings, and one on Sacred Images, in which he affirmed that the gods resided in their statues. His celebrated work on the Mysteries (*Peri Musteriôn*) is, however, disputed; it is supposed by Meiners not to be written by I.; but is asserted by Tennemann to be the work of this author. It is drawn up as the answer of Abammon, a priest, to a letter addressed to his pupil, Anebo, by Porphyry. It contains many Egyptian doctrines, and esoterical explanations derived from the Hermetic Books, the writings of Bitys and others, mixed with Pythagorean and Neo-Platonic ideas. The style of I. is not careful, and inferior to Porphyry. I. is supposed to have died at Alexandria, 333 A. D.—Several other writers of this name are known, as a younger philosopher of the Neo-Platonic school, born at Apamea, and supposed to be a nephew of the preceding, praised by Libanius to Julian the Apostate; another, son of Himerius, mentioned by the same author, and a physician at Constantinople.

Eudocia, *Violetum*, p. 244; Eunapius, *Vit. Philosoph.*, p. 20; Hebensbreit, *De Iamblicho* (Leip. 1744); Brucker, *Hist. Crit. Phil.*, ii. p. 260; *Iamblichus*, a Gale, fo. (Ox. 1678).

IBA'RRA, or **SAN MIGUEL DE IBARRA**, a town of Ecuador, South America, in the department of Quito, and 60 miles north-east of the town of that name. It is situated on the northern base of the volcano of Imbabura, is well built, and carries on manufactures of wool and cotton. Pop. estimated at about 10,000.

IBE'RIA. See HISPANIA and GEORGIA.

IBE'RIS. See CANDYTUFT.

I'BEX, the ancient name of the Bouquetin (q. v.), or Steinbock of the Alps; and now, according to some zoologists, of a genus of the goat family, or sub-genus of goat, having the horns flat, and marked with prominent transverse knots in front, whereas those of the true goats are compressed and keeled in front, and rounded behind. The species are all inhabitants of high mountainous regions. The I. of the Caucasus and the I. of the Pyrenees differ a little from the I. of the Alps, and from one another, but the differences may perhaps be regarded as those of varieties rather than of species.

The conventional ibex represented in Heraldry resembles the heraldic antelope in all respects, except that the horns are straight and serrated.

IBICUI', or **IBICUY**, an important affluent of the Uruguay (q. v.).

I'BIS, a genus of birds of the family *Ardeidæ*, or, according to some ornithologists, of *Scolopacidæ*, and perhaps to be regarded as a connecting link between them. The bill is long, slender, curved, thick at the base; the point rather obtuse; the upper mandible deeply grooved throughout its length. The face, and generally the greater part of the head, and sometimes even the neck, are destitute of feathers, at least in adult birds. The neck is long. The legs are rather long, naked above the tarsal joint, with three partially united toes in front, and one behind; the wings are moderately long; the tail is very short. The Sacred I., or Egyptian I. (*I. religiosa*), is an African bird, two feet six inches in length, although the body is little larger than that of a common fowl.—The Glossy I. (*I. falcinellus*) is a smaller species, also African, but migrating northwards into continental Europe, and occasionally seen in Britain. It is also a North American bird. Its habits resemble those of the sacred ibex. Its colour is black, varied with reddish brown, and exhibiting fine purple and green reflections. It has no loose pendent feathers.—The White I. (*I. alba*), a species with pure white plumage, abounds on the coasts of Florida. Audubon saw multitudes on a low islet, and counted 47 nests on a single tree.—The Scarlet I. (*I. ruber*) is a tropical American species, remarkable for its brilliant plumage, which is scarlet, with a few patches of glossy black.—The Straw-necked I. (*I.* or *Geronticus spinicollis*) is a large Australian bird of fine plumage, remarkable for stiff naked yellow feather-shafts on the neck and throat.

Sacred Ibis.

The Sacred Ibis, one of the birds worshipped by the ancient Egyptians, and called by them *Hab* or *Hib*, and by the modern Egyptians *Abu-Hannes* (i. e., Father John), is a bird with long beak and legs, and a heart-shaped body, covered with black and white plumage. It was supposed, from the colour of its feathers, to symbolise the light and shade of the moon, its body to represent the heart; its legs described a triangle, and with its beak it performed a medical operation; from all which esoterical ideas it was the avatar of the god Thoth or Hermes (see Hermes), who escaped in that shape the pursuit of Typhon, as the hawk was that of Ra, or Horus, the sun. Its feathers were supposed to scare, and even kill, the crocodile. It appeared in Egypt at the rise, and disappeared at the inundation of the Nile, and was thought, at that time, to deliver Egypt from the winged and other serpents which came from Arabia in certain narrow passes. As it did not make its nest in Egypt, it was thought to be self-engendering, and to lay eggs for a lunar month. According to some, the basilisk was engendered by it. It was celebrated for its purity, and only drank from the purest water, and the most strict of the priesthood only drank of the pools where it had been seen; besides which, it was fabled to entertain the most invincible love of Egypt, and to die of self-starvation if transported elsewhere. Its flesh was thought to be incorruptible after death, and to kill it was punishable with death. Ibises were kept in the temples, and unmolested in the neighbourhood of cities. After death, they were mummied, and there is no animal of which so many remains have been found at Thebes, Memphis, Hermopolis Magna, or Eshmun, and at Ibiu or Ibeum, fourteen miles north of the same place. They are made up into a conical shape, the wings flat, the legs bent back to the breast, the head placed on the left side, and the beak under the tail; were prepared as other mummies, and wrapped up in linen bandages, which are sometimes plaited in patterns externally. At Thebes, they are found in linen bandages only; well preserved at Hermopolis in wooden or stone boxes of oblong form, sometimes in form of the bird itself, or the god Thoth; at Memphis, in conical sugar-loaf-shaped red earthenware jars, the tail downwards, the cover of convex form, cemented by lime. There appear to be two sorts of embalmed ibises—a smaller one of the size of a corncrake, very black, and the other black and white—the *Ibis Numenius*, or *Ibis religiosa*. This last is usually found sometimes with its eggs, and with its insect food, the *Pimelia pilosa*, *Akis reflexa*, and portions of snakes, in the stomach. It is said to resemble the I. of India rather than Africa. By the Jews, it was held to be an unclean bird.—Wilkinson, *Manners and Customs*, v. 7, 217; Passoloegua, *Catalogue Raisonné*, p. 255; Pettigrew, *History of Mummies*, p. 205; *Horapollo*, i. c. 30, 36.

IBRAHIM PASHA, the adopted son of Mohammed Ali, the viceroy of Egypt, was born in 1789, and gave the first proofs of his gallantry and generalship in 1819, in quelling the insurrection of the Wahabis. He afterwards subdued Sennaar and Darfur. He invaded the Morea at the head of an Egyptian army in 1825, with the view of reducing it under the power of Mohammed Ali; but the intervention of the great powers in the affairs of Greece compelled him to abandon this enterprise in 1828. Mohammed Ali having conceived the design of adding Syria to his dominions, Ibrahim crossed the Egyptian border with an army in October 1831, took Acre by storm, and quickly made himself master of the whole of Syria. A peace was concluded on 4th May 1833, the Turks not only consenting to give up Syria, but also making over Adana to Ibrahim personally, on a kind of lease. When war broke out again between Mohammed Ali and the sultan in 1839, Ibrahim was again successful, totally routing the Turks in the great battle of Nisib on 24th June. The interference of the great powers, eventually compelled him to relinquish all his Syrian conquests, and to return to Egypt, suffering, during his passage through the desert, the most terrible hardships and losses, whilst the attempt to elevate Egypt to complete independence came to an end. In 1848, when the aged pacha had sunk into absolute dotage, I. went to Constantinople, and was installed by the Porte as Viceroy of Egypt; but on 9th November 1848, he died at Cairo. He was succeeded, not by any of his own children, but by Abbas Pasha, the favourite grandson of Mohammed Ali.

IBRAI'L. See Brahilov.

ICE is water in the solid form. It is specifically lighter than water which is just about to freeze, and therefore swims in it. Water, in becoming solid, expands about $\frac{1}{9}$th of its volume or bulk. The formation of ice takes place generally at the surface of water. This is owing to the peculiarity, that when water has cooled down to within 7°·4 of freezing, it ceases to contract, as before, with increase of cold, and begins to expand until it freezes; which causes the coldest portions of the water to be always floating on the surface. In some circumstances, however, not very well explained, ice forms at the bottom of rivers, and is called ground-ice.

Water in ordinary cases freezes at the degree of heat marked 32° on Fahrenheit's thermometer, and 0° on the Centigrade and Reaumur's; but if it is kept perfectly still, it may be cooled to nearly 22° F. below freezing, and still remain liquid. The least shake, however, or the throwing in a solid body, makes a portion of it freeze instantly, and its temperature rises immediately to 32°. Sea-water, and salt water in general, freezes at a lower temperature than pure water; in doing which, part of the salt separates, and the ice, when melted, gives water that is fresher than the original. The colour of pure ice is deep blue, which is only discernible, however, when it is in large masses. It is best seen in the clefts of a glacier or an iceberg.

In the neighbourhood of the poles, and on mountains of a certain height in all latitudes, there exist immense masses of permanent ice; and even in some districts of Siberia, where a kind of culture is practicable in summer, there are found at a certain depth below the surface of the earth strata of ice mingled with sand. In sinking a well at Yakutsk, the soil was found frozen hard to the depth of 382 feet, and consisting in some parts entirely of ice. These permanent masses of ice must be classed with rocks and mountains, as among the solid constituents of the globe. In the lower regions of the torrid zone there is no ice, and in the temperate zones, it is a passing phenomenon. From the polar ice-fields and glaciers which are always protruding themselves into the sea, great floating masses become detached, and form *icebergs*, floes, and drift-ice. These bergs or mountains of ice are sometimes more than 250 feet above the sea-level. They present the appearance of dazzling white chalk-cliffs of the most fantastic shapes. Fresh fractures have a green or blue colour. From the specific gravity, it is calculated that the volume of an iceberg below the water is eight times that of the protruding part. Icebergs, and floes or ice-fields, are often laden with pieces of rock and masses of stones and detritus, which they have brought with them from the coasts where they were formed, and which they often transport to a great distance towards the equator. These floating masses of ice are dangerous to navigation.

The hardness and strength of ice increase with the degree of cold. In the severe winter of 1740, a house was built of the ice of the Neva at St Petersburg 50 feet long, 16 wide, and 20 high, and the walls supported the roof, which was also of ice, without the least injury. Before it stood two ice-mortars and six ice-cannon, made on the turning-lathe, with carriages and wheels also of ice. The cannon were of the calibre of 6-pounders, but they were loaded with only ¼ lb. of powder, and with hemp-balls—on one occasion with iron. The thickness of the ice was only four inches, and yet it resisted the explosion.

About twenty-four years ago, Faraday called attention to a remarkable property of ice, since (incorrectly) called Regelation. He endeavoured to account for the fact, that two slabs of ice, with flat surfaces, placed in contact, unite into one mass when the temperature of the surrounding air is considerably *above* the freezing-point, by assuming that a small quantity of water, surrounded on every side by ice, has a natural tendency to become ice; and the fact, that two blocks of ice placed in contact do not unite unless they are *moist*, seems to bear out this idea. But J. Thomson gave a totally different explanation of this phenomenon. He shewed that the capillary force of the film of water between the plates is sufficient to account for a very considerable pressure between them; so that from his point of view the phenomenon would be identical with the making of snowballs by pressure; and the formation, by a hydraulic press, of clear blocks from a mass of pounded ice, an observed fact, the explanation of which is to be found in the property of ice mentioned below. See *Proceedings of the Royal Society*, 1860—1861. Faraday, taking up the question again, shewed that the (so-called) regelation takes place in *water* as readily as in air, a fact quite inconsistent with the action of capillary forces. To this, J. Thomson replied, shewing, very ingeniously, that the capillary forces he at first assumed are not necessary to a complete explanation of the observed phenomena. See reference above.

Other views of the question are numerous, for instance, that of Persoz, adopted by Forbes, in which ice is considered as essentially colder than water, and as passing through a sort of viscous state before liquefying, as metals do during the process of melting. This idea, however, has not of late found much support; and it is probable that the true solution of the question is, as J. Thomson has lately pointed out, to be found in the analogy of the crystallisation of salts from their aqueous solutions.

However that may be, there is no doubt about the following property of ice, theoretically predicted by J. Thomson from the experimental fact of its expanding in the act of freezing, and demonstrated by means of the Piezometer by Sir W. Thomson—viz., that the freezing-point of water, or the melting-point of ice, is *lowered by pressure;* and the brothers have, with singular ingenuity, applied this to the explanation of the motion of glaciers. That a mass of glacier-ice moves in its channel like a viscous fluid, was first completely established by Forbes. Thomson's explanation of this motion is of the following nature: In the immense mass of the glacier (even if it were homogeneous, much more so when full of cracks and fissures, as it always is), there are portions subjected to a much greater strain than others. The pressure to which they are subjected is such as corresponds to a melting-point considerably *below* the temperature of the mass—and therefore, at such points, the ice melts, the strain is relieved, and the whole mass is free for an instant to move nearly as a fluid would move in its place. But, the strains being thus for an instant removed, the temperature and pressure of the water are again consistent with freezing—the thin layer of water quickly solidifies, and then matters proceed as before. Thus, at every instant, the strains at different parts of the mass melt it at those places where they are greatest, and so produce the extraordinary phenomenon of a mass which may in common language be termed *solid*, and even *rigid*, slowly creeping down its rocky bed like a stream of tar or treacle.

Ice-Trade and Manufacture.—The trade in ice is now one of great and increasing importance. Ice has always been esteemed as a luxury in warm weather; and this early led to the storing of it in winter and preserving it for summer use. The Greeks, and afterwards the Romans, at first preserved snow, closely packed in deep underground cellars. Nero, at a later period, established ice-houses in Rome, similar to those in use in most European countries up to the present time. But these means were not enough to supply the luxurious Romans with ice for cooling beverages, and they actually established a trade in snow, which was brought to Rome from the summits of distant mountains.

The trade in ice in this country has, until lately, been very limited, having been chiefly confined to the supply required by a few of the first-class fishmongers and confectioners—the private residences of the more opulent families being furnished with ice-houses in which a sufficiency is kept for private use. But the North Americans have started a trade in this article in their own cities, which has extended to Europe and Asia, and has, in an incredibly short space of time, attained a surprising magnitude. The export of ice from America was commenced about 1820, by a merchant named Tudor, who sent ice from Boston to the West Indies. After persevering against many losses, he succeeded in establishing a trade with Calcutta, Madras, and Bombay; and now not only is it sent in vast quantities to those places, but also to Hong-kong, Whampoa, and Batavia. About fifteen years since, the Wenham Lake Ice Company commenced sending ice to this country from Boston, which is the great American port for shipment of this material; and since then, not only has there been a continually increasing supply, but the success of the Company has been so great as to tempt others into the market, and the supply for Great Britain now comes chiefly from Norway; 139,421 tons having been imported from thence in 1872, of the value of £128,196, whilst only 100 tons was received from other countries. Ten or twelve years previous to this, America had sent to Great Britain on an average 20,000 tons annually, costing as many thousand pounds.

In America, the ice is chiefly collected in the neighbourhood of Boston, Philadelphia, Baltimore, Washington, and New York, and the lakes which supply it form no small part of the property of those whose lands border thereon; these have all been carefully marked out, and the right secured, so that, when the winter comes, and the ice is formed, the harvest begins with great regularity. The ice is cleared from snow by means of an implement called the plane. An ice-plough, drawn by horses, and driven by a man riding upon it, is then made to cut deep parallel grooves in the ice, and these are again crossed by other grooves at right angles, so that the whole of the surface is deeply marked out into small squares, measuring a little more than three feet. A few of these square blocks being detached by hand-saws, the remainder are easily broken off with crowbars, and floated away to the ice-storehouses, which are usually built of wood, on the borders of the lake. Some of these are of vast dimensions, and contain vaults of great depth; the walls are double, and sometimes treble, being altogether as much as four feet in thickness, and having hollow spaces between to render them less heat-conducting. The blocks of ice are covered up with sawdust, a layer being placed between each tier of blocks. Many of these ice-houses are made large enough to hold from 40,000 to 50,000 tons of ice. When fully stored, a large quantity of dried marsh-grass is trodden in upon the top, to the thickness of several feet, and the doors are then securely closed. The total value of the ice which is stored in America has been computed at £900,000, and if to this we add the ice-trade of Norway, Sweden, Russia, which, from the slight data we possess, is estimated at £600,000, we have the astounding fact, that a value of one million and a half sterling is added to a comparatively small body of water by the mere act of freezing.

Notwithstanding the facilities for importing ice, there is, and always will be, a necessity for procuring it locally if possible. Hence there has been much talent brought to bear in devising means for artificial freezing. See FREEZING MIXTURES. But until recently, the modes of producing ice artificially were too costly to be practically useful. The desideratum, however, may now be considered as supplied; for machines are constructed by Mr Siebe of Lambeth capable of producing ten tons per day. Such a machine requires steam-power to work it, and its action consists in evaporating ether or any similarly volatile liquid *in vacuo*, and again condensing the vapour to liquid, so as to be used afresh. By this machine, 20° F. below zero (52° of cold) has been easily obtained, and such a machine is now regularly producing large quantities of ice nearly under the equator in Peru, where previously ice had never been seen; and others are in use in India and at the Cape in the service of the government, for the use of the troops and hospitals. Another machine was first shewn in the London Exhibition of 1862 by the French firm of Carré and Co., which, from its extreme simplicity, and the fact that it can be adapted to the humblest kitchen, has led to its extensive application. The price is from £4 upwards; and as the volatile liquid is only the aqueous solution of ammonia, the cost of working it is very slight. The importance of low temperatures in many manufactures has lately increased the demand for freezing-machines, and they are now made of great size and power. The machine-made ice has the same valuable quality that distinguishes the imported lake ice, viz., its perfect purity, so that pieces can be put into the drink that is to be cooled.

ICEBERG. See ICE.

ICE PLANT (*Mesembryanthemum* [q. v.] *crystallinum*), an annual herbaceous plant, a native of Africa and of the south of Europe, remarkable for the watery vesicles (*papulæ*) with which its whole surface is covered, and which have the appearance of granules of ice, and sparkle in the same manner in the sun. It is common as a tender annual in our green-houses, the peculiarity from which it derives its name making it an object of interest. The seeds are used for food in the Madeira Islands. The ashes supply barilla, and the plant is burned on this account in countries where it abounds.

I'CELAND, an island in the northernmost part of the Atlantic, on the confines of the Arctic Ocean; in N. lat. 63° 23′—66° 33′, and W. long. 13° 22′—24° 35′, distant about 600 miles from Norway, and 250 from Greenland, 250 from the Faröe Isles, and above 500 from the north of Scotland. It belongs to the kingdom of Denmark. Its extent is about 39,207 square miles; its extreme length from east to west is upwards of 300 miles, its greatest breadth from north to south about 200. Its coasts, particularly on the north and west, are very much broken by bays or *fiords*. In some of the bays are numerous small islands. I. is in many respects one of the most interesting parts of the world. Its physical features are very remarkable, and not less so its history and the character of its inhabitants. It consists in great part of lofty mountains, many of which are active volcanoes; only certain level districts along the coasts, and a few dales, are habitable, or in any degree capable of cultivation, whilst even there scarcely a tree is to be seen, and the climate is unsuitable for grain. The interior of the island is almost entirely occupied with rugged tracts of naked lava and other volcanic products, vast ice-fields in many places connecting its high mountain summits, among which are prodigious glaciers, in some instances descending even to the coast, they and the torrents which gush from them rendering communication between one inhabited spot and another very difficult and dangerous.

Yet here has civilisation been long established, and the people, necessarily very poor, have cultivated poetry and other departments of literature with great success.

The highest mountain in the island is Oeräfa Jökul, which attains a height of 6426 feet above the level of the sea. It is situated in the south-east, and is connected with a vast mountain mass, of which several of the summits are actively volcanic, no less than 3000 square miles being perpetually covered with ice and snow at an elevation varying from 3000 to above 6000 feet, whilst all underneath seems to be full of either active or smouldering volcanic fire. The most celebrated volcano is Hecla (q. v.). Krafla is perhaps the most noted of a great group of active volcanoes in the north of the island. The eruptions of Hecla have caused no little devastation, but still more terrible and destructive have been those of Skaptár Jökul and other volcanoes of the same mountain mass, which burst forth for the first time within the historic period in 1362. In repeated instances, volcanic islets have been thrown up in the bays and near the coasts of I., which have generally disappeared again within a short time. Connected with the volcanic fires are also hot springs in great number, some of which flow gently, and others, called *Geysers* (q. v.), gush up at intervals and with ebullitions of great violence. Numerous hot springs may in many places be seen sending up their steam in a single little valley, and the Icelanders are accustomed to avail themselves of them for the washing of clothes and other purposes. The water of some is merely lukewarm, whilst that of others is boiling; some are pure, and some sulphureous. They are subject to great variations, and appear and dry up very suddenly. Earthquakes are frequent, and the island suffered very severely from this cause in 1755 and 1783. The winter is not generally more severe than that of Denmark, although more protracted, and it is rather the shortness of the summer and the insufficiency of summer heat, with the superabundance of moisture, than the severity of the winter, which is unfavourable to the growth of corn and plants of many other kinds. In the southern portions of I., the longest day lasts 20 hours; the shortest, 4 hours. In the northern districts, the sun never sets for a whole week in midsummer, and in midwinter never rises above the horizon during an equally long period of time.

About 20,000 oxen, 30,000 horses, and 400,000 sheep constitute the chief part of the wealth of the inhabitants. The horses are small, but vigorous and active. They receive little attention from their owners, whose oxen require almost all the hay and other fodder they can store up for winter. I. ponies have now begun to be imported into Britain. Reindeer were introduced into I. by a public-spirited governor in 1770, and have become naturalised in the uninhabited tracts of the interior, where, however, their presence is of little importance. Seals abound on the coasts, where sea-fowls are also extremely numerous, and their flesh, eggs, and feathers are much sought after. Swans, and other *Anatidæ*, frequent the lakes. The Eider Duck is plentiful on many parts of the coast, and its down is a principal article of commerce. Fish of many kinds are abundant on the coasts, salmon and trout in the rivers. The food of the people consists in great part of fish. The cod-fishery is extensively prosecuted by the French, from two to three hundred French vessels and about 7000 seamen being employed in it, under the immediate patronage of the French government, which aims at thus training seamen for the navy. The salmon-fishery of some of the rivers has begun to be prosecuted for the supply of the London market. The herring-fishery has not hitherto received special attention, but vast shoals of herrings frequent the fiords. The most important agricultural operations are those of the hay-harvest. The seeds of the *Melur*, or Upright Sea Lyme Grass (*Elymus arenarius*), are gathered and used for making pottage and cakes, and are much relished; bread made of imported grain being rather a luxury in the houses of the common people. Meal made of Iceland Moss (q. v.) is used in a variety of ways, and this lichen is gathered in large quantities both for home use and for exportation. Potatoes, turnips, kale and cabbage, spinage, parsley, radishes, mustard, cresses, &c. are produced in gardens. The mineral wealth of I. has only begun to be developed. In no part of the world is sulphur found in such abundance. Iron ore is also found. There is a peculiar kind of brown coal called *Surtarbrand* (q. v.), which, along with drift-wood, is much used for fuel on the northern and eastern coasts.

It is supposed that the population of I. was once 100,000, but it subsequently diminished. Since 1840, when it amounted to 57,094, a gradual increase has taken place, until in 1870 it had reached 69,763. The people, who are of Scandinavian origin, are distinguished for honesty, purity of morals, and a wonderful love of education. Notwithstanding their poverty and other adverse circumstances, it is rare to find an Icelander who cannot read and write. They belong to the Protestant Church. The clergy are, like their parishioners, very poor; they are under one bishop. The Icelanders are strongly attached to their native country, and delight in the study of its history as set forth in ancient *sagas* and poems. Their language is the old Norwegian, preserved in almost its pristine purity. See SCANDINAVIAN LANGUAGES AND LITERATURE. They are rather a small race, and seldom attain to a great age. Scurvy was a very common disease, and cases of elephantiasis were frequent, probably owing in a great measure to the nature of their food, and still more to their miserably crowded and unventilated dwellings, which are mostly cottages of the humblest description, built of turf or of pieces of lava, the crevices stuffed with moss, and the roof formed of turf. The former of these diseases has now entirely disappeared, and the latter is becoming very rare. The knitting of stockings and gloves is a common kind of domestic industry, and with the sale of skins, wool, feathers, eider-down, fish-oil, &c., enables the peasantry to procure a few articles of foreign produce. The chief imports are rye, barley, flour, coffee, liquors, tobacco, sugar, coal, iron, &c. Some years ago, upwards of 40,000 Danish barrels of grain (of all kinds) were imported; also about 427,000 lbs. of coffee, 448,000 quarts of various liquors, 109,000 lbs. of tobacco, 457,000 lbs. of sugar, and 32,000 chaldrons of coal. The annual exports are valued at 4,000,000 ryksdaler (£900,000), and consist of dried fish, wool, hosiery, tallow, train-oil, lard, and preserved meat. The destruction of meadows by volcanic eruptions, and the interruption of fishing by drift-ice, have sometimes caused great distress. Since 1855 free-trade has been in force; 32 authorised trading-places have been opened, of which Reykiavik, with a population of 2024, and situated at the head of a bay in the south-west of the island, is the most important. Here the governor resides; the *Althing*, a kind of parliament, is held; here are a public library of 8000 volumes, a Royal Icelandic Society, and an observatory; and newspapers and Icelandic books are printed. There is regular steam-communication during summer with Leith and Copenhagen.

The authentic history of I. begins with the latter half of the 9th c., when emigrants from Norway settled here. The Landnama Book, however, one of the earliest of the records of the island, states that the Christian relics found here by the Norwegians on their arrival—as wooden crosses, &c.—had been erected previously by Irish settlers. However this may be, it is certain that the first authentic successful settlement of I. was made under Ingolf, a Norwegian, who, after a fruitless attempt on the south coast in 870, succeeded in establishing himself at Reikiavik in 874. The changes introduced in Norway by Harald Haarfager caused many who could not endure them to betake themselves to other countries, and particularly to I., all the habitable coast districts of which were occupied within sixty years, and the old Norwegian institutions were transferred to it unmodified. The government was at first, in the times of paganism, hierarchic and aristocratic; it became afterwards a kind of aristocratic republic. The Althing met every summer in the valley of Thingvalla. Christianity was not established by law till 1000 A. D., and then not without much opposition. Schools were then founded, and two bishoprics in Holar and Skalholt.

The Icelanders were enterprising sailors in the early periods of their history, and discovered Greenland about the year 982, and a part of the American coast, which they called *Vineland*, about 990. They made voyages also to the south, visiting the furthest parts of the Mediterranean. The most flourishing period of Icelandic literature and commerce was from the middle of the 12th to the beginning of the 13th c., when, in consequence of domestic broils, Haco V. of Norway succeeded in reducing the whole island under his sway in 1262, and a declension began, which continued till a new impulse was given to the minds of men, here as elsewhere, by the Reformation. When Norway was united to Denmark in 1380, I. shared its fate, but was not transferred along with Norway to a new allegiance in 1814. The Protestant religion was introduced in 1540, but not fully established till 1551. In the 17th c., the island suffered much from the ravages of Algerine pirates, who carried away many persons to slavery. In 1707, small-pox carried off 18,000 persons; and in 1784—1785, about 9000 died of famine.—The Althing, after it had subsisted for fully 900 years, was suppressed in the 19th c., but was reorganised in 1843. By the new constitution for Iceland of Jan. 1874, the Althing has obtained legislative powers in all matters concerning Iceland.—See Von Troil, *Letters on Iceland*, 1772; Sir George Mackenzie, *Travels in Iceland*, 1810 (cheap edition by W. and R. Chambers, 1851); Henderson, *Journal of a Residence in Iceland*, 1818; R. Chambers, *Tracings of Iceland and the Faröe Islands*, 1856; C. S. Forbes, *Iceland, its Volcanoes, Geysers, and Glaciers*, 1860.

ICELAND MOSS (*Cetraria Islandica*), a lichen found in all the northern parts of the world, and valuable on account of its nutritious and medicinal properties. It is collected as an article of commerce in Norway and Iceland. In very northern regions, it grows even near the level of the sea; in more southern countries, it is found on mountains. It is not uncommon in the mountainous parts of Britain, although not turned to any economic account. In Carniola, it is used for fattening cattle and pigs. It grows in extreme abundance in Iceland on tracts otherwise desert; and numerous parties migrate from great distances with horses, tents, and provisions, in the summer months, for the sole purpose of gathering it, as an article of commerce, and for food. In many places, this lichen thickly covers the whole surface of the ground, growing about 1½—4 inches high; and consisting of an almost erect *Thallus* (q. v.). It is of a leathery and somewhat cartilaginous substance. When I. M. is used as an article of food, its bitterness is first partially removed by steeping in water, after which, in Iceland and other northern countries, it is sometimes pounded and made into bread; or it is prepared by boiling, the first water being rejected. It is often boiled with milk, making a kind of jelly, either with milk or water. It is an agreeable article of food, and very suitable for invalids. It contains about 80 per cent. of a kind of starch called *Lichen Starch*, or *Lichenin*, and owes its bitterness to an acid principle, *Cetraric Acid*.—An allied species, *Cetraria nivalis*, growing in northern countries, possesses similar properties. It is very abundant in some parts of Iceland, is much used for food, and is called *Mary's Grass* by the Icelanders.

Iceland Moss (*Cetraria Islandica*).

ICHNEU'MON (*Herpestes*), a genus of digitigrade carnivorous quadrupeds of the family *Viverridæ* (q. v.), having a much elongated body, small head, sharp muzzle, rounded ears, and short legs. The species, which are pretty numerous, are natives of Africa and the warmer parts of Asia. One, the ANDALUSIAN I. (*H. Widdringtonii*), occurs in the south of Spain. They feed on small quadrupeds, reptiles, eggs, and insects. Some of them, particularly the EGYPTIAN I. (*H. Ichneumon*) and the MANGOUSTE or MUNGUS (*H. griseus*) of India, have been greatly celebrated as destroyers of serpents and other noxious reptiles, many wonderful fables being superadded to the truth on this subject. The Egyptian I., the I. of the ancients, is larger than a cat, gray, with black paws and muzzle, and a black tuft of diverging hairs at the end of the tail. It abounds in Lower Egypt, but in Upper Egypt it is comparatively rare. It often enters houses, and devours poultry and their eggs. With noiseless gliding motion it advances on serpents until it can suddenly

Egyptian Ichneumon (*Herpestes Ichneumon*).

seize them behind the head, where its long sharp teeth inflict a fatal wound. It scratches up the sand for the eggs of crocodiles, which it eats with great avidity. It was a sacred animal among the ancient Egyptians; the killing of it was forbidden; and individuals, for the maintenance of which funds were set apart, were objects of worship. The I. is easily domesticated, and forms a cat-like attachment to the place of its residence. It is useful in keeping houses free of rats and other vermin. It is therefore not unfrequently domesticated in Egypt, as the mangouste also is in India. This species is rather smaller, of a lighter colour, and has a pointed tail.

ICHNEUMON, a Linnæan genus of insects, now constituting a family or tribe, *Ichneumonidæ*, of the order *Hymenoptera*, section *Terebrantia*. The *Ichneumonidæ* are extremely numerous. Gravenhorst's *Ichneumonologia Europæa* describes nearly 1650 European species, and they are equally abundant in other parts of the world. Many of them are minute, others are large insects; a few of the tropical species are amongst the largest of insects. They have the abdomen united to the thorax by a pedicle, which is often very slender. The abdomen itself is slender, and the whole form attenuated. The antennæ are generally thread-like, composed of a great number of joints, and are kept in very constant vibration. The ovipositor in some is short; in some it is very long, much longer than the body of the insect, and enclosed in a kind of sheath formed of two parts, concave on their inner surface, from which it is disengaged when about to be used, the whole then often seeming as three threads proceeding from the extremity of the abdomen. All the *Ichneumonidæ* deposit their eggs either in or on—generally in—the bodies, eggs, or larvæ of insects, or in spiders. Some of them deposit their eggs in aphides. They are thus extremely useful to the farmer and gardener. Particular species of *Ichneumonidæ* are the natural enemies of particular kinds of other insects. Thus, *Microgaster glomeratus* and *Pimpla instigator* lay their eggs in the caterpillars of the cabbage butterfly. Some species deposit only one egg in the egg or larva which is destined to afford food to their own larva; others deposit a number of eggs together. Those which have a long ovipositor use it to reach eggs or larvæ under the bark of trees, in holes of wood, &c. The I. larvæ generally consume only the fat of the larva on which they feed, which continues to subsist and so to sustain them till they are ready for transformation into pupæ. In their perfect state, the *Ichneumonidæ* feed only on the juices of flowers. They are very often to be seen flying about umbelliferous flowers. The I. larvæ are without feet. The pupæ of many are enclosed in silken cocoons.

ICHNO'LOGY (Gr. science of footprints) is the name given to that section of Palæontology which treats of the impressions made on mud or sand, now indurated into rock, by the animals of the period to which the rocks belong, or by meteoric or other transitory physical forces. The actual remains of the hard portions of the animals themselves are the materials on which chiefly rests our knowledge of the former inhabitants of the globe; but of many animals we know nothing more than the more or less distinct impressions made by them as they moved over the surface of a muddy shore. And in some beds, not only is the evidence of the shore-wave preserved in the ripple-mark, and the influence of the sun's heat exhibited in the superficial cracks, but frequently the passing hail-storm, or the sudden and heavy thunder-shower, has left its impress upon them, and this so perfectly, that it is not difficult to determine, from the form of the cup-like depression, whether or not the rain was accompanied by a breeze, for, by observing the amount of difference in the sides of the cup, and the position of the highest side, the direction of the gale and its velocity may be approximately determined. Though the force or body forming the impression has been removed immediately after it has made the pressure, yet in these prints the evidences of animal life and of the activity of physical forces, have come down to us from the remotest periods.

The impressions occur almost invariably on rocks that have been deposited as mud; only in a few cases have they been noticed in sandstone. Sometimes the argillaceous deposit is a thin layer between two sandstone beds; it is then difficult to obtain a clear surface in the shale; but the details are carefully preserved in relief in the natural cast on the under surface of the superimposed sandstone. In this manner the footprints are preserved at Stourton in Cheshire.

The necessary conditions for the preservation of footprints seem to be either of the following. The silt-bed may have formed an extensive flat shore, uncovered by the tide at each ebbing. Whatever impressions were made on this plastic surface would be baked and hardened by the influence of the sun, if it remained for a sufficient time uncovered by the water; and when the tide again flowed, the hardened mud, resisting its influence, would receive another film of sediment, which would specially deposit itself in the depressions, and thus secure the permanence of the impressions. These influences would operate more powerfully on portions of the shore which were under water only at spring-tides. The impressions of numerous wading birds are preserved in this manner at the present day, on the plastic mud which covers the flat shore of the Bay of Fundy, where the tide rises, it is said, as much as 70 feet. Both Gould and Lyell have given detailed accounts of the process as it goes on there. The other method is one independent of the sun's influence, where, on an ordinary muddy shore during the recession of the tide, the depressions are filled up by blown sand, and the tide, on its return, flows over a level surface, on which it deposits a fresh layer of silt.

The study of ichnology carries us back to the remotest known period of animal life on the globe. The deposit from which has been obtained the fragment of the oldest known trilobite (Palæopyge), contains the borings of certain worms (fig. 1) and impressions of rain-drops. In strata of the same period, but a little later, series of regularly recurring groups of markings are considered by Mr Salter as having been produced by the sharp claws of crustacea in walking; while other sets he refers, with considerable show of probability, to the strokes of the bifurcate tail of an unknown crustacean as it swam through shallow water. From the American representatives of the same rocks (Potsdam sandstones), Professor Owen has described a number of impressions made apparently by different animals, to which he has given the generic name of Protichnites. The slabs shew that the animals

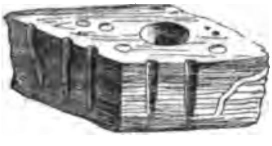


Fig. 1.—Annelid Borings (Arenicolites):
From Cambrian Rocks.

made at each step 14, 16, or more impressions. They were most probably crustacea, furnished with three or four pairs of bifurcating limbs, like the modern king-crab. Similar impressions have been observed in the Lower Silurian rocks of Eskdale in Scotland, and have been named *P. Scoticus*. The tracks of numerous annelids occur also in these rocks. They exhibit the impressions of the creatures as they moved along, or sometimes through, the soft mud, and they frequently terminate in a distinct impression of the form of the worm itself, produced perhaps by the dead body, although no trace of the body itself is preserved (fig. 2).

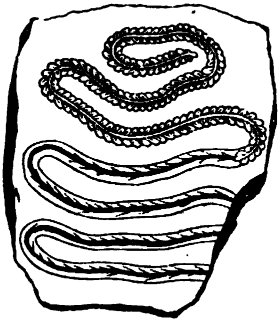


Fig. 2.—Nereites Cambrensis:
From the Lower Silurian Shales of Moffat.

The footprints of a small reptile had been observed on the sandstone of a quarry near Elgin, which most probably belongs to the Old Red Sandstone Measures. In 1851, it was discovered that they were produced by a little reptile (*Telerpeton Elginense*), whose remains were there found. And more recently, Professor Huxley has referred a different set of impressions to the remarkable fish-like reptile, Stagonolepis, which he describes.

The Coal Measures of our own country and of Germany have disclosed the footprints of different reptiles.

The New Red Sandstone strata abound in footprints. It was the Permian or lower division of this series that supplied, in 1828, the impressions which gave the first indication of animal life from such evidences to the mind of Dr Duncan—a man who deserves to be remembered less for his works in natural history, important though they were, than for his eminent services to his country as the founder of savings-banks. The tracks he described occur on the layers of unctuous clay which separate the beds of sandstone in the quarries at Corncockle, Dumfriesshire; they frequently are clear and delicate, as at the moment when they were impressed, and are repeated bed after bed on the fresh tablets as they were prepared for their reception. From their number and direction, they seem to be the tracks of animals passing together across a tide-receded estuary, to some frequented ground periodically sought for food or pleasure. No animal remains whatever have been found associated with them; they seem, however, to belong to forms of tortoise. The slab figured is a portion of the track probably of a long-tailed Chelonian, with a stride a little over six inches. The pad of the foot was soft and smooth; the light impressions of the fore-foot were nearly obliterated by the hind-foot, which was furnished with four claws (fig. 3). Sir William Jardine, on whose property the Corncockle quarries are, has made these tracks the subject of a valuable and elaborate monograph.

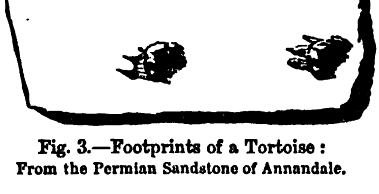


Fig. 3.—Footprints of a Tortoise:
From the Permian Sandstone of Annandale.

In the Triassic rocks, the well-known foot-tracks of the Labyrinthodon (q. v.) occur.

The earliest evidence of the existence of birds are the traces of their feet in the argillaceous sandstones of Connecticut, which are now known to be of the Lower Oolitic age. The structure of the tridactyle feet which produced these impressions exhibits the regular progression in the number of the toe-joints from the innermost to the outermost toe peculiar to birds, and they must be taken as evidencing the occurrence thus early of the class, although a considerable interval elapses before the first true fossil of a bird occurs; namely, the remarkable long-tailed bird from the Upper Oolite rocks of Solenhofen, recently described by Professor Owen. Immense tridactyle footprints have been known for many years in rocks of Wealden age in the south-east of England. At first, they were supposed to be birds; but a more careful examination has shewn them to belong to reptiles; and the discovery in the same strata of the perfect foot of a young iguanodon, measuring 21 inches in length, and furnished with three toes, which would form a print precisely similar to the tracks so long known, shews them to have been certainly produced by the Iguanodon (q. v.).

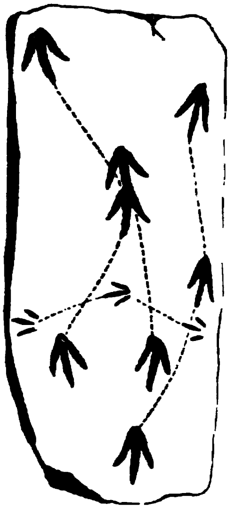


Fig. 4.—Footprints of Birds:
On the Oolitic Sandstones of Connecticut.

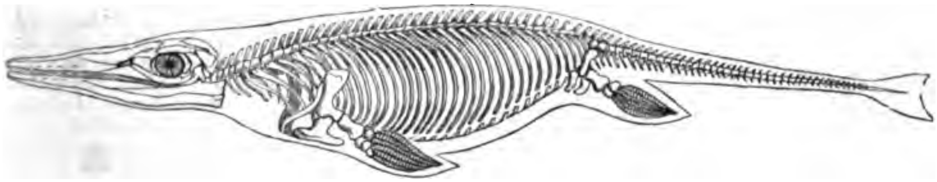
ICHTHYODO'RULITE (Gr. fish-spear-stone), the name given to fossil fish spines, that are not uncommon in the stratified rocks. Plagiostomous fishes have their dorsal fin furnished in front with a strong bony spine. The fin is connected with the spine, and is elevated and depressed by its movement. It seems also to be employed by the fish as a defence against its larger foes. Some bony fishes have similar spines, as the Sticklebacks, Silurids, &c. The spines are most frequently unassociated with any fish remains, having belonged to plagiostomous fish, in which the spine is simply implanted in the flesh, and consequently would be speedily separated from the body of the fish when it began to decompose.

The earliest certain evidence of vertebrate animals is the spines of plagiostomous cartilaginous fishes which occur in the bone bed of the Ludlow rocks, the uppermost of the Silurian deposits. Spines belonging apparently to three species have been found; they are small, compressed, slightly curved, and finely grooved lengthwise, and belong to the genus Onchus. Along with them have been found petrified portions of tubercular and prickly skin, like the shagreen of the shark.

The Old Red Sandstone has supplied such a variety of spines as to have afforded the materials for establishing fourteen genera, and in the Coal Measures they are more numerous, belonging to no less than twenty-one genera.

ICHTHYO'LOGY (Gr. *ichthys*, a fish; *logos*, a discourse), that branch of natural history which treats of fishes. Aristotle is the most ancient author having any claim to be noticed in a history of ichthyology, nor was this science much indebted to any other of the ancients. In modern times, it began to be cultivated, about the middle of the 16th c., by Belon, Rondelet, and Salviani. Towards the close of the 17th c., it made great progress through the labours of Willoughby and Ray; in the 18th c., through those of Artedi, Klein, Linné, Gronow, Brunich, Scopoli, and Bloch; in the beginning of the 19th c., through those of Cuvier and De la Cépède; whilst, more recently, Valenciennes, Müller, Agassiz, and Owen are eminent amongst many who have prosecuted the study of ichthyology with ardour and success. The name of Yarrell deserves to be particularly mentioned for his work on British Fishes. The earlier ichthyologists generally included the *Cetacea* among fishes. Linné removed the *Cetacea* to their proper place. He also placed the *Cartilaginous Fishes* with Reptiles in his class *Amphibia*, from which they have since been, by the common consent of naturalists, brought back to their place in the class of Fishes. Linné's system of ichthyology is almost as artificial as his system of botany. It is founded on the relative positions of the pectoral and ventral fins, without reference to any important point of comparative anatomy or animal economy. Other ichthyologists, both before and since, have laboured to discover a natural arrangement, to which the progress of comparative anatomy has greatly contributed, although success is still confessedly very imperfect. Even the system of Agassiz, founded on the external covering of fishes, is not wholly artificial, and is of very convenient application to fossil ichthyology.

ICHTHYOSAU'RUS (Gr. fish-reptile), a remarkable genus of reptiles which inhabited the sea during the deposition of the Secondary strata. Like the modern Cetacea, their structure was modified to suit their aquatic life. The body was shaped like that of a fish, the limbs were developed into paddles, and the tail, long and lizard-like, was furnished, it is believed, with a fleshy fin, as in the dolphin, except that its position was vertical. The head was large, and produced into a long and pointed snout, resembling that of the crocodile, except that the orbit was much larger, and had the nostril placed close to it, as in the whale, and not near the end of the snout. The jaws were furnished with a large series of powerful conical teeth, lodged close together in a continuous groove, in which the divisions for sockets, which exist in the crocodile, were indicated by the vertical ridges on the maxillary bone. The teeth were hollow at the root, sheathing the young teeth, which gradually absorbed the base of the older ones, and, as they grew, pressed them forward, until they finally displaced them. The long and slender jaws were strengthened to resist any sudden shock by being formed of many thin bony plates, which produced light and elastic as well as strong jaws. The most remarkable feature in the head was the eye, which was not only very large—in some specimens measuring 13 inches in diameter—but was specially fitted to accommodate itself for vision in air or water, as well as for speedily altering the focal distance while pursuing its prey. The structure, which thus fitted the eye so remarkably to the wants of the animal, consists of a circle of 13 or more overlapping sclerotic bony plates surrounding the pupil, as in birds. This circle acted as a sort of self-adjusting telescope, and accompanied by the extraordinary amount of light admitted by the large pupil, enabled the ichthyosaurus to discover its prey at great or little distances in the obscurity of the night, and in the depths of the sea. The neck was so short that the body was probably not in the least constricted behind the head. The backbone was fish-like; each joint had both its surfaces hollow, making the whole column very flexible. The small size of the paddles compared with the body, and the stiffness of the short neck, seem to suggest that the tail must have been an important organ of motion. Professor Owen is satisfied that it was furnished with a vertical tail, because the vertebræ are compressed vertically, and also because the tail is frequently found disarticulated a short distance from its extremity, as if the weight of the upright tail had caused it to fall when the animal had begun to decompose. The fish-like body, the four paddles, and especially the powerful tail, would make the ichthyosauri active in their movements; and consequently, with their predaceous habits, very dangerous enemies to the other animals that inhabited with them the Secondary seas. That their principal food consisted of fishes, is evident from the masses of broken bones and scales of contemporary fishes that have been found under their ribs in the place where the stomach of the animal was situated.



Ichthyosaurus.

The remains of ichthyosauri are peculiar to the Secondary strata, occurring in the various members of the series from the Lower Lias to the Chalk, but having their greatest development in the Lias and Oolite. More than 30 species have been discovered; they differ from each other chiefly in the form of the head, some having a long and slender snout, like the gavial of the Ganges, while others had short and broad heads, more like the common crocodile.

The great repository for ichthyosaurian remains hitherto has been the Lias at Lyme Regis.

ICHTHYO'SIS, or FISH-SKIN DISEASE, is characterised by a hardened, thickened, rough, and almost horny state of the cuticle, which breaks into small, irregular, scale-like pieces, which do not readily exfoliate, but which, if removed, are speedily reproduced. The disease may affect almost the whole surface, or may be confined to a single part; and is most frequently, but not always, congenital. It is attended with no constitutional disturbance, and the general health is often very good. The disease is, however, extremely obstinate, and when congenital, may be considered as incurable.

The treatment consists in the frequent use of the warm or vapour bath, so as to soften the thickened epidermis and to facilitate its removal, and friction by means of a piece of flannel may be conjoined with the bath. The employment of sulphureous baths, such as those at Harrogate, has occasionally been found of temporary use; and the internal administration of tar, cod-liver oil, &c., sometimes gives relief.

I'CICLES, in Heraldry, are charges of the same shape as drops in the bearing called Gutté (q. v.), but reversed. They have also been called Clubs, Locks of Hair, and Guttés reversed.

ICI'LIUS, the name of a plebeian family in Rome, which produced some of the most zealous defenders of the plebeian interest against the patricians. The name of one of them is associated with one of the most touching incidents in the legendary history of Rome. See APPIUS CLAUDIUS.

ICO'D, or **ICOD DE LOS VINOS**, a small town on the north-west coast of Tenerife, one of the Canaries (q. v.). Pop. about 5500.

ICOLMKI'LL. See IONA.

ICO'NIUM. See KONIEH.

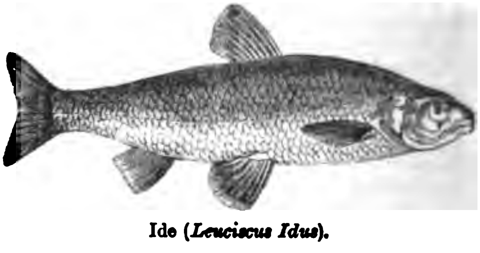
ICO'NOCLASTS (Gr. *eikon*, image, and *klazo*, I break), the name used to designate those in the church, from the 8th c. downwards, who have been opposed to the use of sacred images;—that is, of statues, pictures, and other sensible representations of sacred objects;—or at least to the paying of religious honour or reverence to such representations. The iconoclast movement had its commencement in the Eastern Church. Opinion is divided as to the origin and antiquity of the practice of Image-worship (q. v.) in the church; but it is certain that in the 6th and 7th centuries it prevailed extensively, especially in the Eastern Empire, and that practices existed in some churches which were a source of much suspicion, and even of positive offence. Many bishops interposed to correct these abuses; but the iconoclast movement, strictly so called, began with the imperial edict issued in 726 by the Emperor Leo III., surnamed the Isaurian, forbidding the honours paid to sacred images, and even commanding the removal from the churches of all images, that of our Lord alone excepted. This was followed by another decree in 730, which prohibited, under pain of death, as sinful and idolatrous, all acts of reverence, public or private, to images, and directed that, wherever such images should be found, they should forthwith be removed or destroyed. The attempt to enforce this decree occasioned great agitation, especially in the Greek islands and in Italy. The popes Gregory II. and Gregory III. protested vehemently against it, repudiated the imputation of idolatry, and explained the nature of the honours to images for which they contended. Leo persevered, nevertheless, in his opposition, which was continued by his successor, Constantine, surnamed Copronymus. Under this emperor, a council was held in Constantinople in 754, in which the iconoclast decrees were affirmed in their fullest extent; and Constantine's son, Leo IV., renewed, on his accession in 773, the enactments of his predecessors. Under the widow of Leo, the Empress Irene, a council was held at Nice, 786 (see IMAGE-WORSHIP), in which these proceedings were condemned and revoked; but other succeeding emperors, Nicephorus (802—811), Leo the Armenian (813—820), Michael the Stammerer, and Theophilus, returned, with greater or less severity, to the policy of the iconoclast emperors. As regards the Greek Church, the controversy may be said to have been finally settled under the Empress Theodora in a council held at Constantinople in 840, or at least by a subsequent one of 870. The modern usage of the Greek Church permits pictures, but rejects graven or sculptured representations of sacred objects. Except in Italy, the iconoclast controversy created but little sensation in the Western Church until the movement in the time of Charlemagne and his successors, which shall be noticed under IMAGE-WORSHIP.

In the modern church, the popular violences directed in Switzerland, Great Britain, and some parts of Germany, against crucifixes, images of saints, and other objects associated with what has been stigmatised as the idolatry of Rome, have sometimes been described under the name of Iconoclasm.

ICY CAPE, a headland of North America, is in the 71st degree of north latitude, about the middle of that long reach of the arctic coast between Cape Lisburne on the south-west, and Cape North or Point Barrow on the north-east. It was discovered by Cook in 1778, and was his furthest point north of Behring's Strait.

I'DA, a high mountain range, in Asia Minor, extending from Phrygia through Mysia into Troas. The city of Troy was situated at its base. It is the scene of many ancient legends. The southern part of the range was called Gargarus, the highest peak of which is about 4700 feet above the sea. Here there was a temple of Cybele, who therefore was called the *Idæan Mother*. From Ida flow several famous streams, as the Granicus, Simois, and Scamander.—There is another Ida in Crete, extending from west to east, and now called Psiloriti. On this Ida, according to an ancient legend, Zeus was educated.

IDE (*Leuciscus Idus*), a fish of the family *Cyprinidæ*, of the same genus with the roach, dace, chub, &c. It is a native of the lakes of the northern parts of Europe, ascending rivers in April and May to spawn. The ide is one of those fishes which it seems both easy and desirable to introduce into British waters.



Ide (*Leuciscus Idus*).

IDEA. This word has borne very distinct meanings in the history of philosophy. Down to the 17th c., it had the signification given to it by Plato, and referred to the Platonic doctrine of eternal forms existing in the Divine mind, according to which the world and all sensible things were framed. Plato made a grand distinction between the *intelligible*, or what occupied the intellect, and the *sensible;* the one represented the eternal, the immutable, and the certain; the other, the mutable and fleeting part of the universe. The forms preceded the matter; the actual circles occurring in nature were produced from a pre-existing ideal circle holding a place in the Divine intelligence; the actual men were generated from an ideal man. The word was used in this sense in literature as well as in philosophy down to the 17th c., as in Spenser, Shakspeare, Hooker, and Milton. Thus in *Paradise Lost*—

> 'God saw his works were good,
> Answering his fair *idea*.'

Sir W. Hamilton dates the change that came over the application of the word from the publication of Descartes's *Discourse on Method* in 1637, remarking, however, that in a treatise by David Buchanan, published at Paris the year before, the new meaning had been introduced. 'The fortune of this word is curious. Employed by Plato to express the real forms of the intelligible world, in lofty contrast to the unreal images of the sensible, it was lowered by Descartes, who extended it to the objects of our consciousness in general. When, after Gassendi, the school of Condillac had analysed our highest faculties into our lowest, the *idea* was still more deeply degraded from its high original. Like a fallen angel, it was relegated from the sphere of Divine intelligence to the atmosphere of human sense; till at last *Ideologie* (more correctly Idealogie), a word which could only *properly* suggest an *à priori* scheme, deducing our knowledge from the intellect, has in France become the name peculiarly distinctive of that philosophy of mind which exclusively derives our knowledge from the senses.'—Hamilton's *Discussions*, p. 70.

In speaking of the mental representation of external things, Descartes, instead of employing the various terms *image*, *species*, *phantasm*, &c., which had been the words formerly in use for that particular signification, used the word idea. In this he was followed by other philosophers, as, for example, Locke, who states that he has adopted the word to stand for 'whatever is the object of the understanding, when a man thinks.' Thus the mental impression that we are supposed to have when thinking of the sun without seeing the actual object, is called our idea of the sun. The idea is thus in contrast with the sensation, or the feeling that we have when the senses are engaged directly or immediately upon the thing itself. The sensation is what constitutes the *thing*, the reality: the impression persisting after the thing has gone, and recoverable by mental causes without the original, is the idea. Although the word in this application may be so guarded as to lead to no bad consequences, Dr Reid was of opinion that it gave countenance to the setting up of a new and fictitious element in the operations of the mind. This, however, raises the great question of metaphysics—namely, the exact nature of our knowledge of an external world. See PERCEPTION.

It is difficult to avoid the use of the word idea, and yet, owing to the looseness of its application, there is a danger of its not conveying a definite signification. We need a general word to express the contrast to sensation, or to actuality; and no better term has yet been found than idea, being what is common to memory and to imagination, and expressing the mind as not under the present impression of real objects, but as, by its own tenacity and associating powers, having those objects to all practical ends before its view. Thus, all our sensations, whether of sight, hearing, touch, taste, or smell, and all the feelings that we have in the exercise of our moving energies, become transformed into ideas when, without the real presence of the original agency, we can deal with them in the way of pursuit or avoidance, or can discriminate and compare them, nearly as if in their first condition as sensation. Sir W. Hamilton, in his *Lectures on Logic* (i. 126), has endeavoured to avoid employing the word, but other writers on mental philosophy have freely adopted it in the above acceptation. See also GENERALISATION and IMAGINATION.

IDELER, CHRISTIAN LUDWIG, an eminent astronomer and chronologist, was born 21st September 1766, at Gross-Brese near Perleberg in Prussia, and, after holding various offices, received a professorship at the university of Berlin in 1821. He died August 10, 1846. I.'s most important works are, *Historische Untersuchungen über die Astronomischen Beobachtungen der Alten* (Leip. 1806); *Untersuchung über den Ursprung und die Bedeutung der Sternnamen* (Berlin, 1809); *Handbuch der Mathematischen und Technischen Chronologie* (2 vols. Berlin, 1825—1826), the last of which was the first work that presented a clear view of the reckoning of time among the ancients; and *Die Zeitrechnung der Chinesen* (Berlin, 1839).

I'DEM SO'NANS, a term sometimes used in English law, where a mistake as to a surname is made in a legal document, to denote that the name used by mistake was of a similar sound, in which case the mistake is generally treated as immaterial.

IDE'NTITY of person in point of law must often be proved in legal proceedings, as in proving a marriage, proving a pedigree, proving a thief, &c. The usual proof is the oath of some one who knew or was cognizant of the facts at both the times referred to. A favourite defence of thieves and persons accused of crime is, that it is a case of mistaken identity, in which case the prisoner must generally establish an *alibi*—i. e., that he was in some other place at the time in question.

IDENTITY, CONTRADICTION, AND EXCLUDED MIDDLE. It has been common to look upon some truths as necessary, in opposition to others that, although certain to all intents and purposes, are not necessary, but *contingent*. Thus, it is considered a necessary truth, that two straight lines cannot enclose a space; that the less cannot include the greater; that a man cannot be in two places at the same time. On the other hand, it is not necessary that gold should be yellow, or water transparent: these facts, we conceive, might have been otherwise arranged. There has been much controversy as to this character of necessity that distinguishes some of our beliefs from others. See NECESSITY. The schoolmen laid down three principles, involving what they considered the widest generalisations of our necessary beliefs: these are the laws of Identity, Contradiction, and Excluded Middle.

The law of Identity is expressed thus: 'Whatever is, is;' a proposition justly considered as irresistible. If any objection lies against it, it is, that nothing appears to be got by affirming it. When we say that 'Water freezes at 32°,' there is a piece of new information conveyed; by merely knowing water in its liquid state, we should not know that at 32° it became solid; the affirmation is something real. But when we say that 'Water is water,' there is the form of information, but nothing is conveyed; the proposition belongs to the class termed 'identical.' We merely re-affirm what is already affirmed. The law of identity can only mean that we are to adhere to the meaning of a word as once given; that is to say, we should be consistent in the use of terms. It is a law; not of things, but of the employment of language to denote things.

The law of Contradiction is, that 'the same attribute cannot be both affirmed and denied of the same subject;' or that a thing cannot be and not be at the same time. In other words, two affirmations that contradict each other cannot be both true. We cannot say both that the 'Sun has risen,' and the 'Sun has not risen;' 'Gold is heavy,' and 'Gold is not heavy.' Here, also, one might suggest the remark, that the proposition is an identical one; for the use of the word 'not' can only mean that the proposition to which it is coupled cannot be held along with the proposition to which it is not coupled. That if the affirmative be true the negative must be false, and if the negative be true the affirmative must be false, are but the same thing differently expressed. The word 'not' is an abbreviation for what would otherwise be a more roundabout expression. Instead of saying: 'I disbelieve, and deny that gold is white,' we say: 'Gold is *not* white.' So far, therefore, the principle of contradiction, like that of identity, is not a law of things, but of the use of language; implying simply, that when we have affirmed a fact in one form of words, we must, in varying our terms, adhere to the same affirmation.

But this remark does not exhaust the scope of the principle. It has already been observed (see CONDITIONED), that our knowledge can never be confined to one absolute property; in other words, to know a thing, we must know something different from it. We cannot even be conscious of one unvarying impression; animals that live in total darkness are not conscious of the darkness, they would become so only in passing into light. It is true that we are constantly in the habit of mentioning a single property, and leaving out of account the related fact but for which the first would have no existence; we may talk of light without alluding to darkness. But it is not the less certain that the alternative circumstance, for the time suppressed, is a real part of the case; and there are many occasions, when our meaning cannot be fully imparted without actually quoting the alternative; and to be logically or formally complete, we ought at all times to state the two.

There are many qualities the very mention of which brings vividly before the mind an opposed couple: as, up, down; straight, crooked; desire, aversion; &c. But beyond these cases, it is a tenable assertion that every fact or property recognised by the human mind must be recognised with relation to some other fact or property, its contrast or opposite, but for which as an alternative, the mind would not have that opportunity of *transition* essential to consciousness itself. Take *redness*, which does not suggest to the mind an opposite in the same manifest form as in the above instances. If all light were red, there would be no designation of redness; the only terms would be light and dark. But as there are varieties of light, that is, as we experience mental shocks or impressions by transitions occurring under the luminous agency, we are made alive to subordinate differences, which we mark as so many distinct properties. When white and red are presented to the eye in succession, there is imparted a shock of difference, developing an item of knowledge, which, to be fully expressed, would be 'white-red.' White would then mean the opposite of red, and red the opposite of white; to the affirmation, 'Snow is white,' there would correspond as an essential and inseparable part of the same fact, 'Snow is not red.' But as there are a great many transitions of colour that make the mind sensible to difference, the mention of one colour is attended with, not one simple denial, but many denials. We have red-green, red-yellow, red-blue, &c.; and, moreover, when these couples pass in succession before the view, we are further struck with the fact of *agreement* in the common effect 'redness.' Thus, the fact or property, 'redness,' is the name for the common element in certain couples, which element it affirms, while denying in each case the contrasting element; it is not-white, not-green, not-yellow, not-blue, and not every other colour, which placed side by side with it made the mind alive to difference. When, by differences and agreements as now described, a class of colours is constituted, the mention of one is the denial of every other member of the class; and the denial of one is the mention of some other or others, provided we are keeping our attention confined to that class. Professor de Morgan introduced into logic the phrase 'universe of the proposition,' to intimate the class of objects implied when an affirmation, with its corresponding denial, is given forth. Thus, 'Such a thing is red,' implies as the universe of the proposition the class of colours; 'A rose smells sweet' is in the universe 'odours.'

Many other examples might be quoted in illustration of the general principle, and also to shew that, in the case of ambiguity or uncertainty in the meaning of a positive term, the proper remedy is to demand an explicit statement of the quality, or qualities, denied. Thus, if a thing is spoken of as 'beautiful,' which contrast is intended? for there are several implied in the name. Is it 'beautiful, not ugly or deformed,' 'not indifferent or insipid,' 'not sublime?' &c. The important function of *defining* terms is thus, in the last resort, to bring into open statement, what is usually left in the form of a tacit understanding, the denial corresponding to each affirmation. See also CONDITIONED.

The principle of Excluded Middle is another form of the principle of Contradiction, implying the same general fact, and resting on the same foundation. It is, that of two contradictories, both cannot be false, or one must be true. Any given assertion must be *either* true or false; either the affirmative is true, or otherwise the negative is true, which means that the affirmative is false. 'This house is either mine or not mine;' 'Gold is yellow, gold is not yellow,' cannot be both false, one must be true. There is no *middle course* in such an alternative. But on examination, it will appear that this principle does not hold in the same unqualified sense as the principle of contradiction; for the attribute affirmed or denied must be something intelligible and definite, as well as relevant to the subject in hand. We often say such a thing is neither big nor little, implying that there is a certain mean point that excludes the extremes, and yet those two terms are the negative of each other. In a word, it is an essential condition of the principle that the universe of the proposition should be distinctly understood and kept in view. If we say 'this is either red or not red,' the alternative is indisputable within the universe 'colour,' but not otherwise; the taste of an orange is neither red nor not red: if we jump over the boundaries of the class, the principle no longer holds good.

The three principles of Identity, Contradiction, and Excluded Middle, are usually talked of as necessities of the human mind, from which there is no escape. But we have just seen that in the case of the Excluded Middle, there are possible evasions; and even the principle of contradiction itself is flatly met by Hegel, who lays it down as a maxim of his philosophy that 'being' and 'not being' are the same, and deduces important inferences therefrom. All this should make us cautious in declaring any formula or any doctrine to be absolutely necessary, or imperative on the human mind.

IDES. See CALENDS.

I'DIOCY is the non-development of the mental faculties. A dement is deprived of powers which he once possessed; an idiot never, or only imperfectly, possesses such powers. In certain cases, the human form appears scarcely to be animated by intelligence at all; it is a senseless, motionless mass, to which the special senses impart no intimation of an external world, and from which there emanate no manifestations of human love or passion, or perception. The degrees of deprivation are, however, very numerous and sharply defined, so as to suggest different modes of management and training, and different degrees of moral responsibility in the individuals. The general characteristics of the vast majority of idiots may be held to be diminutive stature, grotesque appearance, inactivity, uncleanly habits, gluttony, obtuse or acute sensibility, inability to regulate movements, to articulate, to count, degradation of propensities, and helplessness. The various degrees of their dependence upon others has been estimated thus: of 574—53 were as helpless as infants; 74 as children of two years old; 94 as children of seven years old; 138 could engage in simple work with some small profit, if carefully watched and directed; 179 could nearly earn their bread; and 36 could, under due discipline, maintain themselves. In this calculation, imbeciles are included. The arrestment of the evolution of intelligence, in whole or in part, may commence and be consummated previous to birth, in consequence of moral impressions or accidents or diseases on the part of the mother; during infancy, from defective nutrition or injudicious management; and during childhood up to puberty, from scrofula, rickets, hydrocephalus, and from unwise interference with the faculties in process of growth. A large number of idiots are microcephalous, or present heads of very small dimensions; and though they decay and die at an early age, they are apparently healthy. But a much larger number are not merely examples of imperfect growth; they labour under positive disease and degeneration, and present symptoms either of constitutional taint, or of those specific affections, such as convulsions and paralysis, as are referred to the nervous structure.

The ameliorations which occasionally take place under judicious treatment, and the educability of a few individuals within a certain range, have suggested to physicians and philanthropists the propriety of attempting to rouse, direct, and apply such powers as may exist. The first attempt to give regular instruction to idiots was made in the Bicêtre at Paris many years ago. A magnificent training-school, now numbering about 600 inmates, has been some time in operation at Earlswood, Reigate; and there is a similar institution at Larbert, Stirlingshire, while a smaller school exists at Baldoran, Forfarshire.—Seguin, *Traitement Moral, &c., des Idiots;* Art. 'Idiotisme,' *Dict. de Médecine;* Abbots, *Handbook of Idiocy;* Buckminster Brown, *Treatment and Cure of Cretins and Idiots.*

IDIOSY'NCRASY (Gr., a peculiar temperament), the name given to any constitutional peculiarity. Thus, there are persons who have a great dislike to particular kinds of food, smells, sounds, &c., which to most persons are agreeable; and, on the other hand, a desire is sometimes manifested for things generally disliked. In particular individuals, again, an eruption of the skin will be caused by eating strawberries, or swooning by the smell of a rose, and that quite unconnected with any liking or disliking; and such effects are produced when the person is unaware of the cause. Idiosyncrasies also occur, in consequence of which certain medicines become inoperative, or certain poisons harmless. Idiosyncrasies are either permanent or temporary, sometimes arising from mere morbid conditions, and disappearing along with them.—The term is also employed to denote *mental,* as well as *physical* peculiarities.

I'DOCRASE. See VESUVIAN.

IDOL (Gr. *eidôlon,* an image), **IDO'LATRY** (worship [*latreia*] of images). By the name idol is meant an image intended to represent a divinity, and to be adored as such. The act of worshipping such an object as a divinity is called idolatry. Although the first principles of reason suggest to man's mind the idea of one Supreme Being, the source of all existing things, and the origin of all good (see GOD), yet the very earliest historical records, sacred and profane, teem with evidences of the errors into which men quickly fell through ignorance and passion, changing 'the glory of the uncorruptible God into an image made like to corruptible man, and to birds, and four-footed beasts, and creeping things' (Rom. i. 23). To these images, as well as to the images of inanimate objects, or of the ideal powers or forces supposed to be embodied in such objects;—as the sun, the moon, the stars, air, water, fire, and other natural elements—divine honours were paid by most of the ancient nations; to which honours the name of idolatry has been given. Hence, as each of these corrupt worships had its own peculiar symbols, the idolatry of the ancient Gentile religions may be reduced to four classes: 1. The idolatry of nature-worship, which was of two kinds —the first of inorganic. nature, which consisted chiefly in *Litholatry,* or the worship of stones or pillars, mentioned in Leviticus, xxvi., and in Numbers, xxxiii. 52; the second of organic nature, or of the powers of nature, as *Dendrolatry,* or the worship of trees—under which form were symbolised the productive or generative powers of nature, and to which the most modern investigators of Phœnician antiquities trace the origin, as well of the grossly immoral worship of the *Ashtaroth* of the Phœnicians, as of the phallic worship, which found its way, under various forms, through all the kindred races, both in the West and in the East. 2. The idolatry of animal-worship, which we find as well in the (perhaps originally symbolical) worship of the sacred oxen, the crocodiles, and serpents among the Egyptians, as in that of the still more degrading forms of animal life which constituted the object of adoration with other nations. 3. A higher form of idolatry, which prevailed among the races of Chaldean origin, was *Astrolatry,* or star-worship, which is often designated by the name of *Sabæism.* There was one form of Sabæism which cannot strictly be called idolatry, as it did not involve the use of idols, but addressed itself directly either to the heavenly bodies themselves, or to the element of fire, with which they were associated. But the same object of religious worship, coupled with the use of idolatrous representations, is found in the worship of Baal, of Moloch, and of Tammuz, the Phœnician Adonis (Ezekiel, viii. 14). 4. The last form of idolatry, and that which prevailed in the later period of the ancient Gentile religions, was *Anthropolatry,* or the worship of representations of the human form. It is chiefly familiar to us through the mythology of Greece and Rome, but it also found a place in most of the other religious systems, in some of which the representations of the human form were variously modified, so as to symbolise those special attributes which formed the peculiar objects of the worshippers' adoration. Of this there are many examples in the mythological representations of the Egyptians and of the Indians. In the Egyptian religion, indeed, and in the later Grecian, many of the idols were representations of pure abstractions, as of certain faculties or affections of the mind, of virtuous desires, or of evil passions. Nor can it be doubted, that among the more cultivated classes, there were individuals by whom these abstractions were fully understood, and by whom the crude idolatry of the multitude was regarded solely as a device adapted to their more gross and material conceptions.

The Jews, notwithstanding the many safeguards by which the belief of the one Supreme Being was protected in their religious system, were frequently seduced into the idolatrous worship of the Gentile nations among which they were thrown. It is one of the most remarkable among the anomalies of the history of this singular people, that the great and radical purification of their faith in the unity of God dates from their protracted Babylonian captivity, from which time it was maintained, notwithstanding the effort of Antiochus Epiphanes to introduce the Greek idolatry (1 Macch. i.), down to the coming of our Lord. The idolatry into which the Jews fell at different periods was chiefly of the first and the third forms described above.

The idolatry of the savage tribes of the African and Oceanican races is for the most part of the class described under the head FETICHISM.

I'DRIA, a small but important town of Austria, in the crownland of Carniola, celebrated for its quicksilver mines (discovered in 1497), is situated in a deep, caldron-shaped valley, on a river of the same name, 22 miles west-south-west of Laibach. The descent to the mines is by 787 steps, hewn in the rock, and is easy, and free from danger. They are said to be the richest in Europe. Upwards of 125 tons of quicksilver are produced here annually, and about 60 tons of cinnabar (red sulphuret of mercury). Pop. (1869) 3960, about 400 of whom are regularly employed as miners, the others chiefly in the manufacture of linen and silk fabrics and bone-lace; and in distilling spirits.

IDUME'A. See EDOM.

IDUN, or **IDUNA**, the name of a goddess of the northern mythology. She was the daughter of the dwarf Svald; but being received among the *Æsir*, she became the wife of Bragi. I. possessed a precious apple, by the use of which the gods preserved their perpetual youth. She was carried off by the giant Thiassi, with the assistance of Loki; but the gods sent the latter after her, to bring her back, which he did, after changing himself into a falcon, and I. into a nut.

I'DYLL (Gr. *eidullion*, Lat. *idyllium*, a little image), a term generally used to designate a species of poem representing the simple scenes of pastoral life. It is, however, an error to suppose that the idyll is exclusively pastoral; certainly, there is no warrant for such a notion in the usage either of the ancients or the moderns. Of the thirty *Eidyllia* of Theocritus, not more than one-half are pastoral in their character. After the use made of the word by Tennyson, in his *Idylls of the King*, which are epic in their style and treatment, and romantic and tragic in their incidents, it becomes very difficult to say what is not an idyll.

I'GLAU, a very old walled town of Austria, in the province of Moravia, is situated on the river Iglawa, close to the Bohemian boundary, 49 miles west-north-west of Brünn. It consists of the town proper and of three suburbs. In the midst of the spacious and beautiful town square, stands the guard-house. I. carries on spinning, dyeing, and brewing, as well as extensive manufactures of woollen goods and of machinery. Its trade, especially with Poland, is very important. Several very productive silver-works are in operation here. Pop. (1869) 20,112.

IGLOO'LIK, an island of some historical interest, lies near the east end of the Strait of the Fury and Hecla, in lat. 69° 21′ N., and long. 81° 53′ W. It was named after an intelligent Esquimaux woman, Parry's guide and pilot on his second voyage; and here that navigator passed the winter of 1822—1823 from 30th October to 12th August. During this time, the temperature ranged between — 45° and 59° of F., thus yielding a mean of 7° above zero.

IGNA'TIUS, St, Bishop of Antioch after 69 A.D., is said to have been a disciple of St John, and is reckoned one of the apostolical Fathers. He bore the surname of *Theophoros*—i. e., one who carries God [or as I. explained it, 'Christ'] in his heart; or, again, as some (Jerome amongst them) wrongly supposed, 'one who was carried by God'—i. e., Christ (cf. Mark, ix. 36)—whom, however, according to St Chrysostom, I. never saw. This legend that he was the little child whom Jesus set in the midst of his disciples, may, however, like the other tradition of his relationship to St John, be taken as symbolic of his winning, affectionate nature. I. was a true shepherd of his people, one of those meek, earnest, loving spirits to whose beautiful unobtrusive piety Christianity owed its first and best triumphs. Domitian's persecution of the church of Antioch proved him to be no less courageous than pious, and when that storm had passed over, the second and fiercer persecution of Trajan gratified I.'s wish of being sacrificed for his flock. The story of his interview with Trajan has come down to us. That strong ruler, full of worldly sagacity, just and virtuous after his fashion, could not understand a man so utterly unworldly as Ignatius. He contemptuously called him a *kakodaimon*, or, as we should say, 'a poor devil,' and in the end condemned him 'to be led as a prisoner to Rome, there to be made the food of wild beasts for the amusement [*ad delectationem*] of the people.' The sentence was executed 107 A. D., or, according to others, 116 A.D. In the Church of Rome, his martyrdom is commemorated on the 1st of February; in the Greek Church, on the 20th December.

The genuineness of the writings (a Liturgy, and a little work entitled *Didachê*, quoted by Chrysostom) and epistles ascribed to him—of which fifteen (twelve in Greek and three in Latin) are now extant —and some of which are quoted in the 2d, 3d, and 4th centuries, and were widely read in the ancient church, has been eagerly discussed and much disputed since the 16th century. The common opinion of scholars (until perhaps the last twenty years) was in favour of the genuineness of seven of the Greek epistles, which are extant in two redactions of different length, and in two corresponding ancient Latin translations—those to the Ephesians, Magnesians, Philadelphians, Trallians, Smyrnæans, Romans, and to Polycarp, his contemporary; but even these were regarded as spurious by Daillé, Semler, Hermann, Ernesti, and others, with whom in the main Neander concurs. The controversy received a new impetus by the publication of Bunsen's *Ignatius und seine Zeit* (Hamb. 1847), in which that writer endeavoured to establish the genuineness of three of the seven epistles, and the spuriousness of the others; his conclusions were, however, assailed by the great leader of the Tübingen school, F. C. Baur, in his *Die Ignatianischen Briefe und ihr neuester Kritiker* (Tüb. 1848). The most probable view of the seven epistles is that which conceives them to have a basis of genuineness, but to have suffered extensive interpolation. The reason why these epistles have excited so keen an interest, especially among ecclesiastics, is, that the question of church government is believed to hang very much upon them; they are, in fact, a battle-ground between Episcopalians and Presbyterians; and as they seem to favour the hierarchical system of the former, Episcopalians have, as a rule, been strenuous in defence of their Ignatian origin, while Presbyterians have as warmly attacked it. The discovery, in an Egyptian convent, of a Syriac version of three of the epistles—those to the Romans, the Ephesians, and to Polycarp (published by the Rev. W. Cureton, formerly of the British Museum, under the title of *The Ancient Syriac Version of the Epistles of St Ignatius*, &c., Lond. 1845), has, on account of its possessing higher claims to be considered genuine than any Greek MSS., led to the conclusion that the common Greek text has been very seriously tampered with—the interpolations consisting often of passages enforcing episcopal authority, and asserting the deity of Jesus Christ.

The best edition of the writings ascribed to I. is contained in the *Patres Apostolici* of Cotelerius (2d edit. Amst. 1724); of those commonly held to be genuine, by Jacobson (Oxford, 1838); various translations of the seven epistles have been made into English—the best known is that by Archbishop Wake.

IGNATIUS' (ST) BEANS, the seeds of the *Ignatia amara*, formerly *Strychnos Ignatii*, a tree of the natural order *Loganiaceæ*, and nearly allied to that which produces *Nux vomica* (q. v.), a native of Cochin-China and of the Philippine Islands. The fruit is of the size of a large pear, and contains about twenty brownish seeds, of about the size of olives, rounded on one side, and somewhat angular on the other. These seeds came into the Dutch shops under their present name about the end of the 17th c., but there is some reason to think that they are the *nux vomica* of earlier writers. They contain *strychnia*, and their medicinal uses are similar to those of *nux vomica*.

IGNATIUS LOYOLA. See LOYOLA.

I'GNEOUS ROCKS are those which have been produced from materials fused by heat. They differ from the sedimentary rocks in their origin, structure, and position. They invariably come from below upwards, breaking through the older rocks. The materials of sedimentary strata are fragments of pre-existing rocks, worn, by the action of water, either into a fine mud or into rounded particles, of greater or less size; whereas igneous rocks exhibit either a vitreous structure, as when they have been quickly cooled; or a granular structure, composed of more or less minute crystals, according to the rate of cooling; or a vesicular structure, when they have been expanded by the contained gases, or by being brought into contact with water. Some rocks are erroneously called igneous, whose materials, though originally obtained from volcanoes or other subterranean source, have yet been ultimately arranged by water, like the materials of Grahame's Island (q. v.). When this fact receives due consideration, many igneous rocks, whose position is now a puzzle, will be better understood. Some of the rocks composing Arthur's Seat, near Edinburgh, are undoubtedly of this character, and before a right theory of the hill can be constructed, these must be separated from the truly igneous rocks. In position, also, the igneous may be distinguished from the sedimentary rocks, for they seldom occur regularly stratified, with a parallel upper and under surface, but are generally local, thinning out into wedge-shaped beds, or having that irregular stratification which may be seen in modern lava. They also occur as upright walls or dykes, filling up cracks in the sedimentary strata.

The most satisfactory classification of the igneous rocks is based upon their age. The three obvious divisions thus established are each characterised by peculiar mineral and structural differences. The oldest or Granitic series (q. v.) are generally associated with the Palæozoic strata, but are sparingly found in the Secondary, and even in the Tertiary formations. The special peculiarity of the granitic rocks is the great abundance of silica contained in them; it forms not only a considerable amount of the constituents of the hornblende and felspar, but crystallises free in the rock-mass as rock crystal. The Trappean Rocks (q. v.) are associated with the Palæozoic and Secondary strata, and are composed of crystals of felspar and hornblende, varying in their character according to the predominance of the one or other of these ingredients. The Volcanic (q. v.) are the newest igneous rocks; they belong to the present period, or the Tertiary strata. The chemical ingredients are the same as those that constitute the Trappean rocks, but they are somewhat differently built up, augite being the peculiar form the silicate of magnesia and lime assumes in the newer rocks, while it appears as hornblende in the older or Trappean series.

I'GNIS FA'TUUS (Lat. 'vain or foolish fire') is a luminous appearance frequently seen in marshy places, churchyards, and over stagnant pools, which has puzzled philosophers from the time of Aristotle. It generally appears a little after sunset, as a pale bluish-coloured flame, varying in size and shape; sometimes it shines steadily till morning, at other times disappears, and reappears within about half-hourly intervals. It floats in air at about two feet from the ground, is sometimes fixed, and sometimes travels with great rapidity. In general, it recedes on being approached, and *vice versâ*, though several successful attempts have been made to light a piece of paper by it. Many efforts have been made to discover its cause; but so varied are its appearances, and so void of any common principle, that these attempts have totally failed. Of the various theories advanced we need mention only two. The first is, that the ignis fatuus is due to *phosphuretted hydrogen gas* (PH_3), which possesses the power of spontaneous ignition on coming in contact with dry atmospheric air; the gas would be generated by the decomposition of animal matter present in a marshy soil. The motion of the ignis fatuus is accounted for by the flame being communicated along the line of a stream of the gas. The second is, that it is due to the combustion of *light carburetted hydrogen gas* (C_2H_4), arising from the decomposition of vegetable matter; but though this supposition satisfactorily accounts for many appearances connected with the ignis fatuus, the gas itself is not spontaneously combustible, and an additional supposition requires to be made to account for its ignition. The probable conclusion is, that a number of phenomena similar to the eye, but arising from different causes, are aggregated under the term ignis fatuus. *The ignis fatuus, however, has never been produced artificially.* Electricity and phosphorescence can produce the luminous appearance, but, as far as our present knowledge enables us to judge, they are unable further to imitate it.

It is not a common phenomenon, many distinguished naturalists never having seen it; but it is not unfrequently seen in the north of Germany, the swampy and moorland districts in the south and north-west of England, and in the Lowlands of Scotland. It is seen in the above places from the middle of autumn till the beginning of November. In former times, the ignis fatuus, under the names of *Will-o'-the-wisp, Jack-a-lantern, Spunkie,* &c., was an object of superstition among the inhabitants of the districts where it appears, and was believed to be due to the agency of evil spirits attempting to lure the traveller to his destruction; and, unfortunately, there are too many instances on record of travellers mistaking the ignis fatuus for a lamp, and being thus decoyed into marshy places, where they perished.

IGNORA'MUS (Lat. we do not know), the word formerly written by a grand jury on the back of an indictment, meaning that they rejected it. The words now used are 'Not a true bill,' or 'Not found.'

IGNORANCE OF THE LAW, or **IGNORA'NTIA JU'RIS,** is held in law to be no excuse for any breach of contract or duty, nor for crime or other offence. It is absolutely necessary to start with this maxim, otherwise it would be quite impossible to administer the law, for if once a contrary maxim were allowed, it would not only be a premium to ignorance, but would lead to endless and abortive inquiries into the interior of a man's mind. Ignorance of a fact, however, is a different thing. Another kindred maxim of the law is, that every man intends the consequences of his own act. Thus, if he shoot at or give poison to a person, it is presumed that he intended to kill such person. So, if he leave a trap-door open in a street or thoroughfare, it is held that he intended people to fall into it and be injured. There is, however, a doctrine called *bona fides,* which, in the case of petty offences punishable by justices, often tempers the strict and rigid application of the maxim, *ignorantia juris neminem excusat;* and even in crimes, a judge always takes into consideration, when passing judgment, whether the prisoner or defendant was an ignorant or intelligent person.

IGNORA'NTINES (Fr. *Frères Ignorantins*), a religious congregation of men in the Roman Catholic Church, associated for the gratuitous instruction of poor children in sacred as well as secular learning. It was founded in France in the early part of the 18th c. (1724), by the Abbé de la Salle, and has gradually been introduced into every Catholic country of Europe. In France, this congregation shared at the Revolution the fate of all the other religious bodies; but the brethren, under the name of Brothers of the Christian Schools, were recalled, and re-established under Napoleon in 1806. They are now exceedingly numerous in France, Italy, and Germany, and many branches exist in England and Ireland. In the latter country, they possess, especially in Dublin, Cork, Limerick, Waterford, large educational establishments; and they have published for the use of their schools a series of school-books, which are designed to combine with secular knowledge information on the subject of religion, specially designed for Roman Catholic pupils.

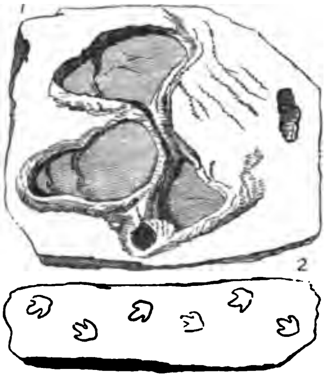
IGUALA'DA, a town of Spain, in the modern province of Barcelona, and situated about 40 miles west-north-west of the city of that name, on a rising ground on the left bank of the river Noya. It is for the most part closely built, dark, and dirty; carries on manufactures of cotton and woollen goods, hats and firearms, is the seat of considerable trade, and contains a population of 10,000.

IGUA'NA, a genus of saurian reptiles, the type of the family *Iguanidæ,* a family which contains many genera and species, and to which belong some of the largest saurians now existing, except those of the crocodile family. Far larger saurians allied to them existed in former geological periods. See Iguanodon. The *Iguanidæ* have a lizard-like form and a long tail. The tongue is thick, fleshy, not extensile, and is notched at the tip. They have rows of small teeth on the palate, and their jaw-teeth are remarkable both for their form and mode of insertion, not being lodged in distinct sockets, but fixed in a kind of furrow along the internal face of the jaw-bone, adhering by one side of the bony surface of the root. The food of the *Iguanidæ* consists chiefly of leaves and fruits. They are all natives of warm climates. In the genus I., the back exhibits a row of elevated, compressed, pointed scales along its whole length, and which is continued to the extremity of the tail; whilst under the throat is a great dewlap-like pouch. The feet have long toes, not webbed, with sharp claws, well adapted for climbing trees, while the compressed tail is the organ of progression used in swimming. The Common I., or Guana, is abundant in the West Indies and tropical parts of America, living mostly among trees. It attains a length of four or five feet. It is of a greenish-yellow colour, mottled with green, the tail ringed with brown. It is esteemed a most delicate article of food, and is used by all classes of persons. It is often caught by means of a noose thrown over its head; dogs have also been trained to hunt it on some of the West India *keys,* where it has not opportunity of taking refuge in trees. The eggs—which are about the size of those of a pigeon, but have no hard shell, and are laid in the sand—are also eaten, and are very pleasant. Other species of I. and nearly allied genera are eaten in tropical America, as the Horned I. (*I. cornuta* or *Metapoceros cornutus*) of Hayti. The true iguanas are all American.

Iguana.

IGUA'NODON (Iguana, and Gr. *odous,* tooth), a genus of remarkable gigantic dinosaurian reptiles, more abundant in the Wealden beds of Kent, Sussex, and the Isle of Wight, than any other genus of associated saurians. Their singular structure, differing in many important particulars from any known reptile, long caused great diversity of opinion as to their true position. Dr Mantell, their original discoverer, and their learned expounder, first knew of their existence from some enormous bones, which, notwithstanding their colossal size, he considered reptilian. A large tooth next turned up, whose smooth worn crown attested its having belonged to a herbivorous animal. Numerous other specimens of teeth were in progress of time discovered, and Dr Mantell found that they corresponded in a remarkable manner with the teeth of the small American lizard, the iguana, although they exhibited very striking and important differences. Since the original discovery of the teeth, several other portions of this remarkable reptile have been found. The fragmentary and imperfect materials which have yet turned up make any estimate of the size of this animal purely hypothetical. Dr Mantell's estimate is as much as 70 feet in extreme length, while Professor Owen considers it to have been not over 28 feet.

The structure of the skeleton is very remarkable. The fragments of the upper and lower jaw shew that the head was produced into a short snout, which supported a nasal horn. The vertebral column was somewhat fish-like; the joints being slightly concave on both surfaces, yet it had lofty neural arches, and the sacrum was composed of five anchylosed joints, a structure found in no other reptile. The limbs were long and strong, raising the body some distance from the ground. The largest femur yet found measures four feet eight inches in length, and the shaft has a circumference of twenty-five inches. The leg terminated in a three-toed foot, which produced the enormous tridactyle impressions on the argillaceous Wealden beds that were for some time considered to be the footprints of huge birds. The discovery by Professor Owen of all the bones of a perfect foot, however, conclusively connects these impressions with the iguanodon. His figure, in a recent volume of the Palæontographical Society's publications, exhibits a foot 21 inches long by 9½ inches broad, while our figure is reduced from a footprint 24 inches long.



1. Footprint of Iguanodon, from the cliff at Hastings, one-sixteenth natural size.

2. Reduced track, exhibiting the Arrangement of the Footprints.

The teeth of the iguanodon, while bearing a general resemblance to those of the iguana, were much more complicated both in external form and internal structure than in any other known reptile. In all other known reptiles, the vertically flat teeth are always sharp-edged, and fitted only to cut off the plants on which they feed, but the worn crowns in this animal shew that the iguanodon thoroughly triturated its food before swallowing it.

IHRE, Johan, an eminent Swedish scholar of Scottish extraction, was born at Lund in 1707, and educated at the university of Upsala, where he acquired a great reputation, and carried off the highest honours. He subsequently travelled in France and England, was appointed under-librarian to the Academy of Sciences, on his return to Sweden, and rose through a variety of offices to be professor of belles-lettres and political economy (1748). He died in 1780. I.'s principal work is his *Glossarium Suiogothicum* (1769), a work of great talent and erudition, which may be regarded as the foundation of Swedish philology. It was got up at the cost of the state, which gave I. 10,000 dollars to execute it. His numerous academical disputations, amounting to upwards of 450, are still valuable, especially those on the Mœso-Gothic version of the Gospels by Ulfilas.

IKUPA, the principal river of Madagascar (q.v.).

I'LCHESTER, a small and decayed town of England, in the county of Somerset, is situated in the rich valley of the Yeo or Ivel—from which it derives its name—33 miles south-south-west of Bath. The principal buildings are the parish church, an ancient structure surmounted by a low octagonal tower, and the county jail. I., supposed to be the Ischalis of Ptolemy, was the principal station of the Romans in this region, and was fortified by them with a strong wall and ditch, both still traceable. Numerous Roman remains have been found here. I. is the birthplace of Roger Bacon. Pop. (1871) 743.

ILE-DE-FRANCE, one of the old provinces of France, having Paris as its capital, and now mostly comprised in the departments of Seine, Seine-et-Oise, and Oise. During the last century of the Carlovingian dynasty, the Ile-de-F. was possessed by a race of powerful nobles, who latterly took the title of Dukes of France. One of the most able of these was Hugo or Hugues, surnamed Le Blanc, or Le Grand, who, for 20 years previous to his death (956), virtually wielded the sovereign power under the Carlovingian kings Louis IV. and Lothaire. His son, Hugo Capet, eventually became the actual sovereign. See Capetian Dynasty.

I'LETZK, or **ILETZKAÏA ZASHCHITA**, a small town and fort in Eastern Russia, on the border of the Kirghiz territory (government of Orenburg), situated on the river Ilek, near its confluence with the Ural, in lat. 51° 9′ N., long. 54° 59′ E. The town was founded by Cossack emigrants in 1737, and contained, in 1867, a pop. of 2493 inhabitants. It is remarkable for its quarries of rock-salt, the richest in Russia. The salt-beds of I. were formerly worked by the native Bashkirs, but since 1754, both the extraction and sale of the salt are monopolised by the government, and are the source of considerable revenue. All the country round I., especially along the river Solianka, is one continual layer of salt, covered with a sandy or clayey alluvion, 3½ to 4½ feet thick. The thickness of the salt bed is not yet thoroughly ascertained, notwithstanding many investigations, from Pallas up to the present time. The I. salt is considered the best in Russia. On the surface of the bed, cubic blocks of salt are found, pure and transparent like crystal, and weighing from 3 to 30 lbs. each. Various small articles are manufactured out of such blocks, and the common people ascribe to them a healing virtue in ophthalmic disease. Near I. there are two lakes, one of which is salt and warm, the other acid.

I'LEUM. See Digestion, Organs of.

I'LEUS, or **ILIAC PASSION**, is regarded by some writers as a distinct disease, but is in reality the closing stage of the severest forms of enteritis, or of colic, and is often connected with some irremovable mechanical obstruction. It may indeed occur in any case in which the contents of the bowel cannot find their way onwards. The peristaltic action of the intestine is inverted; there is intense vomiting, and even feculent matter is discharged by the mouth. Desperate as the condition of the patient is, his case is not absolutely hopeless; but as recovery, when it occurs, is due rather to nature than to art, it is unnecessary to enter into the subject of treatment.

I'LEX, a tree often named in the Latin classics, the Evergreen Oak or Holm Oak (*Quercus Ilex*). See OAK. It is a native of most parts of the south of Europe and of the north of Africa, often attaining large dimensions, as it sometimes does where planted in Britain. It grows in general singly or in small groups, and loves the vicinity of the sea. Its leaves are ovate-oblong, acute, leathery, hoary beneath; but they vary much in some respects, from the size of a sloe-leaf to that of a beech, and from being very spiny at the edge to perfect evenness. It is a very ornamental tree, and has not been so much planted in Britain as it deserves. Its wood is very hard and heavy, tough, durable, and useful, particularly for axles, pulleys, screws, and whatever is to be subjected to much friction. The acorns are of various quality, sometimes bitter, and sometimes sweet and eatable.—In modern botany, *Ilex* is the generic name of the Holly (q. v.).

I'LFRACOMBE, a small market-town, seaport, and watering-place of England, on the north coast of the county of Devon, is finely situated amid picturesque irregular hills, on a cove or inlet of the Bristol Channel, 11 miles north-north-west of Barnstaple. The harbour is formed by ramparts of rock, and furnished with a light-house, and a pier 850 feet in length. The bathing establishment is a Doric building, erected here in 1836, and supplied with sea-water from the shore by means of a tunnel. The town is chiefly dependent upon its wealthier residents and its summer visitors; but an active fishery and coasting-trade are also carried on. Pop. (1871) 4721.

I'LIAC A'RTERIES. The Aorta (q. v.) divides at its lowest point—which is usually on the left side of the body of the fourth lumbar vertebra—into the two common iliac arteries, which pass downwards and outwards on each side to the margin of the pelvis for about two inches and a half, and then divide into the external and internal iliac artery of either side. The external iliac passes obliquely downwards and outwards to the femoral arch, when it enters the thigh, and becomes the femoral artery. The internal iliac is a short vessel, about an inch and a half in length, which divides into an anterior and a posterior trunk. The anterior trunk divides into several branches, which supply the bladder, the rectum, the generative organs, and muscles both within and on the outside of the pelvis, with arterial blood; while the branches of the posterior trunk mainly supply muscles within and on the outside of the pelvis. The importance of the internal iliac artery in carrying on the circulation in uterine life is noticed in the article FŒTUS.

ILI'SSUS. See ATHENS, and ATTICA.

I'LIUM. See PELVIS.

ILIUM. See TROY.

I'LKESTON, a thriving market-town of England, in the county of Derby, and situated ten miles north-east of the town of that name, on an eminence in the valley of the Erewash. Manufactures of hosiery and lace are here carried on, and a number of the inhabitants are employed in the coal and iron works of the vicinity. Pop. (1871) 9662.

ILLE-ET-VILAINE, a maritime department in the north-west of France, formed out of a portion of the old province of Bretagne, is quadrangular in shape, and lies between the English Channel and the department of Loire-Inférieure. Area, 2573 square miles, or 1,646,670 square acres, of which 1,016,580 acres are arable land; pop. (1872) 589,532. It is watered chiefly by the rivers from which it derives its name—the Vilaine, and its tributary, the Ille. The usual grain-crops are raised in sufficient quantity to meet the wants of the population. Flax and hemp are extensively produced, and the cider of this district is esteemed the best produced in the country. Cattle are reared in great numbers, iron mines are worked, and great varieties of linen and woollen fabrics are manufactured. The department is divided into six arrondissements—Rennes, Fougères, Montfort, St Malo, Vitré, and Redon. Rennes is the capital, and St Malo the principal seaport.

ILLEGI'TIMACY. See LEGITIMACY; BASTARDS.

ILLI'CIUM, a genus of trees of the natural order *Magnoliaceæ*, having flowers with three or six petal-like sepals, numerous petals arranged in several rows, and numerous stamens and pistils; the capsules arranged in a star-like form, opening upwards, and each containing a single seed. The species are few, but very widely distributed. The most important is *I. anisatum*, the fruit of which is known as Star Anise, or Chinese Anise. See ANISE. This tree is held in high estimation among the Japanese, and is planted near their temples, as their gods are supposed to delight in it.—Among the other species is *I. Floridanum*, a shrub with fine pendent clusters of dark purple flowers, native of Florida and Louisiana, of which the leaves are very fragrant, the capsules also smelling of anise, though more faintly than those of the Chinese tree. Similar in fragrance is *I. parviflorum*, another Floridian species.

ILLIMA'NI, one of the principal mountains of the Bolivian Andes. See ANDES.

ILLINOI'S, a river of North America, is formed in the north-east portion of the state of Illinois by the union of the Kankakee and Des Plaines, flows south-west, and joins the Mississippi 20 miles above the mouth of the Missouri. It is 500 miles long, and is navigable for 245 miles. It is broad, deep, and sluggish, and widens occasionally into lake-like expanses. It is connected by a canal with Lake Michigan.

ILLINOIS, one of the United States of America, extending from 36° 56′ to 42° 30′ N. lat., and 87° 35′ to 91° 40′ W. long., being 388 miles long, and 212 wide; containing an area of 55,405 square miles, or 35,459,200 acres. It is bounded N. by Wisconsin; E. by Lake Michigan, and the state of Indiana, from which it is partly separated by the Wabash river; S. by the converging rivers Mississippi and Ohio, which separate it from Missouri and Kentucky; and W. by the Mississippi, which separates it from Missouri and Iowa. The state is divided into 102 counties; the capital is Springfield, near the centre of the state, and the most important towns are Chicago, the principal port on Lake Michigan, Galena and Alton on the Mississippi, and Cairo, at the southern terminus of the Central Railway, and the confluence of the Ohio and Mississippi rivers. The population of the state has increased with marvellous rapidity. In 1810, it was 12,282; in 1820, 55,211; in 1830, 157,445; in 1840, 476,183; in 1850, 851,470; in 1860, 1,711,753; and in 1870, 2,511,096. More than half the people of I. were born in other states or foreign countries, a large number being Irish and Germans. In 1850, there were but 707 paupers in a population of 851,470. The state of I. is generally level, having few hills and no mountains. The lowest portion is but 340 feet, and the highest only 800 feet above the Gulf of Mexico. It is nearly covered by fertile prairies; while river-bottoms, with a soil of vegetable mould 40 feet in depth, have produced heavy crops of maize for many successive years without manuring. The country is so level that the canal which unites Lake Michigan with Illinois river and the Mississippi is fed by water pumped from the lake to a height of twelve feet.

The principal rivers, besides those which form the boundaries, are the Illinois and Rock rivers, and their tributaries. The whole state is of limestone formation, with rich lead deposits in the north-west, and a large portion of the great bituminous coal formation, 375 miles long and 200 wide, lying in this and the adjoining states. The climate is mild, with an average of 77° Fahr. in summer, and 33¼° in winter, but ranging from 20° below to 100° above zero; it is also healthy, except in swamp-lands or river-bottoms, which are subject to fever and ague and bilious diseases. The productions are wheat, maize, tobacco, cattle, hogs, apples, pears, peaches, grapes, &c. There were (1872) 5725 miles of railway, including the Illinois Central, 708 miles, and the Galena and Chicago, 459 miles.

In 1870, I. contained 11,050 public schools, 6 universities and 779 other schools. In the same year it produced 30,128,405 bushels of wheat, 129,921,395 bushels of Indian corn, and 42,780,851 bushels of oats. In 1830, the Mormons built the city of Nauvoo, on the Mississippi; but in 1844, their prophet, Joseph Smith, was killed by a mob; and his followers, 20,000 in number, made their exodus across the plains to the territory of Utah.—I. was first explored by La Salle, and the French missionaries and Indian traders, who formed the earliest settlement at Kaskaskia, in 1673. Ceded by France to Great Britain, and then to the United States, it remained a portion of the North-west Territory, until its organisation as a state, with a governor and legislature, in 1818.

ILLUMINATED MANUSCRIPTS. See Manuscripts.

ILLUMINATI, a name which has at different periods been borne by four different societies—that of the *Alombrados* in Spain, in the end of the sixteenth century; that of the *Guerinets* in France, about the year 1684, enthusiasts and visionaries; an association of Mystics in Belgium, in the latter half of the 18th century; and the *Order of the Illuminati*, which was founded at Ingolstadt on May 1, 1776, and soon spread over almost all the Roman Catholic parts of Germany. It is this which is now commonly meant when the name Illuminati is employed. Its founder at first called it the Order of the Perfectibilists. It owed its existence to Adam Weishaupt, Professor of Canon Law at Ingolstadt, a man of superior abilities and much benevolence, but deficient in practical knowledge of mankind. Filled with detestation of Jesuitism, and impatient of the restraints which were at that time imposed on the human mind in Roman Catholic Germany, and in no part of it more than in Bavaria, under the bigoted administration of the Elector Charles Theodore, he conceived the idea of forming an association which should extend its ramifications everywhere, and should consist of the choicest spirits, should labour for the establishment of the dominion of reason, and promote religious and political enlightenment and emancipation. Religious dogmas and forms of worship were to be rejected, a system of deism was to be propagated, and republican opinions. The accession of the Baron von Knigge to the new order, and the support which it received from the Freemasons, led to its rapid extension, so that, at one time, more than 2000 of the most accomplished men in Germany were members of it. Weishaupt's knowledge of the order of the Jesuits led him to borrow some of their methods for the accomplishment of what he regarded as the most opposite ends; and the Illuminati were soon involved in a system of mutual espionage, confession, and the like, essentially inconsistent with true freedom, but calculated to place the threads all in one hand, by which the holy legion was to be led on, as it was imagined, to the benefaction of mankind. But from this cause, the dissolution of the order soon ensued. Weishaupt and Knigge, its two leaders, quarrelled with one another. The order began to be openly denounced as dangerous, and, on the 22d of June 1784, an edict was issued by the Elector of Bavaria for its suppression, which was followed by another on 2d March 1785. Weishaupt was degraded and banished. He retired to Halle, where he died in 1830, at the age of 83. Various other members were severely punished, and the form of justice was not strictly observed in the proceedings against them.—Great importance was at one time attached to the order of the Illuminati, whose secret influence was regarded as a principal cause of many of the political events of the time of the French Revolution, and the works of Abbé Barruel and of Professor Robison of Edinburgh upon this subject were eagerly read, but the highly exaggerated character of their views is now generally acknowledged.

ILLUPIE. See Bassia.

ILLUSORY APPOINTMENT, a legal phrase which denotes that where a person has a power or faculty to divide property among several others, such as children, and he gives one or more a very small sum, and the bulk of the property to the rest, the former is called an illusory appointment. In vulgar parlance, it is like cutting off an heir or child with a shilling. In general, it is competent, both in England and Scotland, to make an illusory appointment, but much depends on the peculiar terms of the deed or will originally giving this power to appoint or divide.

ILLUSTRATED PUBLICATIONS are a remarkable feature of the literature of our times. The employment of illustrations or pictorial sketches to render books more intelligible and attractive, has long been common, but has of late years been carried to an extent previously unknown. There are two methods of illustration: by copper or steel plate engravings, which, being on leaves apart from the text, are executed separately; and by wood-engravings, which, inserted as blocks in the typography, are printed as part of the work. Wood-engraving is not new, but it was little employed for general illustration until comparatively recent times. Throughout the 18th and the first quarter of the 19th c., illustrations, for the most part, consisted of separate engravings on copper. See Engraving. In the early part of the 19th c., books of travels and works of a fanciful kind, and also in natural history, issued in London, were illustrated chiefly by aquatint engravings. Among the artists who were noted for this species of illustration were Rowlandson, John Clark, and the Cruikshanks, and as the engravings were coloured by hand, they were particularly attractive. Clark was principally employed to illustrate voyages and travels. In the preparation of designs for these illustrations, the author of the work was usually much indebted to the artist, who, in many cases, was furnished with only a few scratches to guide him in his representations. The use of aquatint engravings was at length superseded by lithography; but before this new species of illustration came greatly into vogue, wood-engraving took the place of all kinds of illustration except that of the high-class line steel-engravings, which are still in use for costly publications. The taste for illustrated works first sprung up in England, and thence it extended to France, Germany, and the United States. From 1820 to about 1830, was the great era of Illustrated Annuals (q. v.). The taste for these illustrated year-books ultimately wore itself out, and was succeeded by a demand for highly illustrated books of poetry by popular authors, such as Rogers, Byron, and Campbell, and in the disposal of these elegant works, some publishers realised handsome fortunes. Latterly, illustration has consisted for the greater part in wood-engravings, for they possess the inestimable advantage of being printed with the letter-press, and in the hands of high-class artists, the design and execution of these embellishments have reached extraordinary perfection. Executed with comparative cheapness and rapidity, wood-engravings have been largely employed to illustrate popular periodicals, encyclopædias, and newspapers. *The Illustrated London News* was the first illustrated paper; *The Graphic* came next; and these two are the best in England. See WOOD-ENGRAVING.

ILLY'RICUM (Gr. ILLYRIS, ILLYRIA) is the Roman name of a country whose limits in ancient times varied very considerably. In the 4th c. B.C., the Illyrians, who are the ancestors of the modern race generally known as Albanians (see ALBANIA), inhabited the whole eastern coast of the Adriatic Sea and adjacent islands, with the western parts of Macedonia as far as Epirus. Philip of Macedon conquered the country as far as the river Drilon (modern Drino), and thence arose the division into *Illyris Græca* and *Illyris Barbara* or *Romana*. The former, now Albania (q. v.), was incorporated with Macedonia. *Illyris Barbara* or *Romana* was divided into Iapydia, Liburnia, and Dalmatia. The Illyrians were much addicted to piracy, which soon brought them into collision with the Romans, and led to their subjugation about two centuries B.C. They made numerous efforts to shake off the Roman yoke, but were always defeated, and the country became a most important province of the Roman empire, comprising the territory represented in modern times by Croatia, Dalmatia, Herzegovina, Montenegro, nearly all Bosnia, and a part of Albania. On the division of the Roman empire, I. shared in the vicissitudes that followed that act. A decree of Napoleon, on 14th October 1809, gave the name of Illyrian Provinces to Carniola, Dalmatia, and other countries from the Adriatic Sea to the Save, then belonging to the French empire. At his fall, these provinces were united as a kingdom to the Austrian empire, and some alterations were made in its boundaries, especially by the restoration to Hungary of what had formerly belonged to it, and the annexation of the whole of Carinthia instead. The kingdom was divided into the two governments of Laibach and Trieste, Laibach being the capital, which arrangement subsisted till 1849, when it was subdivided, for administrative purposes, into the duchies of Carinthia (q. v.), Carniola (q. v.), and the coast district, containing the counties of Görz (q. v.), Gradiska, and Istria (q. v.), with the city and territory of Trieste (q. v.).

I'LMEN (formerly *Moysk*), a lake in North-western Russia, government of Novgorod, 27 miles long, 20 miles broad, and 16 feet deep. The lake is stormy, and unfit for navigation; its bottom stony. The rivers Shelon, Lovat, Msta, and several others, flow into the lake, which discharges its waters through the river Volkhof into Lake Ladoga. The lake abounds in fish, chiefly sandres, bream, and smelt, and fishing on its banks occupies a population of about 20,000. The lake I. is historically remarkable, because it was on its banks that the Slavonian tribes lived, who, a thousand years ago (862), invited the Variago-Russ to come and rule over them, from which time dates the origin of the Russian nation.

ILME'NIUM, the name applied by Hermann to a new metal analogous to tantalum. He obtained its oxide from a mineral to which the various names of *Urano-tantalite*, *Samarskite*, and *Yttro-ilmenite* have been applied, and which occurs in the Ilmen Mountains in Siberia. Its existence as an independent metal is not satisfactorily established.

I'LMINSTER, a small but ancient market-town of England, in the county of Somerset, is situated on the right bank of the Isle, 44 miles south-west of Bath. The Free Grammar and Commercial Schools, with an endowment of nearly £1000 a year, were founded in 1586. Some manufactures of woollens, silks, and lace are carried on. Pop. (1871) 2431.

IL OBEI'D, or **EL OBEID** (pronounced *Lobeid*), an important trading town of Africa, capital of Kordofan, is situated in lat. 13° 11′ N., long. 29° 35′ E., at the foot of a long and gradually sloping plain, the drainage from which, after heavy rains, frequently inundates the principal streets. The town consists of a number of villages, originally separate, and inhabited by distinct races, but now joined together, and only distinct enough to form separate quarters. The houses and mosques, as well as the government offices, are almost all built of a fragile clay, and the general appearance of the place is uninviting, gloomy, and dirty. The *zoog*, or market-place, contains four rows of booths, and fruit, vegetables, tobacco, and manufactures in iron and wood are here sold. The wholesale trade is carried on in private houses. Gum-arabic, ivory, tamarinds, and ostrich feathers, are the chief articles of export. Population estimated at about 30,000.

ILO'RI, ILO'RIN, or, more properly, ALORI, a very large town of Africa, the great centre of the Fulbe, in Yóruba, is situated in lat. 8° 30′ N., and long. 4° 33′ E., 46 miles south-west of the banks of the Niger, and about 150 miles north-east from the shore of the Bight of Benin. Nothing very definite seems to have been published regarding it. Dr Barth, in conversing about I. with an intelligent native who had lived for a long time in Constantinople, was told that it was 'without the least doubt larger than the latter city.'

I'LSLEY, EAST, a small but ancient market-town of Berkshire, England, is situated in a secluded valley amid bleak and dreary downs, about 56 miles west of London. It is remarkable chiefly for its sheep-markets, which are among the most important in the kingdom; 50,000 sheep have been known to be penned for sale here in one day. The ordinary sheep-fairs are held on every alternate Wednesday, from the Wednesday fortnight before Easter till July. The downs in the vicinity of the town are celebrated as training-grounds for race-horses. About a mile distant is the village of West Ilsley. Pop. (1871) 608.

IMAGE-WORSHIP (Gr. *iconolatria*), the use, in public or private worship, of graven or painted representations of sacred persons or things, and especially the exhibition of honour, reverence, or worship to or towards such representations. This practice, in the various degrees of which it is susceptible, has formed, for many centuries, so fruitful a subject of controversy among Christians, that we think it expedient first briefly to detail the history of the use of images in Christian worship during the several periods, and secondly to state summarily the opposite views of this history which are taken by the two great parties into which Christians are divided on the question.

Neither in the New Testament, nor in any genuine writings of the first age of Christianity, can any trace be discovered of the use of statues or pictures in the worship of Christians, whether public or private. The earliest allusion to such representations is found in Tertullian, who appeals to the image of the Good Shepherd as engraved upon the chalices. A very curious pagan caricature of Christianity, of the very same age, lately discovered scratched upon the wall of a room in the palace of the Cæsars (see GRAFFITI), which rudely represents a man standing in the attitude of prayer, with outstretched hand, before a grotesque caricature of the crucifixion, and which bears the title 'Alexamenus worships God,' has been recently alleged by Catholics as an additional indication of at least a certain use of images among the Christians of the 2d century. The tombs of the Christians in the Roman catacombs, many of which are of a date anterior to Constantine, frequently have graven upon them representations of the Dove, of the Cross, of the symbolical Fish, of the Ship, of Adam and Eve, of Moses striking the rock, of Jonas, of Daniel in the lions' den, of the apostles Peter and Paul, and above all, of the Good Shepherd; and those compartments of the catacombs which were used as chapels are often profusely decorated with sacred representations, the age of which, however, it is not easy to determine with accuracy. But whatever opinion may be formed as to particular instances, such as these, it is admitted by Catholics themselves (who explain it by the fear of perpetuating the idolatrous notions of the early converts from paganism) that for the first three centuries the use of images was rare and exceptional; nor was it until after the establishment of Christianity under Constantine, and particularly after the condemnation of the Nestorian heresy in 430, that statues and pictures of our Lord, of the Virgin Mary, and the Saints, were commonly introduced in churches, especially in the East and Italy. And yet, even in the 5th c., the practice had already reached a great height, as we learn from the church historian, Theodoret, for the East, and from Paulinus of Nola, for Italy; and in the 6th and 7th centuries, many popular practices prevailed, which called forth the condemnation of learned and pious bishops both in the East and in the West. It was usual not only to keep lights and burn incense before the images, to kiss them reverently, and to kneel down and pray before them, but some went so far as to make the images serve as godfathers and godmothers in baptism, and even to mingle the dust or the colouring matter scraped from the images with the Eucharistic elements in the Holy Communion! This use of images by Christians was alleged as an obstacle to the conversion of the Jews, and as one of the causes of the progress of Mohammedanism in the East; and the excesses described above provoked the reaction of Iconoclasm (q. v.). In the second Council of Nice, 787, the doctrine as to the worship of images was carefully laid down. A distinction was drawn between the supreme worship of adoration, which is called *latreia*, and the inferior worship of honour or reverence, called *douleia;* and still more between *absolute* worship, which is directly and ultimately rendered to a person or thing *in itself*, and *relative*, which is but addressed *through* a person or thing, ultimately *to* another person or thing represented thereby. The second Council of Nice declared, first, that the worship to be paid to images is not the supreme worship of *latreia*, but only the inferior worship of *douleia;* and, secondly, that it is not *absolute*, and does not rest upon the images themselves, but *relative*, that is, only addressed through them, or by occasion of them, to the original which they represent. This explanation of the doctrine and the practice was thenceforth generally received; but a strange error in the translation of the Greek acts of the Council of Nice, by which it appeared that the same adoration was decreed by that council to images 'which is rendered to the Holy Trinity itself,' led to a vehement agitation in France and Germany under Charlemagne, and to a condemnation by a synod at Frankfurt of the doctrines of the Council of Nice. But an explanation of this error, and of the false translation on which it was based, was immediately afterwards given by the pope; and eventually the Nicene exposition of the doctrine was universally accepted in the Western as well as in the Eastern Church.

At the Reformation, the reforming party generally rejected the use of images as an unscriptural novelty, irreconcilable as well with the prohibition of the old law as with that characteristic of 'spirit and truth' which is laid down by our Lord as specially distinctive of the new dispensation; and they commonly stigmatised the Catholic practice as superstitious, and even idolatrous. The Zwinglian, and subsequently the Calvinistic churches, absolutely and entirely repudiated all use of images for the purposes of worship. Luther, on the contrary, while he condemned the Roman worship of images, regarded the simple use of them even in the church, for the purpose of instruction, and as incentives to faith and to devotion, as one of those *adiaphora*, or *indifferent* things, which may be permitted, although not of necessary institution; hence, in the Lutheran churches of Germany and the northern kingdoms, pictures, crucifixes, and other religious emblems are still freely retained. In the Anglican Church, the practice is still a subject of controversy. In the Presbyterian Church, and in all the other Protestant communions, images are entirely unknown.

The Roman Catholic Church, through the decree of the Council of Trent, disclaims the imputation, commonly made against Catholics, of the idolatrous worship of images, 'as though a divinity dwelt in them, or as though we [Catholics] asked anything of them, or trusted in them, as the heathens did in their idols.' It renews the Nicene distinction between *absolute* and *relative* worship; the latter of which alone—'whereby we worship Christ and the saints, who are the prototypes of these images'—it sanctions or permits; and it contends for the great advantage, especially for the rude and unlearned people, to be drawn from the use of pictures and statues in the churches as 'memorials of the sufferings and of the mercy of our Lord, as instructive records of the virtues of the saints, and exhortations to the imitation of their example, and as incentives to the love of God and to the practice of piety' (Sess. xxv. *On the Invocation of Saints*). In many foreign churches, especially in Italy, in Southern Germany, and in France, are to be found images which are popularly reputed as especially sacred, and to which, or to prayers offered before which, miraculous effects are ascribed. But instructed Catholics declare that the legends connected with such images form no part of Catholic belief. Most Catholic books of instruction contain cautions against attributing such effects to any special virtue of the images themselves, rather than to the special faith, trustfulness, and fervour which are stirred up by their presence, and by the recorded examples of the mercy of God with which they are associated in the minds of the faithful.

IMA'GINARY QUANTITY. In the working of many algebraic problems, it often happens that the root of a negative quantity must be extracted; if the root is odd, the operation can be performed (see INVOLUTION), but if even, the root can only be *formally* extracted, and is in consequence called an *impossible* or *imaginary* quantity. For instance, the cube root of -64 is not an imaginary quantity, for $-4 \times -4 \times -4 = -64$, and therefore $\sqrt[3]{-64} = -4$; but the square root of -64 is an impossible quantity, for no possible quantity (whether it be + or —) multiplied by itself can produce a negative quantity; similarly and *à fortiori*, the fourth root of -64 is an impossible quantity, and the same is true of all even roots. Imaginary quantities are, however, generally reduced to one denomination as multiples of $\sqrt{-1}$, in the following manner: $\sqrt{-64} = \sqrt{64 \times -1} = \sqrt{64} \times \sqrt{-1} = 8\sqrt{-1}$; and again, $\sqrt{-18a^5} = \sqrt{9a^4 \times -2a} = \sqrt{9a^4} \times \sqrt{2a} \times \sqrt{-1} = 3a^2\sqrt{2a}\sqrt{-1}$. These forms very frequently occur in higher algebra.

IMAGINA'TION. The meaning of this word enters into many relationships, and is thereby rendered difficult to define. The principal meaning is doubtless what connects it with Poetry and Fine Art, from which the other significations branch off. The simplest mode of explaining this complicated relationship will be to state in separation the different constituents of the power in question. We shall then see why and where it touches upon other faculties, which still require to be distinguished from it.

1. Imagination has for its objects the *concrete*, the real, or the individual, as opposed to abstractions and generalities, which are the matter of science. The full colouring of reality is implied in our imagination of any scene of nature. In this respect, there is something common to imagination and memory. If we endeavour to imagine a volcano, according as we succeed, we have before the mind everything that a spectator would observe on the spot. Thus, sensation, memory, and imagination alike deal with the fulness of the actual world, as opposed to the abstractions of science and the reasoning faculties.

The faculty called *conception*, in one of its meanings, has also to do with this concrete fulness, although, in what Sir William Hamilton deems the original and proper meaning of that word, this power is excluded. In popular language, and in the philosophy of Dugald Stewart, conception is applied to the case of our realising any description of actual life, as given in history or in poetry. When we completely enter into a scene portrayed by a writer or speaker, and approach the situation of the actual observer, we are often said to *conceive* what is meant, and also to imagine it; the best word for this signification probably is 'realise.'

2. It is further essential to imagination in its strictest sense that there should be some original construction, or that what is imagined should not be a mere picture of what we have seen. Creativeness, origination, invention, are names also designating the same power, and excluding mere memory, or the literal reproduction of past experience. Every artist is said to have imagination according as he can rise to new combinations or effects different from what he has found in his actual observation of nature. A literal, matter-of-fact historian would be said to be wanting in the faculty. The exact copying of nature may be very meritorious in an artist, and very agreeable as an effect, but we should not designate it by the term imagination. There are, however, in the sciences, and in all the common arts, strokes of invention and new constructions, to which it might seem at first sight unfair to refuse the term in question, if originality be a leading feature in its definition. But still we do not usually apply the term imagination to this case, and for a reason that will appear when we mention the next peculiarity attaching to the faculty.

3. Imagination has for its ruling element some *emotion* of the mind, to gratify which all its constructions are guided. Here lies the great contrast between it and the creativeness of science and mechanical invention. These last are instrumental to remote objects of convenience or pleasure. A creation of the imagination comes home at once to the mind, and has no ulterior view.

Whenever we are under the mastery of some strong emotion, the current of our thoughts is affected and coloured by that emotion; what chimes in with it is retained, and other things kept out of sight. We also form new constructions that suit the state of the moment. Thus, in fear, we are overwhelmed by objects of alarm, and even conjure up spectres that have no existence. But the highest example of all is presented to us by the constructions of fine art, which are determined by those emotions called *æsthetic*, the sense of beauty, the pleasures of taste; they are sometimes expressly styled 'pleasures of the imagination.' The artist has in himself those various sensibilities to an unusual degree, and he carves and shapes his creations with the view of gratifying them to the utmost. Thus it happens that fine art and imagination are related together, while science and useful art are connected with our reasoning faculties, which may also be faculties of invention. It is a deviation from the correct use of language, and a confounding of things essentially distinct, to say that a man of science stands in need of imagination as well as powers of reason; he needs the power of *original construction*, but his inventions are not framed to satisfy present emotions, but to be instrumental in remote ends, which in their remoteness may excite nothing that is usually understood as emotion. Every artist exercises the faculty in question, if he produces anything original in his art.

The name 'Fancy' has substantially the meanings now described, and was originally identical with imagination. It is a corruption of fantasy, from the Greek *fantasia*. It has now a shade of meaning somewhat different, being applied to those creations that are most widely removed from the world of reality. In the exercise of our imagination, we may keep close to nature, and only indulge the liberty of re-combining what we find, so as to surpass the original in some points, without forcing together what could not co-exist in reality. This is the sober style of art. But when, in order to gratify the unbounded longings of the mind, we construct a fairyland with characteristics altogether beyond what human life can furnish, we are said to enter the regions of fancy and the fantastical.

The 'ideal,' and 'ideality,' are also among the synonyms of imagination, and their usual acceptation illustrates still further the property now discussed. The 'ideal' is something that fascinates the mind, or gratifies some of our strong emotions and cravings, when reality is insufficient for that end. Desiring something to admire and love beyond what the world can supply, we strike out a combination free from the defects of common humanity, and adorned with more than human excellence. This is our 'ideal,' what satisfies our emotions, and the fact of its so doing is the determining influence in the construction of it.

I'MAUM, the appellation given to the most honoured teachers of Mohammedanism. The word is Arabic, and signifies a director or teacher. It is commonly employed to designate any of the persons belonging to the Mohammedan Ulema (q. v.), or priestly body. They are distinguished from the laity by a turban somewhat higher than usual. They are held in great reverence by the people. The sultan himself has the title of Imaum, as the spiritual chief of all Moslems. The word is sometimes incorrectly written Imaun.

IMAUS. See Hindú-Kúsh.

IMBA'TTLED. See Embattled.

IMBECI'LITY must not be confounded with idiocy. In the former, there is the *imperfect* development of mind; in the latter, there is the *non*-development of mind. In the feeble intellect, there may be present every faculty which distinguishes the most gigantic understanding, and these may act under ordinary laws; but they are dwarfed, incapable of continued growth and training, and are exercised and applied under the guidance and assistance of others, or of external circumstances. There are large numbers of weak-minded, useless persons in every community, who differ from the more robust intellects solely in degree. But the more marked and recognisable imbecility, as transmitted congenitally, as following dentition, chorea, convulsions, and diseases which retard vigorous bodily development, or as induced by the great constitutional changes at puberty, is characterised by all or many of the following symptoms. The expression is vacant, the senses are dull; the head is small, the body deformed; the gait is vacillating and restless; the head is pendent, thrown back, or agitated; the saliva escapes; the language is limited and infantile; the ideas are few, and consist of mere sensuous impressions; the temper is timid, facile, and vain; and the passions are little susceptible of control. The affection has been regarded as general, or involving the whole mind; or as partial, when the intellect only, or the sentiments only, or a particular faculty may be feeble and ineducable. In a legal view, such persons have been divided into those who have, and those who have not, a moral perception of right and wrong. It is, however, worthy of consideration, that while they may know right from wrong in their ordinary and habitual range of duties, and within the scope of their own capacity, they may fail to do so beyond these narrow limits, and where questions of property, propriety, or abstract justice are concerned. Many imbeciles are muscular, capable of performing acts requiring strength and endurance rather than dexterity; and in this country, as well as many others, they are not merely the 'naturals,' who run everybody's messages, but they are converted into the domestic drudges of the homestead, the white slaves of the farm. From the more clever and cunning of the class were the professional fools of former ages selected. Imbeciles are often confounded with genuine idiots, and their partial educability has exaggerated the supposed success in the attempts to elicit and mature the embryo mind. However far this training may be carried, and even when the subject has become self-maintaining, it may be safely asserted that he is never self-guiding nor self-governing, nor capable of an independent existence.—Howe, *On the Causes of Idiocy;* Reports, Idiot School, Earlswood; *De l'Idiotie chez les Enfants*, par Felix Voisin.

IMBECILITY, in point of law—i.e., something short of idiocy or lunacy—is no ground of relief in England against a contract, though relief is always granted in case of fraud, and the imbecility of one of the parties may form an element of the fraud. Nor does the law of England in any peculiar way protect an imbecile person or his property; for so long as a person is not actually insane or an idiot, he can do what he likes with his own. In Scotland, however, an imbecile person is to a certain extent protected against being imposed upon, as regards his heritable property, by a step called interdiction, which consists in either the imbecile, who is conscious of his weakness, executing a bond of interdiction, by which he puts himself under trustees, whose consent is in future made necessary to render valid his contracts, or he may be judicially interdicted by the Court of Session, at the instance of his next of kin, with like effects. The trustees or guardians in such cases are called the interdicters. See Lunacy.

IMBER, or **IMMER.** See Diver.

I'MBROS, an island of the Ægean Sea, about 11 miles north-east of Lemnos, and the same distance from the mouth of the Dardanelles. It is 18 miles in length, and has an area of 116 square miles. The island is mountainous, its highest summit being 1845 feet above sea-level, and is covered with wood. Corn, wine, and cotton are abundantly grown in the valleys; oil is also produced. I. contains four villages, the chief of which, called Imbro, is built on the site of an ancient town of the same name. Pop. of entire island about 4000.

IMBRU'ED, or **EMBRUED,** an expression used in heraldry to signify bloody, or dropping with blood. Weapons thus blazoned are drawn with drops of blood falling from them.

IMERI'TIA, formerly an independent Transcaucasian territory, now part of the government of Kutaïs (see Transcaucasia), is bounded on the N. by the Caucasian mountains, and on the W. by the districts of Ghuria and Mingrelia. Area, 4040 sq. m.; pop. 100,000. Its history as an independent dominion commenced from about the beginning of the 15th c., and was long marked by internal dissensions. In 1745, Salomon I. was proclaimed, but his nobles revolting shortly after, and aided by the Turks, dethroned him. Salomon applied for help to Russia, and in 1769, Count Todtleben, at the head of a Russian force, entered I., restored the king, and drove back the Turks. The civil dissensions of this province, however, continued, and at last, in 1810, after having long acknowledged allegiance to Russia, it was formally incorporated in and proclaimed a province of that empire.

IMIDES. See Organic Bases.

IMITA'TION. See Sympathy.

IMITATION, in the science of musical composition, is the repeating of the same passage, or the following of a passage with a similar one, in one or more of the other parts or voices, and it may be either strict or free. When the imitated passage is repeated note for note, and every interval is the same, it is called strict, and it may take place in the unison or octave, or in any other of the degrees of the scale, either above or below the original passage. The progression of a passage may also be imitated by an inversion, or by reversing the movement of the original; also by notes of a greater or of a lesser value. See Double Counterpoint, Fugue, and Canon. Imitation in composition is one of the most important means of producing unity and animation in the progression of the parts, and is used in a strict, and also in a free manner, in the instrumental works of Haydn and Beethoven, and also by Mozart in his easier operatic works. Many composers, however, resort to imitation improperly, and generally from poverty of musical ideas, or from pedantry. No fixed rules can be given for its use.

I'MITATIVE INSA'NITY. There are many mental diseases, especially those marked by grotesque external manifestations, by gesticulations, and convulsive seizures, which appear to be propagated by imitation. In the healthy and naturally constituted, there exists a tendency to copy and reproduce, or represent what powerfully impresses the imagination; and during the excitement of individuals or communities, this inclination is more influential, and passes beyond the control of the will. Great caution, however, must be exercised in distinguishing between what is epidemic and depends upon atmospheric or external moral causes, from the results of strong or morbid states of the mind itself. An idiot is mentioned by Gall, who, having seen the slaughter of a pig, killed a man after the same fashion. A child of seven years old suffocated a younger brother on the suggestion of the strangling of Punch at the hands of the devil. The example of suicide by hanging having been set by a pensioner in the Hôpital des Invalides, six similar deaths followed, and by suspension from the same lamp-post. After the return of the Bourbons, there appeared in succession seven female claimants to the parentage of Marie Antoinette; and pyromania, propagated by sympathy, is well known to have existed in Normandy in 1830.

IMMA'CULATE CONCEPTION OF THE BLESSED VIRGIN MARY, Feast of, a festival celebrated on the 8th of December in the Latin, and on the 9th in the Greek Church, in which latter church it is held under the name of 'The Conception of St Anne,' the mother of the Virgin Mary. The festival of the Conception itself is traceable in the Greek Church from the end of the 5th c., and in the Latin dates from the 7th; but a great controversy prevailed for a long time in the West as to whether and in what sense the conception of the Blessed Virgin Mary was to be held immaculate, and in what sense the Blessed Virgin herself was to be held conceived without sin. It was believed to be a consequence of the doctrine of the divine maternity, and a necessary part of the honour due to the Incarnation, that the Blessed Mother should be held to have been at all times free from the stain of sin. This might have been, either by her having been, like the prophet Jeremiah (Jer. i. 6), or the Baptist St John (Luke, i. 35), sanctified before her birth—that is, purified in her mother's womb from the stain of original sin; or by the still higher sanctification of having been entirely exempted from the stain of sin, either—for the discussion was carried to all these subtleties—before the formation of the embryo in the womb of her mother, or at least before its animation by union with the soul. The actual controversy in the West may be said to have commenced with St Bernard, who not only remonstrated with the canons of Lyon in 1131 for their unauthorised introduction of this festival in their cathedral, but rejected the opinion of the Blessed Virgin's having been conceived free from original sin, though he admitted her sanctification in her mother's womb (*Epist.* 174, *Ad Canon. Lugdunensis*). The discussion thus raised led to a protracted controversy in the schools. The great master of scholastic subtlety, John Duns Scotus, in a disputation held before the university of Paris in 1307, maintained the doctrine of the immaculate conception in its highest sense; and the entire order to which he belonged, the Franciscan, as well as the school to which he has given his name, the Scotists, afterwards zealously defended it. On the other hand, the Thomist school, which was that of the Dominican order, having denied the immaculate conception, much division for a time existed; but the prevailing tendency was at all times towards the Scotist opinion. The university of Paris, in 1387, condemned the Thomist doctrine. The council of Basel—although, it is true, at the time when it was in conflict with the pope—declared the doctrine of the immaculate conception to be a Catholic dogma, and reprobated in the strongest terms the opposite opinion. Sixtus IV., however, imposed on the defenders of both opinions, in 1470, the obligation of mutual toleration and charity, and renewed this constitution in 1483; but in the end of the same century the university of Paris required, as a condition of the doctorate, an oath on the part of the candidate that he would defend the dogma of the immaculate conception. The Council of Trent, without discussing the scholastic dispute, merely declared that 'in its decree on original sin it did not comprehend the blessed and immaculate Virgin Mary,' and renewed the constitution of Sixtus IV. already referred to. This abstinence on the part of the council led to a further renewal of the dispute, which reached such a pitch towards the close of the 16th c., that Pius V. not only prohibited either side from stigmatising the opposite with the name of heretical, but forbade all public discussions of the subject, except in theological disputations in the presence of a learned auditory. In the pontificates of Paul V. and Gregory XV., earnest instances were made by the Spanish crown to obtain a definite declaration in favour of the doctrine of the immaculate conception; but the pope again refused, contenting himself with repeating the constitution of Sixtus IV. He added, however, certain new provisions: 1. That disputants, in asserting the doctrine of the immaculate conception, should abstain from assailing the opposite doctrine. 2. That no one except the members of the Dominican order, and others specially privileged, should presume to defend, even in private disputation, the doctrine that the Blessed Virgin Mary was conceived in original sin. 3. That, nevertheless, in the public mass or office of the church, no one should introduce into the prayers or other formularies any other word than simply *conceptio*, without adding any epithet involving either doctrine. At the same time, opinion was setting steadily in favour of the doctrine of the immaculate conception. Alexander VII., and afterwards Clement IX., added new solemnity to the festival. Clement XI. ordained that it should be observed as a holiday of obligation, and at length Gregory XVI. permitted that the epithet immaculate should be introduced into the public service. In the end, at the instance of bishops in various parts of the church, the present pope, Pius IX., addressed a circular to the bishops of each nation, calling for their opinion, and that of their people, as to the faith of the church on the point; and on the receipt of replies all but absolutely unanimous, he issued a solemn decree at Rome, in a numerous council of bishops, on the 8th December 1854, declaring the doctrine to be an article of Catholic belief, and proposing it as such to the universal church. This decree has been implicitly accepted throughout the Roman Church.

IMMORA'LITY, in point of law, is a good defence to actions and suits, but it must be some immorality which runs counter to the well-known policy of the law. Thus, for example, if a man gave a bond, or granted a deed, giving to a woman some annuity, with a view to induce her to live in concubinage, this would be a good defence against the bond or deed being enforced, for the law discountenances his conduct; whereas, if it were merely a bond, or a gift, in consideration of something of the same kind past and ended, the deed would be good. So the keeper of a house of ill-fame is not allowed to sue, and has no legal remedy against her guests for any sum agreed to be paid for immoral purposes. In most other respects, the mere personal immorality of the parties who are litigants makes no difference whatever as to their respective remedies, for the law protects the bad as well as the good, the unjust as well as the just.

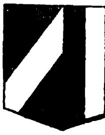
IMMORTA'LITY is the continued existence of the human soul in a future and invisible state. 'If a man die, shall he live again?' is a question which has naturally agitated the heart and stimulated the intellectual curiosity of man, wherever he has risen above a state of barbarism, and commenced to exercise his intellect at all. The religion of all civilised peoples may be said more or less to recognise the affirmative of the question,* although often under very vague and materialistic forms. In the ancient Egyptian religion, the idea of immortality first assumes a definite shape. There is a clear recognition of a dwelling-place of the dead and of a future judgment. Osiris, the beneficent god, judges the dead, and 'having weighed their heart in the scales of justice, he sends the wicked to regions of darkness, while the just are sent to dwell with the god of light.' The latter, we read on an inscription, 'found favour before the great God; they dwell in glory, where they live a heavenly life; the bodies they have quitted will for ever repose in their tombs, whilst they rejoice in the life of the supreme God.' Immortality is plainly taught, but bound up with the idea of the preservation of the body, to which the Egyptians attached great importance, as a condition of the soul's continued life; and hence they built vast tombs, and embalmed their bodies, as if to last for ever. In the Zoroastrian religion, the future world, with its governing spirits, plays a prominent part. Under Ormuz and Ahriman, there are ranged regular hierarchies of spirits engaged in a perpetual conflict; and the soul passes into the kingdom of light or of darkness, over which these spirits respectively preside, according as it has lived on the earth well or ill. Whoever has lived in purity, and has not suffered the *divs* (evil spirits) to have any power over him, passes after death into the realms of light. In the early Grecian paganism, Hades, or the realms of the dead, is the emblem of gloom to the Hellenic imagination. 'Achilles, the ideal hero, declares that he would rather till the ground than live in pale Elysium.' This melancholy view of the future everywhere pervades the Homeric religion. With the progress of Hellenic thought, a higher idea of the future is found to characterise both the poetry and philosophy of Greece, till, in the Platonic Socrates, the conception of immortality shines forth with a clearness and precision truly impressive. In the *Apology* and the *Phædo*, Socrates discourses of the doctrine of the soul's immortality, in language at once rich in faith and in beauty. 'The soul, the immaterial part, being of a nature so superior to the body, can it,' he asks in the *Phædo*, 'as soon as it is separated from the body, be dispersed into nothing, and perish? Oh, far otherwise. Rather will this be the result. If it take its departure in a state of purity, not carrying with it any clinging impurities of the body, impurities which during life it never willingly shared in, but always avoided, gathering itself into itself, and making the separation from the body its aim and study—that is, devoting itself to true philosophy, and studying how to die calmly; for this is true philosophy, is it not?—well, then, so prepared, the soul departs into that invisible region which is of its own nature, the region of the divine, the immortal, the wise, and then its lot is to be happy in a state in which it is freed from fears and wild desires, and the other evils of humanity, and spends the rest of its existence with the gods.'

It is only in Christianity, however, that this higher life is clearly revealed as a reward not merely to the true philosopher, but to every humble and pious soul. Christ 'hath brought life and immortality to light by the gospel.' 'According to his abundant mercy, God hath begotten us again unto a lively hope by the resurrection of Jesus Christ from the dead, to an inheritance incorruptible and undefiled, and that fadeth not away, reserved in heaven.' It is undoubtedly owing to Christianity that the doctrine of the soul's immortality has become a common and well-recognised truth—no mere result of speculation, nor product of priestly invention—but a light to the reason, and a guide to the conscience and conduct. The aspirations of philosophy, and the conceptions of mythology, are found in the gospel transmuted into an authoritative influence, governing and directing the present life.

IMMORTELLES. See EVERLASTING FLOWER.

IMO'LA (anc. Forum Cornelii, or Forum Syllæ), a town of Italy, in the province of Ravenna, stands in a fruitful plain adjoining picturesque hills, close to the river Santerno, and 24 miles west-south-west of Ravenna. It contains some fine palaces, churches, theatres, and benevolent institutions. I. possesses some good manufactures of wax, oil, majolica, silk, and glass, besides extensive leather-curing establishments, and brick and tile works. From a species of white grape grown in the vicinity, the delicious wine known as *vin santo* is manufactured. Pop. (1872) 28,398.

IMPA'LE, in Heraldry, to arrange two coats of arms side by side in one shield divided per pale. It is usual thus to exhibit the conjoined coats of husband and wife, the husband's arms occupying the dexter side or place of honour, and the wife's the sinister side of the escutcheon. When a man marries a second wife, heralds say that he may divide the sinister half of the shield per fess into two compartments, placing the family arms of his deceased wife in chief, and of his second wife in base. A husband impaling his wife's coat with his own, is not allowed to surround the former with the collar or insignia of any order of knighthood to which he may belong. Bishops, deans, heads of colleges, and kings-of-arms, impale their arms with their insignia of office, giving the dexter side to the former. In early heraldry, when two coats were represented in one shield side by side, only half of each was exhibited, an arrangement which has been called *dimidiation*. Sometimes the one coat only was dimidiated. A reminiscence of dimidiation is preserved in the practice of omitting bordures, orles, and tressures in impaled arms on the side bounded by the line of impalement.



Impale.

IMPANA'TION (Lat. *in*, and *panis*, bread), a technical word employed in the Eucharistic controversies to express the peculiar opinion propounded by Luther as to the nature of the presence of Christ in the Eucharist. Differing from the Roman Catholics in denying the transubstantiation of the bread and wine, and from the Sacramentarians in denying that our Lord's presence was merely typical or figurative, Luther contended that the body and blood of Christ were present in, or along with, the elements of bread and wine; in a manner analogous to that in which the divinity of Christ co-exists in the same person with his human nature. Hence, by an analogy with the word incarnation, he devised for the Eucharistic union the term impanation. This doctrine was the subject of a lengthened controversy with Zwingli at Marburg in 1529, which left each party unconvinced; and this theory still continues to be the received one in the orthodox Lutheran schools.

---

* Some of the most widely spread forms of belief in the world would seem to be exceptions to this statement; for in Hinduism the goal sought is absorption into the Universal Spirit, and therefore loss of individual existence; while the pious Buddhist strives for *Nirvana*, or complete extinction. Yet even here the belief in a future life exists in the form of the Transmigration of Souls (q. v.).

IMPEA'CHMENT, the name given to an accusation and trial of a peer or member of parliament, or, indeed, any other person, before the High Court of Parliament, for treason, or some high crime or misdemeanour. This is a kind of trial which is reserved for great and enormous offenders, particularly in matters affecting the constitution, for the ordinary tribunals generally suffice for all cases of crimes. Impeachment, accordingly, is of rare occurrence, the last instance being that of Lord Melville in 1805; but as it is one of the high prerogatives of parliament to try offenders in this way, it is still competent to use it. The proceedings nearly resemble an ordinary trial at law. A pardon by the crown is not pleadable in bar of the prosecution, though, after sentence, the crown may pardon the offender. See May, *On Parliaments*.

IMPEACHMENT OF WASTE, an expression in English Law, used in deeds or wills. When an estate is given to a person for life, or for a term of years, *without impeachment of waste*, the tenant is entitled to cut timber, and do many things on the estate which otherwise he would be unable to do. Still, he is not allowed to do what he likes, for if he abuses his power, and attempts to cut down ornamental timber, for example, or deface the family mansion, the Court of Chancery will interfere by injunction to prevent this. The phrase is not used in Scotland, but the law is not materially different.

IMPENETRABI'LITY, one of the essential properties of matter, implies that no two bodies can at the same time occupy the same space. If a nail be driven into a piece of wood, it does not, properly speaking, *penetrate* the wood, for the fibres are driven aside before the nail can enter. If a vessel be filled with fluid, and a solid body be then placed in it, as much water will run over as is equal in bulk to the solid body, in this way making room for it. The lightest gases are really as impenetrable as the densest solid; although, owing to their compressibility, it is not readily made apparent.

IMPE'RATIVE, CATEGORICAL. According to Kant (q. v.), man, in the consciousness of his moral liberty, recognises two great laws regulating his will; the first prompts him to seek his own well-being, the second *commands* him to be virtuous, even at the sacrifice of that. From this opposition in his moral nature between desire and conscience, springs up the idea of duty, which, in the Kantian terminology, is called the 'moral imperative,' to which Kant adds the epithet *categorical*, to indicate that its commands are absolute and unconditional.

IMPE'RIAL CROWN properly signifies the crown borne by the German emperor; in form, a circle of gold, adorned with precious stones and *fleurs-de-lis*, bordered and seeded with pearls, and raised in the form of a cap voided at the top like a crescent. From the middle of the cap rises an arched fillet enriched with pearls, and surmounted by a globe, on which is a cross of pearls. The name Imperial Crown is, however, in English heraldry, applied to the crown worn in times past by the kings of England. From the 12th century onwards, the crown of the English sovereigns underwent repeated changes in form and enrichment. That of Edward II. was formed of four large and four small strawberry leaves, rising in curves from the jewelled circlet, and having eight small flowers alternating with the leaves. In Henry IV.'s crown, eight strawberry leaves, and as many *fleurs-de-lis* alternated with sixteen small groups of pearls, three in each. Under Henry V. the enriched circlet was for the first time arched over with jewelled bands of gold, and the apex of the arches surmounted with a mound and cross, while *crosses patées* were substituted for the strawberry leaves, and roses or *fleurs-de-lis* for the clusters of pearls. The arches, at first numerous and elevated to a point, became, in later times, restricted to four, and depressed in the centre. The imperial crown of heraldry, as now understood, is, in point of fact, the form of crown worn by the English sovereigns from Charles II. to William IV., as represented in the subjoined woodcut. It has four *crosses patées* and four *fleurs-de-lis* set alternately on the circlet, while four pearl-studded arches, rising from within the crosses, carry at their intersection the mound and cross. The state crown of Queen Victoria differs considerably from this, having a far more enriched character. It is covered with diamonds and studded with gems, and the arches are wrought into wreaths of rose, thistle, and shamrock formed of brilliants. A charge, crest, or supporter, crowned with a regal crown, is said to be *imperially crowned*.

Imperial Crown.

IMPE'RIUM is a word used in the Roman law in various senses, the most important of which is that which it bears when applied to consuls and proconsuls—thence called imperatores. Most of the superior magistrates were also intrusted with the imperium, which meant a sovereign authority. It is of very little practical importance in modern times to trace the extent or precise nature of the authority thus designated, as the subject has no bearing on modern law.

IMPE'RTINENCE, in English Law, means some irrelevant matter introduced in an affidavit or pleading; and the court will generally order it to be struck out, and the offending party to pay the costs of doing so.

IMPETI'GO, a disease of the skin. It consists of crops of pustules, which may either be scattered or collected in groups. These pustules burst, dry up, and become covered with scabs or crusts of a yellow colour, not unlike little masses of candied honey. From beneath these crusts, a purulent discharge commonly takes place; the crusts become thicker and larger, and the skin around and beneath them is red and raw. The disease may be either acute or chronic. In the former case, it is attended with febrile symptoms, which must be combated by the internal administration of purgatives and alkalies, strict attention to diet, and weak alkaline lotions. In chronic cases, the discharge may be checked by a lotion containing ten or fifteen grains of oxide of zinc in an ounce of rose-water.

There are various forms of this complaint, as *I. figurata*, *I. sparsa*, &c. The disease known as *Crustea lactea*, which sometimes covers the faces of children like a mask, is a sort of compound of impetigo and eczema; and the rose-water lotion already mentioned is a useful application for it.

IMPEYAN, or **IMPEYAN PHEASANT** (*Lophophorus Impeyanus*), a large gallinaceous bird of the family *Phasianidæ*, a native of high cold regions of the Himalaya, but remarkable as much as any tropical bird for the splendour of its plumage, enhanced by the changing metallic tints which it exhibits—green, steel-blue, violet, and golden bronze. The fine plumage, however, belongs to the male alone. The female is clothed in sober brown, mottled with gray and yellow, and is smaller than the male. The I. has been found capable of domestication, and may probably be found capable of naturalisation, in Britain. It derives its name from Lady Impey, who first attempted to bring it alive to Britain, but failed. The Nepaulese name, *Monaul*, signifies *Bird of Gold*.

Impeyan (*Lophophorus Impeyanus*).

I'MPLEMENT, in Scotch Law, means fulfilment of a contract or decree of the court.

IMPLEMENTS, AGRICULTURAL. Under this term are generally comprehended not only the implements used in the actual cultivation of the soil, but those requisite for other operations of farming, and for the preparation of the produce of the land for use, in so far as it is ordinarily carried on by the farmer. The first implements for the cultivation of the ground were doubtless such as could be used by man's unaided strength, and many such are still in use, as the spade, the hoe, the fork, and the shovel. When animals were reduced to the service of man, the plough appeared in its first rude form. Grubbers, cultivators, &c., are recent inventions; rollers are more ancient. Sowing machines or drills are modern, but the harrow is ancient, although branches of trees drawn along the newly sown land, long served the purpose of its now carefully adjusted tines.—The necessity of irrigation in some countries early led to expedients and implements for accomplishing it. The Egyptian *shadoof* is figured in the article AGRICULTURE.—Implements for clearing the ground of weeds, for occasional stirring of the ground whilst under crop, and for *earthing up* crops, are all, except the hoe, of comparatively recent invention. The scythe and sickle have existed from remote antiquity, although the reaping-machine is a novelty only beginning to assume a very important place. Wheel-carriages of various descriptions and for various purposes must be mentioned among agricultural implements; also implements for thrashing and winnowing corn, for scutching and breaking flax, for ginning cotton, for crushing sugar-cane and evaporating its juice, &c. The preparation of the produce of different plants requires implements of different kinds. Others are required in the care of cattle, and for the Dairy (q. v.). The principal agricultural implements are noticed in separate articles, and some in connection with particular kinds of cultivated plants.

IMPLU'VIUM, a tank or cistern in the centre of the hall or Atrium (q. v.) of a Roman house. In the examples which remain at Pompeii, the impluvium is generally formed of marble. It is placed immediately under the unroofed part of the atrium, and is intended to receive the rain which runs down from the roof through the opening. The impluvium was frequently adorned with fountains, and formed a very peculiar and interesting feature in the dwellings of the Romans.

IMPO'NDERABLE SUBSTANCES, an epithet applied to light, heat, electricity, and magnetism, at a time when they were universally considered as matter, in contradistinction to those substances which possessed sensible weight. See HEAT.

IMPORTS AND EXPORTS. See BALANCE OF TRADE.

I'MPOST, the point where an arch rests on a wall or column. It is usually marked by horizontal mouldings, but sometimes these are absent, especially in Gothic architecture, where different forms of impost are used. These have been classed by Professor Willis as—1st, 'the *continuous* impost,' where the arch mouldings are carried down the pier; 2d, 'the *discontinuous* impost,' where the arch mouldings abut and are stopped on the pier; 3d, 'the *shafted* impost,' where the arch mouldings spring from a capital, and are different from those of the pier—the form used in the best Gothic; 4th, 'the *banded* impost,' where the pier and arch have the same mouldings; but the impost is marked by a band of horizontal mouldings, as is frequently the case in Italian-Gothic buildings. These simple forms of impost are sometimes used together, so as to produce more complex combinations.

I'MPOTENCY, in Law, is a good ground for either of two married parties annulling the marriage, if the impotency existed at the time the contract was entered into. The defect must be proved. The law is uniform in the United Kingdom.

IMPOU'NDING A DOCUMENT occurs where a document is produced in course of a trial or hearing before a court or judge, who, instead of giving it up to the owner, retains it, in order to enable a prosecution to be brought if necessary.

IMPOUNDING CATTLE is, in English Law, the remedy given to all occupiers of land against the cattle of strangers which stray on such land. It amounts, in fact, to taking and keeping the cattle as a security for the damage which has been done. The occupier is then said to distrain the cattle *damage feasant*. This he does by seizing and driving them to the nearest pound, if there is one within three miles—i. e., an enclosed place kept for the purpose—or he may put them in premises of his own. In either case, he is bound to feed and water the cattle at the expense of the owner of such stray cattle, who can only recover them back by paying these expenses and the damage done, or on giving security, and bringing an action of Replevin (q. v.) to try the right. The cattle cannot be distrained unless they are at the time actually trespassing upon the land. In Scotland, a similar right exists, called the *poinding* of stray cattle.

IMPRE'SSMENT was once the mode formerly resorted to of manning the British navy. The practice had not only the sanction of custom, but the force of law, for many acts of parliament, from the reign of Philip and Mary to that of George III., had been passed to regulate the system of impressment. Impressment consisted in seizing by force, for service in the royal navy, seamen, river-watermen, and at times landsmen, when state emergencies rendered them necessary. An armed party of reliable men, commanded by officers, usually proceeded to such houses in the seaport towns as were supposed to be the resort of the seafaring population, laid violent hands on all eligible men, and conveyed them forcibly to the ships of war in the harbour. As it was not in the nature of sailors to yield without a struggle, many terrible fights took place between the press-gangs and their intended victims—combats in which lives were often lost. In point of justice, there is little, if anything, to be said for impressment, which had not even the merit of an impartial selection from the whole available population.

In recent times, when volunteers fail, a system of Bounties (q. v.) has been resorted to; and it is not very probable that recourse will be again had to impressment. At the same time, the laws sanctioning it slumber, without being repealed.

Under the laws, all eligible men of seafaring habits are liable between the ages of 18 and 55; but exemptions are made in favour of apprentices who have not been two years apprenticed, fishermen at sea, a proportion of able seamen in each collier, harpooners in whalers, and a few others. A press-gang could board a merchant-vessel or a privateer of its own nation in any part of the world, and carry off as many of the best men as could be removed without actually endangering the vessel. The exercise of this power made a privateer dread a friendly man-of-war more than an enemy, and often led to as exciting a chase as when enemies were in pursuit of each other; for the privateer's men were the best sailors, for their purpose, the naval officers could lay hold on.

IMPRI'SONMENT. The power of imprisonment for non-payment of debt, as well as by way of punishment for crime, has always been held to be inherent in courts of justice. In criminal proceedings also, a person may, by a warrant of a justice of peace, be imprisoned before trial, provided the justice considers it is not a proper case for allowing bail; and as a general rule, though in minor offences an accused person may insist on being discharged on tendering sufficient bail, yet in more serious crimes it is always in the discretion of the justice to accept or refuse the bail tendered, and on his refusal, application may be made to judges of the common law courts to accept bail. As regards imprisonment for debt, it is now competent only in cases where there is fraud in contracting or contempt in not paying it. In one case, however, and one only, a person may be imprisoned before judgment has been obtained—viz., where he is about to leave the kingdom. In such a case, the creditor requires to make an affidavit of the debt or cause of action before a judge, and may obtain a *capias* to arrest the defendant, who will not be released, except on bail, until judgment is obtained. With regard to debts under £20, which are generally sued for in England in the county court, though the defendant cannot be imprisoned on a judgment for less than that amount, yet if he wilfully disobey the judgment of the court, which ordered him to pay by instalments or on a time certain, and if the debt was originally contracted by means of fraud, the judge can commit him for contempt, and thus imprison him on another ground. In cases of insolvency, it is no longer an act of bankruptcy to suffer imprisonment for debt, but absenting one's self from business, leaving England, making a fraudulent assignment, &c. is an act of bankruptcy, and he may be adjudicated a bankrupt, and his estate distributed in the usual way by the Court of Bankruptcy. But in general, if a person wishes to be made a bankrupt, he can become so without the necessity of being imprisoned. It was also a doctrine of the law of England, that if a debtor was once imprisoned for debt, it operated as complete satisfaction, and his land or goods could not then be taken. But the debtor could get out of prison through the Bankruptcy Court, which required him to give up everything to the creditors.

In Scotland, imprisonment for debt has not been abolished as yet; and it is competent to imprison a debtor if the debt exceed £8, 6s. 8d. An absconding debtor may also be arrested if *in meditatione fugæ*—i. e., about to leave the country, in which case bail or caution is required. In Scotland, imprisonment for debt is not considered satisfaction of the debt, and the creditor may at the same time poind his goods and adjudge his land, and take other concurrent remedies.

IMPROBA'TION, a Scotch law-term, meaning the disproving or setting aside a deed on the ground of falsehood or forgery.

IMPRO'MPTU, in Music, a short extemporaneous composition. See also FANTASIA.

IMPROPRIA'TION, the transfer to a layman of the revenues of a benefice to which the cure of souls is annexed, with an obligation to provide for the performance of the spiritual duties attached to the benefice. The practice of *impropriation* differs from the somewhat similar but more ancient usage of *appropriation*, inasmuch as the latter supposes the revenues of the appropriated benefice to be transferred to ecclesiastical or quasi-ecclesiastical persons or bodies, as to a certain dignitary in a convent, a college, a hospital; while impropriation implies that the temporalities of the benefice are enjoyed by a layman; the name, according to Spelman, being given in consequence of their thus being *improperly* applied, or diverted from their legitimate use. The practice of impropriation, and still more that of appropriation, as in the case of monasteries, &c., and other religious houses, prevailed extensively in England before the Reformation; and on the suppression of the monasteries, all such rights were (by 27 Henry VIII. c. 28, and 31 Henry VIII. c. 13) vested in the crown, and were by the crown freely transferred to laymen, to whose heirs have thus descended not only the right to tithes, but also in many cases the entire property of rectories. The spiritual duties of such rectories are discharged by a clergyman, who is called a vicar, and who receives a certain portion of the emoluments of the living, generally consisting of a part of the glebe-land of the parsonage, together with what are called the 'small tithes' of the parish.

IMPROVING LEASE, a lease, in Scotland, by which the tenant undertakes to keep the premises in repair; called a repairing lease in England.

IMPROVISATO'RI, an Italian term, designating poets who utter verses without previous preparation on a given theme, and who sometimes sing and accompany their voice with a musical instrument. The talent of improvisation is found in races in which the imagination is more than usually lively, as in the Arabs, and in many tribes of negroes. Amongst the ancients, Greece was the land of improvisation. In modern Europe, it has been almost entirely confined to Italy, where Petrarch, in the 12th c., introduced the practice of singing improvised verses to the lute; and down to the present day, the performances of improvisatori constitute one of the favourite entertainments of the Italians. Females (*improvisatrices*) have frequently exhibited this talent in a high degree. Improvisation is by no means limited to brief poems of a few verses and of very simple structure, but is often carried on with great art, and in the form and to the length of a tragedy or almost of an epic poem. But when the productions of the most admired improvisatori have been given to the world through the press, they have never been found to rise above mere mediocrity. It is worthy of notice that the greater number of the celebrated improvisatori of Italy have been born in Tuscany or the Venetian territories. Siena and Verona have been especially productive of them. Some of the principal are, Serafino d'Aquila (died 1500), Metastasio (q. v.), who soon abandoned the art, Zucco (died 1764), Serio and Rossi (beheaded at Naples, 1799), Gianni (pensioned by Bonaparte), and Tommaso Sgricci (died 1836). The best-known *improvisatrices* are Magdalena Moralli Fernandez (died 1800), Teresa Bandettini (born 1756), Rosa Taddei (born 1801), and Signora Mazzei, the last of whom is probably the first in point of talent.

IMPU'LSIVE MADNESS. The approaches of mental disease are generally slow and perceptible; but instances occur where, without announcement, without any preliminary stage of disease or disturbance, an individual, apparently hitherto of sound mind, is suddenly seized with mania, presents symptoms of incontrollable violence, perpetrates acts of atrocity or absurdity, altogether inconsistent with his previous disposition and deportment; and then, nearly as quickly, subsides into his ordinary state and habits, retaining no, or a very imperfect, recollection of the events which occurred during the paroxysm. It is not, however, in the suddenness or shortness of the paroxysm that the essential characteristic consists. During the continuance of such an affection, three mental conditions are distinctly traced: 1. The sudden birth and irresistible dominion of a propensity; 2. The abolition or impairment of the apprehension of the real and ordinary relations of the individual; and 3. The suspension of the powers by which such propulsions are prevented from arising, or ruled and regulated when they do arise. Alienation of this kind has been chiefly recognised when the instincts are involved; and the most striking illustrations are derived from cases of homicidal or sanguinary tendency, simply because the results may convulse society, or come under the notice of courts of law. But many examples exist of brief periods of aberration which could not be instigated by passion, and involved nothing criminal. A lady is mentioned who never entered church but she was impelled to shriek, or saw plate-glass but she was impelled to break it; and the incongruous laughter, the grotesque gesticulations, and the involuntary and repulsive associations to which good and great men have been subject, must all be placed under this category.

Marc, *De la Folie considérée dans ses Rapports avec les Questions Medico Judiciaires*, t. i. p. 219, and t. ii. p. 473.

IMPUTA'TION is one of the most common technical expressions in Christian theology. It is meant to denote the transference of guilt or of merit of punishment or reward. The doctrine of the imputation of sin, for example, is the doctrine which inculcates that all mankind are sharers in the fact and consequences of Adam's fall from innocence; and the correlative doctrine of the imputation of Christ's righteousness is that which inculcates that the merit or righteousness of Christ is transferred to those who believe in Him, or, in other words, that they become sharers in His merit or righteousness. This idea of transference of intercommunication of good and evil, is a pervading one in Christian theology, and answers to undoubted realities of the spiritual life; but the idea is also apt to become degraded and materialised, and has become so in some of its common representations in popular theology. The doctrine of the imputation of Adam's sin, for example, expresses to some minds not only the idea of the participation of the human race in the consequences of Adam's transgression, so that, because he sinned and fell from innocence, they, the inheritors of his corrupt nature, also sin, and are involved in the miseries of a sinful state; but, moreover, the idea, that the sin of Adam in its direct guilt and wickedness is transferred to his posterity. They reason after this manner: it is undeniable that man suffers on account of original sin; but suffering and sin are inseparably connected. If man suffers on account of original sin, therefore, it is only because he is guilty of it. The sin of Adam in eating the forbidden fruit is equally the sin of his posterity. According to this mode of reasoning, there is a formal imputation of the sin of Adam to all his descendants. God is supposed, as it were, to charge the one to the account of the other, and by a direct and arbitrary act, to hold mankind guilty because Adam fell. To give a logical justification to this view, it is assumed that God entered into a covenant with Adam (see COVENANT), by which the latter was regarded as a representative of the whole human race; so that when he fell, all mankind sinned and fell with him. In the same manner, the merit or righteousness of Christ is supposed to be *imputed* to believers by a direct and formal transference of the one to the account of the other. In both cases, it is the idea of formal and arbitrary exchange that is prominent; and according to some theologians, this idea alone answers to *imputation* of sin or of righteousness. To *impute* sin, is to deal with a *man as a sinner*, not on account of his own act, or at least not primarily on this account, but on account of the act of another; and to *impute* righteousness, is to deal with man as righteous, not because *he is so*, but on account of the righteousness of Christ *reckoned as his*, and received by faith alone. The act of another stands in both cases for our own act, and we are adjudged—in the one case condemned, in the other acquitted—not for what we ourselves have done, but for what another has done for us.

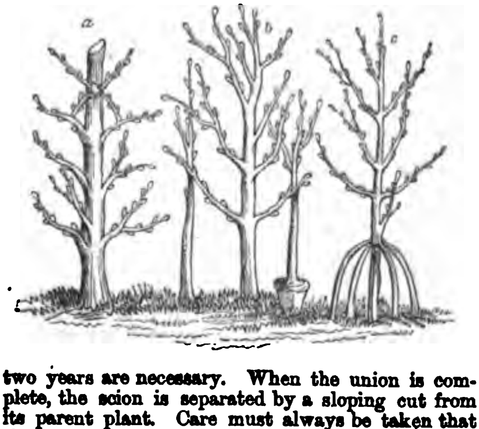
This is a fair illustration of the tyranny which technical phrases are apt to exercise in theology as in other things. When men coin an imperfect phrase to express a spiritual reality, the reality is apt to be forgotten in the phrase, and men play with the latter as a logical counter, having a force and meaning of its own. *Imputation of sin* and *imputation of righteousness* have in this way come to represent legal or pseudo-legal processes in theology, through the working out of the mere legal analogies suggested by the word. But the real spiritual reality which lies behind the phrases in both cases is simple enough. *Imputation of sin* is, and can be nothing else than the expression of the spiritual unity of Adam and his race. Adam 'being the root of all mankind,' the stock which has grown from this root must share in its degeneracy. The law of spiritual life, of historical continuity, implies this, and it requires no arbitrary or legal process, therefore, to account for the sinfulness of mankind as derived from a sinful source. We are sinners because Adam fell. The fountain having become polluted, the stream is polluted. We are involved in his guilt, and could not help being so, by the conditions of our historical existence; but, nevertheless, his sin is not our sin, and cannot in the strict sense be imputed to us, for sin is essentially voluntary in every case—an act of self-will, and not a mere quality of nature; and my sin, therefore, cannot be another's, nor another's mine. In the same manner, the highest meaning of the imputation of the righteousness of Christ lies in the spiritual unity of the believer with Christ, so that he is one with Christ, and Christ one with him, and in a true sense he becomes a partaker of the divine nature. The notion of legal transference is an after-thought—the invention of polemical logic—and the fact itself is deeper and truer than the phrase that covers it. *The race one with Adam, the believer one with Christ*, are the ideas that are really true in the phrases *imputation of sin* and *imputation of righteousness.* The logic of theology has evolved many more applications of the phrases, but these applications are rather the refinements of theological pedantry than the expression of true spiritual relations.

IN ARTI'CULO MO'RTIS, a phrase used in Scotland to denote a deed executed on death-bed. As a general rule, such a deed, in Scotland, operating like a will, may be set aside by the heir-at-law. But a will in England having the same effect cannot be set aside on that ground.

INA'GUA, GREAT and LITTLE, are the two most southerly islands of the Bahama group, the former of which, measuring fifty miles by twenty-five, is remarkable for having its longer dimension placed almost at right angles to those of the rest of the cluster. The Little I. lies about twelve miles north, and measures eight miles by six. The population of both islands together is about 1000, of whom only a small proportion are white.

INANI'TION. See STARVATION.

INA'RCHING, or GRAFTING BY APPROACH, a mode of grafting by which branches are united together before any of them is separated from its original stem. Branches growing across one another sometimes unite in this way of themselves, and it is supposed—not improbably—that an observation of this circumstance first led to the invention of grafting. Inarching is practised in cases in which the ordinary modes of grafting are not found readily to succeed, as with camellias. The stocks to be grafted upon are planted, or placed in pots, around the plant from which the grafts are to be taken. Four or five months are generally sufficient to complete the union, but sometimes even two years are necessary. When the union is complete, the scion is separated by a sloping cut from its parent plant. Care must always be taken that the parts to be joined together be cut so as to fit one another pretty exactly, and they are then firmly tied together, and so covered that neither air nor water may penetrate. It is desirable that they be branches of nearly the same thickness. They should be cut almost down to the pith, but the pith must not be injured. Inarching is performed in spring, after the sap has begun to circulate. The accompanying figure illustrates several ways of inarching. For example, two branches of a tree, *a*, may be bent so as to meet and strike upon a wound in the main stem, by which a gap will be filled up; one growing tree, *b*, either from the ground or a pot, may be led to unite with another; or several suckers, *c*, may be led from the ground archwise to strike upon a point in the stem, thus bringing fresh aid to the productive part of the tree. By means such as these, quickset-hedges are sometimes thickened like a network, so as greatly to improve their appearance and protective qualities.



IN CÆ'NA DO'MINI, a celebrated papal bull, so called from the ancient day of its annual publication, Holy Thursday. It is not, as other bulls, the work of a single pope, but with additions and modifications at various times, dates back from the middle ages; some writers tracing it to Martin V., others to Clement V., and some to Boniface VIII. Its present form, however, it received from the popes Julius II., Paul III., and finally Urban VIII. in 1627, from which year it continued for a century and a half to be published annually on Holy Thursday. The contents of this bull have been a fertile subject of controversy. It may be briefly described as a summary of ecclesiastical censures, especially of those with which grievous violation of the faith of the church, or of the rights of the church or of the Roman see, are visited; excommunication being denounced against heresy, schism, sacrilege, usurpation of the rights of the church or of the pope, forcible and unlawful seisure of church property, personal violence against ecclesiastics, unlawful interruption of the free intercourse of the faithful with Rome, &c. The bull, however, although mainly dealing with offences against the church, also denounces under similar censures other crimes, as piracy, plunder of shipwrecked goods, forgery, &c. This bull, being regarded by most of the crowned heads of Europe as an infringement of their rights, encountered in the 17th c. the determined opposition of nearly all the courts, even the most Catholic; and at length, in 1770, Clement XIV. discontinued its publication, which has never since been renewed.

INCANTA'TION, like *enchant*, is derived from a Latin root meaning simply 'to sing,' as *charm* is only a disguised form of *carmen*, a song. It is the term in use to denote one of the most powerful and awe-inspiring modes of Magic (q. v.), viz., that resting on a belief in the mysterious power of words solemnly conceived and passionately uttered.

There is in the human voice, especially in its more lofty tones, an actual power of a very wonderful kind to stir men's hearts. When to this we add that poetic utterance is a special and exceptional gift; that the language of primitive nations is crude and unmanageable, the words being as difficult to weld together as pieces of cast iron; that it is only when the poet's mind has risen to unusual heat that he can fuse them into those rhythmical sequences that please the ear and hang together in the memory; that, in short, his art is a mystery to himself—an inspiration; we need not wonder at the feeling with which everything in the form of verse or metre was viewed.

The singing or saying of such compositions, which could thus stir the blood of the hearers, they knew not how, what other effects might it not produce!

Accordingly, there is no end to the power ascribed to incantations, especially when accompanied, as they generally were, with the concocting of drugs and other magical rites. They could heal or kill. If they could not raise from the dead, they could make the dead speak, or 'call up spirits from the vasty deep,' in order to unveil the future. They could extinguish fire; darken the sun or moon; make fetters burst, a door or a mountain fly open; blunt a sword; make a limb powerless; destroy a crop, or charm it away into another's barn.

The prayers of heathens, whether for blessings or for curses, partake largely of the nature of magical incantations. They are not supposed to act as petitions addressed to a free agent, but by an inherent force which even the gods cannot resist. This notion is very prominent in Hinduism and Buddhism; but it more or less disguisedly pervades all superstitious worship. 'They think they shall be heard for their much speaking.'

For almost every occasion or operation of life, there were appropriate formulas to be repeated in order to secure success; and many of these, with that reverence for antiquity and conservative tendency which always characterise superstition, continue to live in popular memory, although often the words are so old as to be unintelligible. The Romans, in the days of Cato, used incantations, for curing dislocations, full of words the meaning of which had been lost. A form of words used to this day in Shetland for healing a sprain can be traced back to the 10th century. In its earliest form, as found in an old German manuscript, it narrates how Woden and Baldur riding out to hunt, Baldur's horse dislocated its foot, and how Woden, using charmed words, set bone to bone, &c., and so healed the foot. The repetition of this rhymed narration acted as a charm to heal other lamed horses. The modern version of this tradition, as current in Norway, makes the accident happen to the horse of *Jesus*, and Jesus himself perform the cure. In Shetland, also, it is the Lord, meaning Jesus, that is substituted for Woden; and the formula is applied to the healing of persons' limbs as well as those of horses. The operation is thus described in R. Chambers's *Popular Rhymes of Scotland:* 'When a person has received a sprain, it is customary to apply to an individual practised in casting the "wresting-thread." This is a thread spun from black wool, on which are cast nine knots, and tied round a sprained leg or arm. During the time the operator is putting the thread round the affected limb, he says, but in such a tone of voice as not to be heard by the bystanders, nor even by the person operated upon:

Our Lord rade,
His foal's foot slade;
Down he lighted,
His foal's foot righted.
Bone to bone,
Sinew to sinew,
Blood to blood,
Flesh to flesh.
Heal, in name of the Father, Son, and Holy Ghost.'

INCARNA'TION (Lat. *in*, and *caro, carnis*, flesh), a term much used in theology concerning the union of the divine nature of the Son of God with human nature in the person of Christ. We read in John, i. 14, that 'the Word was made flesh;' but this is understood not as signifying a change of nature, but an assumption of human nature into personal union with the divine nature. In accordance with Luke, i. 35, and other texts of Scripture, the formation of the human nature of Christ is ascribed to the Holy Ghost. The reality of the human nature of Christ was much disputed in the first ages of Christianity, but in our times the chief dispute as to the person of Christ relates to his divine nature. Whilst the doctrine of the incarnation is generally asserted by all who profess Christianity, except Unitarians (q. v.), no explanation of it is attempted or deemed possible. It is regarded, however, as a doctrine fraught with most important consequences, affecting the whole system of Christianity. In the doctrine of the incarnation, it is maintained that in union with the divine nature of the Son of God, there was, and is, in the person of Christ, not only a true human body, but a human 'reasonable' soul.

INCAS. See PERU.

INCE'NDIARY LETTER, a letter threatening to burn the house or premises of a person, generally called a threatening letter. To send such a letter is felony, punishable by three years' penal servitude. The offence is punishable in Scotland according to the discretion of the court.

INCENDIARY SHELLS, another name for Carcasses (q. v.).

I'NCENSE (Heb. *miktar*, *kitter*, and *kitturoth*), a perfume, the odour of which is evolved by burning, and the use of which, in public worship, prevailed in most of the ancient religions. The incense at present in use consists of some resinous base, such as gum olibanum, mingled with odoriferous gums, balsams, &c. There is no regular formula for it, almost every maker having his own peculiar recipe. The ingredients are usually olibanum, benzoin, styrax, and powdered cascarilla bark. These materials, well mingled, are so placed in the censer or thurible as to be sprinkled by falling on a hot plate, which immediately volatilises them, and diffuses their odour through the edifice.

Among the Jews, the burning of incense was exclusively employed as an act of worship, and, indeed, would appear to have been in itself regarded in the light of a sacred offering. The same would also appear for the religion of Egypt; but the Persian sculptures exhibit the burning of incense as one of the marks of honour offered to royalty.

In the Catholic Church, both of the West and of the East, incense is used in public worship, more particularly in connection with the Eucharistic service, which is regarded as a sacrifice; but writers are not agreed as to the earliest date at which its use can be traced. St Ambrose, in the Western Church, alludes to incense in terms which suppose the practice of burning it to be an established one; and in later writers, it is mentioned familiarly as a part of ordinary public worship. In the Roman Catholic Church, incense is used in the solemn (or high) mass, in the consecration of churches, in solemn consecrations of objects intended for use in public worship, and in the burial of the dead. There are also minor incensations of the celebrating bishop or priest and inferior ministers; of prelates, princes, and other dignitaries officially present at the public service, and a general incensation of the whole congregation.

In the Reformed churches, the use of incense was abandoned at the same time with other practices which have been laid aside by them as without 'warrant of Scripture.'

INCE'NSED, or **ANIMÉ**, an epithet applied in Heraldry to panthers or other wild beasts borne with flames issuing from their mouths and ears.

I'NCEST (Lat. *in*, not; *castus*, chaste) is the marrying of a person within the Levitical degrees. In the old ecclesiastical law (now obsolete), and in Scotland, it comprehends cohabitation irrespective of marriage. The law of England enforced these prohibitions by several statutes in the reign of Henry VIII., which are still in force. Recent cases have determined that a marriage between a widower and his deceased wife's sister comes within these rules, and is void, and it makes no difference that the marriage was celebrated in a foreign country, as, for example, Denmark, where these marriages are legal, provided the parties were domiciled in England, and went there merely to evade the English law. It has also been decided in England, that the same rules which apply between legitimate relations apply between natural relations, though one is illegitimate—as, for example, between a man and the daughter of an illegitimate sister of his deceased wife. Though incestuous marriages are utterly void in England, still it is not a criminal offence to marry incestuously, not even in those cases in which the connection is most abhorrent to the moral sense of mankind, and the remedy in the ecclesiastical courts may be considered obsolete. In Scotland, incest, which is calculated on the same grounds, not only makes a marriage void, but the better opinion is, that to marry incestuously, as well as to commit incest, is a capital offence. See MARRIAGE.

INCH, a Gaelic word, corresponding to Irish *innis*, and signifying Island (q. v.); the same root appears in Lat. *ins*-ula. Inch and Innis enter into many compounds, as Inchcolm (q. v.), Inniscattery, an island in the estuary of the Shannon.

I'NCHCOLM (of old, 'St Colm's Inch,' as in Shakspeare's *Macbeth*, act i. sc. 2; in Lat. *Aemonia*, and *Insula Sancti Columbæ*), an islet, beautifully placed in the Firth of Forth, within sight of Edinburgh. It is separated from the north or Fife shore by a channel less than a mile broad, called 'Mortimer's Deep.' The isle is somewhat more than half a mile in length, and less than a third of a mile broad where widest. It had a population in 1871 of 6. It takes its name from St Colm or Columba (q. v.) of Iona, who is said to have dwelt here while labouring for the conversion of the Northern Picts in the 6th century. In the year 1123, King Alexander I. of Scotland, being shipwrecked upon it, found it inhabited by a solitary hermit, who lived on shell-fish and the milk of one cow, and served St Columba in a little chapel or oratory. The king, in gratitude for his escape, founded on the island an abbey of Austin canons regular. Walter Bower, the enlarger and continuator of the *Scotichronicon* of John of Fordun (q. v.), was abbot of the monastery from 1418 till 1449. It was repeatedly sacked by the English during the 14th, 15th, and 16th centuries. The buildings, which have long been in ruins, shew traces of Romanesque work (of about the middle of the 12th c.); but are chiefly First Pointed (of the 13th and 14th centuries). The tower has some resemblance to the tower of Iona. The oldest edifice is a little vaulted oratory (20 feet long by 7 broad), believed to represent the chapel in which King Alexander found the anchorite serving St Columba in the 12th century. It is of the same type as the Irish oratory of Gallerus. It has been lately restored. There is also a chapter-house with a groined roof, and three elegant sedilia. The history of I. has been written with great detail by Professor Sir James Y. Simpson, in the *Proceedings of the Antiquaries of Scotland*, vol. ii. pp. 489—528.

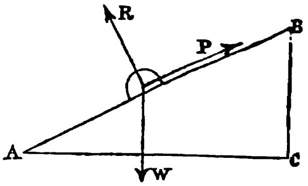
INCHKEI'TH, an island in the Firth of Forth, nearly midway between Leith and Kinghorn. It is a mile in length, and not much more than a third of a mile broad where widest. Its population in 1871 was 9. It is believed to be the site of the town or stronghold of Giudi, described by Bede (who wrote about 731 A.D.) as situated in the middle of the great arm of the sea which runs into Britain from the east (that is, the Firth of Forth). From the island fortress of Giudi, the inlet in which it stood was of old called 'the sea of Giudin,' and hence also, probably, I. took its name. The island is said to have been the site of a church or monastery, founded between 679 and 704 A.D. by St Adamnan, the biographer of St Columba, and his successor in the abbacy of Iona. I. was seized by the English in 1547, when they built a fort, which, in 1549, was taken by the French auxiliaries of Scotland, who gave the island the name of the 'Isle of Horses.' A light-house was built on the site of the fort in 1804. The island, which belongs to the Duke of Buccleuch, is part of the parish of Kinghorn, in Fife.

I'NCIDENCE, ANGLE OF. See CATOPTRICS.

INCIDENT DILIGENCE. In Scotch Law, letters of incident diligence are issued to compel the attendance of witnesses and havers at a trial. In England, a subpœna and a subpœna *duces tecum* are similar writs.

INCI'PITUR, in English Law, the formal commencement of a judgment in a common law court.

INCLINED PLANE, THE, is reckoned one of the Mechanical Powers (q. v.), because, by rolling it up a plane, a man may raise a weight which he could not lift. This principle is extensively made use of, chiefly in the raising of weights and in road-making. It is here unnecessary to go into a mathematical investigation of the theory of the inclined plane, as it may be seen in the common books on mechanics, but the result is as follows: The force required to lift a body (viz., its weight) bears to the force required to keep it from rolling down an inclined plane, the same proportion that the length of the inclined plane bears to its height; also the weight of the body bears to the weight which tends to bend or break the inclined plane, the same proportion that the length of the plane bears to its base. Let us suppose a plane, whose length, AB, is thirteen feet; base, AC, twelve feet; and height, BC, five feet; and let the weight be 780 pounds. Then the force P, which can sustain 780 pounds on the inclined plane, is $\frac{5}{13}$ths of 780, or 300 pounds (i. e., a force which could just lift 300 pounds); also the force R, which presses perpendicularly on the plane, is $\frac{12}{13}$ths of 780, or 720 pounds. When the weight has not only to be sustained on the plain but drawn up it, the resistance of Friction (q. v.) has to be added to the power necessary to sustain the weight. In common roads, engineers are agreed that the height of an incline should not exceed $\frac{1}{20}$th of the length, or, as they phrase it, the *gradient* should not be greater than one in twenty. It may here be mentioned that knives, chisels, axes, wedges and screws, are merely modifications of the inclined plane, but the last two being generally classed as distinct mechanical powers, will be treated each under its own head.



INCOMBU'STIBLE FABRICS have of late years become of great importance, owing to the terrible frequency of death from the ignition of clothing; the search, however, after some means of rendering garments incombustible has continued from a very early period (see Beckmann's *History of Inventions*). After many more or less successful attempts by Gay-Lussac and other chemists, Messrs

Versmann and Oppenheim communicated to the British Association, at Aberdeen in 1859, the results of a series of experiments for rendering linen, calico, muslin, and all other vegetable fibres uninflammable.* They found that many salts possessed this power, but at the same time some of these injured the fabric, spoiled the colour, or were so very expensive, as to render their general use impossible. Two, however, viz., tungstate of soda and sulphate of ammonia, produced the best results without injuring the tissue or colour of the fabric. The first of these acts physically by preventing contact with the air, and does not interfere with the processes of ironing and starching; it is therefore preferable for goods requiring washing. The best method of applying it is by mixing in the proportion of 4 ounces of tungstate of soda to 1 drachm of phosphate of soda (to prevent the formation of a partially insoluble bitungstate), and dissolving the whole in an imperial pint of water. For fabrics which are worn without previous washing, sulphate of ammonia is preferable, and a solution containing 7 per cent. of the crystalline salt is a perfect preservative. In printed muslins of a madder purple, however, a slight paleness of colour is produced, but in no other case is the colour affected, nor does it interfere with the ironing process. It is to be regretted that these simple and efficacious preservatives have not come into general use.—The incombustible fabrics of the ancients were formed of Asbestos (q. v.).

INCOME-TAX, a tax imposed on all persons having incomes above £100, whether from lands or labour. Various acts have passed from time to time to impose this tax—the first introduced by Pitt, and latterly revived in 1842 by Sir Robert Peel, since which date it has been continued—the fairness and public policy of which have given rise to long and endless controversy. See TAXATION.

INCOMME'NSURABLE MAGNITUDES, or **INCOMMENSURABLE QUANTITIES**, are those which have no common measure, i. e., are not, both of them, multiples of the same unit, however small that unit be taken. Examples of incommensurable magnitudes are abundant in mathematical science. Thus, the side and diagonal of a square; the diameter and circumference, or diameter and area of a circle, &c.; 2 and $\sqrt{3}$; $\sqrt{5}$ and $\sqrt{7}$, &c. The term incommensurable magnitudes is used in arithmetic to denote two numbers which have no common measure greater than unity.

INCORPORA'TIONS. See CORPORATIONS.

INCORPO'REAL HEREDI'TAMENT. See HEREDITAMENT.

INCUBA'TION, THE PERIOD OF, or the duration of the time in which birds sit on their eggs before the young are hatched, varies in different species, but is nearly constant in each. In the humming-birds, the smallest animals of this class, it is only 12 days; in canaries, it is from 15 to 18 days; in the common fowl, it is 21 days; in the duck, it is from 28 to 30 days; in the guinea-fowl, it is 28 or 29 days; in the turkey, 30 days; and in the swan, from 40 to 45 days. A certain degree of heat (about 104°) is necessary for the development of the young bird; that of the sun is sufficient, during the day, to hatch the eggs of some birds (for example, the ostrich) inhabiting tropical countries, but in general the mother keeps up a suitable temperature by placing the eggs in a warm and carefully constructed Nest (q. v.), and by covering them with her own body. In some cases, the male bird takes part in this duty; usually, however, his services are restricted to providing his mate with food.

Eggs may, however, be hatched without the aid of the parent bird. From time immemorial, the Egyptians have hatched eggs by artificial warmth in peculiar stoves called *Mammals*. In 1777, Mr Bonnemain devised an apparatus by which, for several years before the French Revolution, he supplied the Parisian markets with excellent poultry, at a period of the year when the farmers had ceased to supply it. A description of this apparatus is given in Ure's *Dictionary of Arts*, &c., 5th ed. 1860, vol. ii. p. 496.

The process of artificial incubation was publicly exhibited some years ago in London, by means of the *Eccaleobion machine* (derived from *ekkaleo*, I call forth, and *bion*, life), which was invented by Mr Bucknell, and is described in his *Treatise on Artificial Incubation*. This machine possessed a perfect control over temperature from 300° Fahrenheit to that of cold water for any length of time, and 'by means of this absolute and complete command over the temperature, the impregnated egg of any bird, not stale, placed within its influence at the proper degree of warmth, is, at the expiration of its natural time, elicited into life, without the possibility of failure.' That chickens were hatched in large numbers by this machine is undoubted, but for some reason —probably from the process not proving sufficiently economical for commercial purposes—the *Eccaleobion* has not been lately heard of.

In 1825, M. D'Arcet obtained chickens and pigeons at Vichy by artificial incubation effected by the thermal waters of that place.

INCU'MBENT, the rector, parson, or vicar holding an ecclesiastical benefice in England or Ireland. It is seldom used in Scotland except popularly in a similar sense.

INCU'MBRANCES, a general term for burdens or charges on land. See HERITABLE SECURITIES, MORTGAGE, LIEN.

INCUNA'BULA, a Latin word signifying cradle, is employed by bibliographers to designate the first fruits of the art of printing; the books which, as Peignot has it, *touchent au berceau de l'imprimerie*. The term is usually restricted to those which appeared before the year 1500, by which time the art was completely formed in all its principal departments. The number of these works is probably not far short of 20,000. Hain, it is true, in his *Repertorium Bibliographicum*, enumerates only 16,299; but as he unfortunately died before his work was completed, it is confessedly imperfect, especially in the last volume.

Incunabula, with hardly any exceptions, belong to the category of rare books, and are therefore much sought for by collectors; but besides the interest attaching to them as literary curiosities, many of them, such as the first editions (*editiones principes*) of the Greek and Roman classics, are intrinsically valuable in a critical point of view; whilst others are important, as marking the successive steps by which the art of printing advanced towards perfection. Information as to these particulars will be found in the article PRINTING.

The principal works treating specially of incunabula are—Panzer, *Annales Typographici, ab Artis Inventæ Origine ad Annum M.D.* (continued, however, to 1536), 11 vols. 4to, Norimbergæ, 1793—1803; Maittaire, *Annales Typographici, ab Artis Inventæ Origine ad Annum* 1557 (*cum Appendice ad Ann.* 1664), 3 tom. in 5 vols. 4to, Hagæ-Comit. 1719—1725; Serna Santander, *Dictionnaire Bibliographique Choisi du XVe Siècle*, 3 tom. 8vo,

---

* Silks, worsteds, and animal fibres may be ignited and charred, but they do not burst into flame, because the gases they yield are not inflammable; vegetable fibres, on the other hand, largely evolve carburetted hydrogen.

Bruxelles, 1805—1807; and Hain, *Repertorium Bibliographicum, quo Libri omnes ab Arte Inventa usque ad M.D. Typis Expressi recensentur*, 4 tom. 8vo, Stutgartiæ, 1828—1838. With all its imperfections, the last is the best work we have on the subject. Much valuable information, conveyed in a pleasing and attractive style, will also be found in Bernard, *De l'Origine et des Débuts de l'Imprimerie en Europe*, 2 tom. 8vo, Paris, 1853.

INDEBITA'TUS ASSU'MPSIT, the name often given to an action for debt in England.

INDE'CENT EXPO'SURE is a criminal offence both at common law and in England and Ireland also by statute. It is not clearly settled whether more than one person must have witnessed the indecency, in order to make it an offence. The exposure must be in some public place. By the statute 5 Geo. IV. c. 83, s. 4, the offence is punishable summarily by three months' imprisonment. To sell or expose an obscene book, print, or picture, is also punishable by fine and imprisonment and hard labour; and a warrant can be obtained under 20 and 21 Vict. c. 83, to search premises, and seize and destroy such books, &c. In Scotland, indecent practices are also indictable offences, but the law is somewhat vague, and the punishment left to the discretion of the court.

INDE'MNITY DEED, in English Law, is a deed given by way of security. The usual form of indemnifying a person is by giving a bond of indemnity, which operates if the engagement is not fulfilled, but otherwise becomes void. A similar bond is called generally a bond of relief in Scotland.

INDE'NTED, in Heraldry, one of the partition lines of the shield, similarly notched to Dancetté (q. v.), but with the notches much smaller, and not limited in number.

INDENTED HEAD, a peninsula in the colony of Victoria, bounds the entrance to Port Phillip on the west.

INDE'NTURE, the technical name given in England to a deed under seal, entered into between two or more parties with mutual covenants. Formerly, it required to be actually indented—i. e., notched or toothed (Lat. *dent*, tooth), or cut in a waving line, so as to correspond with the other copy of the deed—but this is no longer necessary. The name is not used in a general sense in Scotland, except in the case of indentures of apprenticeship (q. v.), though in England it is a synonym for the kind of deeds mentioned.

INDEPE'NDENTS, or CONGREGATIONALISTS. The distinctive principle of the Congregational church polity is, that every Christian church or congregation is entitled 'to elect its own officers, to manage all its own affairs, and to stand independent of, and irresponsible to, all authority, saving that only of the Supreme and Divine Head of the Church, the Lord Jesus Christ.' They regard the Sacred Scriptures as their only standard, and hold that human traditions, fathers and councils, canons and creeds, possess no authority over the faith and practice of Christians. Congregationalism denies that there is any authority in Scripture for uniting the churches of a nation or province into one church or corporation to be ruled by a bishop or bishops, superior to the bishops or pastors of particular congregations, or by a presbytery or synod consisting of the pastors or elders of the several congregations of the nation or province. This is the speciality which distinguishes Independency or Congregationalism from Episcopacy and Presbytery. The term 'Independent' is supposed to have originated in the incidental use of the word in an 'apology' addressed in Latin and English to the British and Continental universities, about the year 1604. But the early maintainers of this form of church government were careful to repudiate certain inferences which might be drawn from the use of the word. 'We do profess dependence,' said one of them, 'upon magistrates for civil government and protection; dependence upon Christ and his word for the sovereign government and rule of our administrations; dependence upon the counsel of other churches and synods, when our own variance or ignorance may stand in need of such help from them.' The independence claimed was only the right of every individual church to administer its own affairs, free from the control or authoritative jurisdiction of other churches—a right compatible, it was asserted, and is still asserted, with union for the promotion of common ends, and with fraternal aid and counsel in cases of variance or other difficulty.

Doctrinally, the early Independents occupied the same position as the other sections of the Puritan family. They held in substance the evangelical doctrines of the Reformers, of the Westminster Assembly, and of the Thirty-nine Articles. While declining subscription, and frankly tolerant of very considerable diversities of opinion, modern Congregationalists profess to be of one mind in regard to the cardinal truths of Christianity.

For the history of this body we must refer to the works named at the end of this article. But it may be mentioned that as early as the days of Queen Elizabeth, they were numerous and influential. In a speech made by Sir Walter Raleigh in the House of Commons in 1592, on the subject of a law to transport the Brownists—as they were offensively and untruly named—he thus refers to their numbers: 'If two or three thousand Brownists meet at the sea-side, at whose charge shall they be transported? or whither will you send them? I am sorry for it, but I am afraid there is near twenty thousand of them in England; and when they are gone, who shall maintain their wives and children?' Several eminent men of this body suffered death for their opinions; others were condemned to banishment. The greater part retired to Holland. Numbers sought an asylum in New England; and America still cherishes the memory of the Pilgrim Fathers, as the founders of those institutions which are the sources of her freedom, her intellectual and moral power, and her national elevation.

By the passing of the Act of Uniformity in 1662, the Independents, along with other Nonconformists, were subjected to much suffering. The act required an express assent and consent to everything contained in the revised Prayer Book, and its effect was to cause 1900 or 2000 of the clergy to leave the church. Still the Independents increased; and the Revolution of 1688, and passing of the Toleration Act in 1689, at length brought them relief. Efforts were made about this time to bring about an accommodation between them and the English Presbyterians; and in 1691, heads of agreement were drawn up, but with little practical result. In 1730, Presbyterians, Baptists, and Independents formed themselves into a united body, under the name of the Three Denominations, for the protection of their civil and religious liberties. The Independents are the largest dissenting body in England except the Wesleyan Methodists. By the census of 1851, the number of their churches in England and Wales, is given at 3244, with accommodation for 1,067,760 persons, and an estimated attendance of 793,142 (see article GREAT BRITAIN). There has been no general religious census since 1851, but it is well known that the Independent body has very largely increased. The largest confederation of its churches is 'the Congregational Union of England and Wales,' which is careful to lay down in its basis the principle that 'it shall not, in any case, assume legislative authority, or become a court of appeal.'

An Independent church is, from its very constitution, at liberty to choose any man for its minister whom it considers qualified for the office—subject only to the check arising from the fact that neighbouring ministers will refuse to ordain or recognise a man whom they have reason to regard as disqualified. But from the beginning the Independents have attached great importance to an educated ministry. Their leaders in the Puritan age, such as Owen, Howe, and Greenhill, were men of great learning, and, as soon as the Act of Toleration in 1689 allowed, measures were taken for securing a succession of educated men. They have now twelve theological colleges in England and Wales. These are:

	Date of Formation.	No. of Students.
Western College, Plymouth,	1752	21
Rotherham College,	1756	18
Brecon College,	1760	32
Airedale College, Bradford,	1784	14
Hackney College,	1796	20
Lancashire College,	1806	40
Spring Hill, Birmingham,	1838	20
New College, London,	1850	44
Bala College,	1842	25
Bristol Institute,	1863	14
Nottingham Institute,	1863	50
Cotton End (for Home Missionaries),	1840	2

In this list 'New College' is a union of three older colleges, Homerton, Highbury, and Coward. The college at Cheshunt, belonging to Lady Huntingdon's trustees, was founded for the preparation of young men for the Christian ministry, in any section of the church to which they might be called. But it is virtually an Independent college—all its present professors and almost all its 38 students being Independents. The 'Carmarthen Presbyterian College,' though governed by Dr Williams's trustees who are Unitarians, has an Independent for its theological professor, and 23 Independent students. The Congregationalists of Scotland have a theological hall in Edinburgh. There are two colleges in Australia and one in Canada.

In Scotland, Independency may be traced back to the days of the Commonwealth, during which it was imported by the chaplains and soldiers of Cromwell. But the present Independent churches in Scotland owe their origin mainly to a missionary movement in the end of the last century, chief among the leaders of which were the brothers Robert and James Haldane, Graville Ewing, John Campbell, and John Aikman. The Haldanes became Baptists in course of time—a circumstance which greatly divided and weakened the new community. The formation of an academy for the training of ministers in 1811, and of the Congregational Union about the same time, did much to restore the lost vigour of the body. There are about 100 churches at present in this 'Union.' It should be added that the Baptist churches, both in England and Scotland, are as strictly 'Independent' as those which bear that name.

In America, the first Independent church was founded by John Robinson at Plymouth, New England, in 1620. In 1637, the spread of Antinomian doctrine caused much discussion in the church. By a synod convened in New England, Antinomianism was unanimously condemned. In 1638, Harvard College was founded. In 1658, the Savoy Confession was adopted. It still remains in force. About 1750, Unitarian principles spread widely in the Congregational churches of America. In 1785, a separation took place between the Unitarians and the Trinitarians, but both still retain the Congregational form of church government. Harvard College is Unitarian. 'Congregationalism,' according to Dr Schaff, 'is the ruling sect of the six north-eastern states, and has exerted, and still exerts, a beneficial influence upon the religious, social, and political life of the whole nation.' In 1869, the number of Congregational churches in the United States was reported to be 3043, and of ministers 3168, with 300,362 church members, and 361,502 children in Sabbath schools. Exclusive of Harvard and other colleges, in the administration of which they have a share, the American Independents possess theological seminaries at Andover, Bangor, New Haven, East Windsor, Oberlin, Iowa, Chicago, and other places. The following are good works to consult: Dr Vaughan's *History of English Nonconformity*; J. Fletcher's *History of Independency*; Waddington's *Early History*; Hanbury's *Memorials*; Neal's *History of the Puritans*; Dr Stoughton's *Ecclesiastical History of England*; and Mosheim's *General Church History*.

INDETE'RMINATE PROBLEMS. It was shewn in the article EQUATIONS that the values of the unknown quantities could only be determined when the number of equations was equal to the number of unknown quantities, but that, if the latter exceeded the former, *several* values might be found for each unknown, in which case the problems which give rise to the equations are called *indeterminate problems*. For example, 'To find the number which, when divided by 2 and 3, leaves remainders 1 and 2,' is an indeterminate problem, admitting of an infinite number of solutions; for though only one unknown quantity appears in the question, yet, in order to form an equation, we are obliged to proceed in the following manner: as x is divisible by 2, with a remainder 1, $x = 2p + 1$; again, as x is divisible by 3, with a remainder 2, $x = 3q + 2$; hence we have the equation $2p + 1 = 3q + 2$ (one equation to find two unknown quantities), from which, by a process which is explained in the ordinary books on algebra, we find $x = 6r - 1$, where r is any positive number whatever. The values of x are, therefore, 5, 11, 17, 23, &c. In general, if the equation is of the form $ax + by = c$, the number of pairs of values (of x and y) is finite; but if of the form $ax - by = c$, the number is infinite. The Diophantine (q. v.) analysis exhibits a very interesting class of indeterminate problems of the second degree.

I'NDEX (more fully INDEX LIBRORUM PROHIBITORUM), a catalogue published by Papal authority in the Roman Catholic Church of books the reading of which is prohibited to members of that church, whether on doctrinal, moral, or religious grounds. As a natural consequence of the claim of the Catholic Church to authority in matters of religion, and to infallibility, that church also claims the right or the duty of watching over the faith of its members, and of guarding it against every danger of corruption, the chief among which is held to be the circulation of books believed to be injurious to faith or to morality. The earliest recorded exercise of this restrictive authority is the prohibition of the writings of Arius; and a council of Carthage, in the year 398, issued, even for bishops, a similar prohibition of Gentile books, although it permitted to them the reading of the works of heretics. The earliest example of a prohibitory catalogue is found in the decree of a council held at Rome (494) under Pope Gelatius (*Labbe Conc.*, ii. col. 938—941), which, having enumerated the canonical books of Scripture and other approved works, recites also the apocryphal books, together with a long list of heretical authors, whose writings it prohibits, and orders to be eliminated from the churches. The medieval popes and councils pursued the same course as to the heterodox or dangerous writings of their respective periods, and the multiplication of such books after the invention of printing led to a more stringent as well as more systematic procedure. The university press of Louvain issued in 1546, and again in 1550, a catalogue of prohibited books. Similar lists appeared by authority at Venice, Paris, and Cologne; and Pius IV. issued in 1557 and 1559 what may be regarded as properly the first Roman Index. One of the gravest undertakings of the council of Trent was a more complete and authoritative enumeration of all those books the use of which it was expedient to prohibit to the faithful. A committee was appointed for the purpose, and had made great progress in the work; but it was found impossible to bring the examination of the books to an end before the close of the council; and the entire of the papers of the committee were handed over by the council to the pope, with instructions that the work should be completed, and the result published by his own authority, which was accordingly done by Pius IV. in 1564. Further additions and certain modifications of its rules were made by Sixtus V. and Clement VII. It was republished in 1595, and with the addition of such books as from time to time it was deemed expedient to prohibit, in several subsequent editions, the most remarkable of which are those of Brasichelli (Rome, 1607); Quiroga, *Index Librorum Expurgandorum* (Salamanca, 1601); and Sotomayor, *Novissimus Index* (Madrid, 1648). The edition best known to modern theological readers is that of Rome, 1819. In the intervals between the editions, the decrees by which further additions to the Index are made, are made public at Rome, and circulated in the various countries.

The prohibitions of the Roman Index are of two classes, either absolute and total, or partial and provisional, 'until the book shall have been corrected.' The edition of Quiroga, mentioned above, regards the latter. The ground of the prohibition may be either the authorship of the work, or its subject, or both together. Under the first head are prohibited all the writings of *heresiarchs*—i. e., the first founders of heresies—no matter what may be the subject. Under the second head are prohibited all books confessedly immoral, and all books on magic, necromancy, &c. Under the third are prohibited all books of heretical authorship treating on doctrinal subjects; all versions of the Bible by heretical authors; and all books, no matter by whom written, which contain statements, doctrines, or insinuations prejudicial to the Catholic religion. The preparation of the Index, in the first instance, was committed to the care of the Congregation of the Inquisition in Rome; but a special Congregation of the Index was established by Pius V., and more fully organised by Sixtus V. This congregation consists of a prefect (who is always a cardinal), of cardinals, of consulters, and of examiners of books (*qualificatores*). Its proceedings are governed by rules which have been authoritatively laid down by several popes, especially by Benedict XIV., in a constitution issued July 10, 1753, to which the reader is referred for the best and most authentic exposition of a subject on which much misconception exists on the part of Catholics as well as of Protestants.

The growth of modern literature has, of course, entirely outstripped the limited and tardy machinery of this tribunal. A very small proportion even of the most anti-Catholic publications outside of Italy find their way by name to the Roman Index; but besides the positive prohibitions of the Index itself, there are certain general rules regarding the use of books by which the freedom of what is considered perilous or pernicious reading is much limited among members of the Roman Catholic Church. These, however, would be entirely beyond the scope of our publication; nor could the rules of the Index even be practically brought into operation in those countries where the Catholic and Protestant literatures are so interwoven, that it is impossible to separate them even in the ordinary intercourse of life. See Wetzer's *Kirchen-Lexicon*, art. 'Index.'

Few parts of the Roman Catholic system are more repugnant to intelligent Protestants than the institution of the 'Index,' as it strikes at the root of the fundamental principle of Protestantism itself—namely, that of private judgment. And this theoretical repugnance is increased by seeing that, in its practical working, such names as Gibbon, Robertson, Guicciardini, Sismondi, Hallam, Goldsmith (*History of England*), Descartes, Locke, Kant (*Essay on Pure Reason*), J. S. Mill (*Political Economy*), Whately (*Logic*), Bacon, Milton, Addison, Dante (*De Monarchia*), &c., are put under the ban.

I'NDIA,* an extensive region of Southern Asia, celebrated during many ages for its riches and valuable natural productions, its beautiful manufactures and costly merchandise, the magnificence of its sovereigns, and the early civilisation of its people. It possesses especial interest to the Englishman, from the intimate connection of its history with that of his own country.

Hither I. is the central peninsula of Southern Asia, and lies in 8° 4'—35° N. lat., and 67°—92° E. long. According to these limits, its length may be stated approximately at 1900 miles, and its breadth, reckoned along the parallel of 25° N. lat., at 1600 miles, with an area of about 1,300,000 square miles. The natural boundaries of this vast region are, on the N., the range of the Himalaya Mountains, which separates it from Tartary, China, and Tibet; on the W., the Suliman Mountains divide it from Afghanistan and Beloochistan; on the S., the Arabian Sea and the Gulf of Bengal; and on the E., the hill-ranges which separate Chittagong and Assam from Burmah. From the mouths of the Brahmaputra and the Indus, the east and west coasts, inclining towards the same point, meet at Cape Comorin, and thus give to Southern I. the form of an irregular triangle. The two sides of the triangle have each a coast-line of about 2000 miles. I. is, in fact, from its great extent of seaboard, essentially a maritime country.

Further I. is the name given to the south-eastern peninsula of Asia. It is not treated of in this article, and for information concerning it reference is made to the articles on Siam, Burmah, Cochin-China, &c.

Physical Features.—Hither I. presents a most diversified surface and varied scenery; it has indeed been called 'an epitome of the whole earth,' consisting as it does of mountains far above the level of perpetual snow; broad and fertile plains, bathed in intensest sunshine, arid wastes, and impenetrable forests. Its great natural divisions are the sub-Himalayan countries, the plain of the Ganges, the plain of the Indus, the Highlands of Northern Hindustan, and the peninsular portion of the country to the south of the Vindhya Mountains.

---

* The name is borrowed by the Greeks from the Persians, who, however, applied the name of Hindus at first only to the dwellers on the banks of the river *Sindhu* (Sans. for Indus). From this, by the regular change of *s* into *h*, the Persian *Hind* is derived. Hindustán (the country of the Hindus) is a modern word applied by the Persians to the whole of India; but Europeans understand it as applying properly to that portion of it which lies north of the Vindhya Mountains.

The Sub-Himalayan Countries form an elevated tract lying between the chief ridge of the Himalayas and the lower elevations which adjoin the plains of the Ganges and Indus. They consist of Cashmere, Gurhwal, Kumaon, Nepaul, Sikkim, and Bhotan, all hill-countries, which, owing to their elevation above the sea, have a cool climate and the vegetation of the temperate zones. These regions are separated from the plain of the Ganges by the Terai, or Great Indian swamp, which extends in a long belt, 5 to 25 miles in width, from Hurdwar to the Brahmaputra. It is covered with great forest trees, and is the haunt of innumerable wild beasts. The soil is very fertile, but malaria renders it uninhabitable by man and the domestic animals, at least from April to October. It is then said to be abandoned even by the wild beasts. This wilderness forms a great physical barrier between the hill-countries and the plains, and separates populations distinct from each other in race and language.

The Plain of the Ganges, which includes Bengal, Bahar, the Doab, Oude, and Rohilcund, is a vast alluvial flat, extending from the Bay of Bengal to the Punjab. Throughout its entire length, the Ganges and its numerous tributaries spread out like the veins of a leaf, carrying everywhere their fertilising influence. The population of these fertile and well-cultivated plains is very dense. Scattered over the agricultural districts, and massed in the great cities and towns, there are not less than 100,000,000 people.

The Plains of the Indus, in the north-west, are less extensive than those of the Ganges, and are separated from the latter by the Aravulli Hills. The Punjab occupies the northern portion. South of the Punjab, and parallel with the river, the great sandy desert of the Indus extends for nearly 500 miles. The valley of the Indus is continued through Sinde to the ocean. The plains of the Indus may be considered to include Cutch and Gugerat, which like them slope towards the Arabian Sea. Between the Indus and the Aravulli Mountains lies the Thur or Indian desert, an expanse covered with sand-hills, 400 miles long and 100 broad. It is only in the neighbourhood of the Indus and the Luni that the surface can be cultivated—although crops of grain may be grown in a few narrow valleys after the rains. The horse and camel alone can cross this desert, which is described in Hindu geography as 'the region of death.' Like the Terai, it forms a great physical barrier separating Western and Eastern India.

The Highlands of Northern Hindustan extend from the Vindhya Mountains as a base, to the border of the Thur. They include the table-land of Malwa and Rajpootana or Rajasthan, which has an elevation of about 2000 feet above the level of the sea.

The Peninsular Portion of I., south of the Vindhya Mountains, which remains to be considered, is called by the natives the Deccan (q. v.). The most remarkable geographical feature of this area is a central table-land—a vast plateau—extending from 12° to 21° N. lat., rising from 2000 to 3000 feet above the sea, and enclosed on all sides by lofty mountains, between which and the sea, on the east and west, are narrow strips of low flat country, divided into several districts. From the low country on the coast to the central table-land, the mountains rise abruptly, in a succession of gigantic terraces or steps, and hence the name of 'Ghauts' (q. v.). The rivers of the Deccan rise in the Western Ghauts, and after traversing the table-land, descend to the sea over the Eastern Ghauts. The slope of the country corresponds with the course of the rivers; it has a gradual inclination towards the east. Ceylon, the Lacadive, and Maladive Islands may also be considered to belong to this part of India.

The *Himalaya* (q. v.) and the *Suliman* Mountains (see Afghanistan) far exceed in altitude the chains which lie within the boundaries of India. The *Vindhya* Mountains, which cross I. between 22° and 25° of N. lat., and separate Hindustan Proper from the southern or peninsular portion of the country, nowhere exceed 6000 feet in height. The Satpura range, between the Nerbudda and Tapti valleys, is a spur of the Vindhya. The *Western Ghauts* run parallel with the Indian Ocean at a distance of 20 to 40 miles. At Mahabaleshwar, the sanitarium of Bombay, they rise to 4500 feet, but they are lofty near Coorg, where one summit has an elevation of 7000 feet. On the opposite coast, forming the south-eastern buttress of the table-land of the Deccan, are the *Eastern Ghauts* (see Ghauts). The physical geography of Southern I. presents the singular phenomenon of isolated masses upheaved amidst the vast plains that occupy the greater portion of the peninsula. Of these, the most remarkable are the Neilgherries (q. v.) or Blue Mountains, which cover an area of 600 square miles. Ootacamund (q. v.), the great sanitarium of Southern India, situated in the midst of them, has an elevation of 7400 feet. Of the minor mountain-ranges of I., the principal are the Sewalik range, near Hurdwar, rising 3000 feet; the Kala or Salt range, adjacent to the Suliman range, rising 2500 feet; the Aravulli, between the basins of the Ganges and the Indus, culminating in Mount Abu at an altitude of 5000 feet; the Kattywar Hills, rising from 1000 to 3000 feet in the centre of the Kattywar peninsula; the hills of Bundelcund, 2000 feet; and the Rajmahal Hills, rising from 5000 to 7000 feet.

The *river-system* of I. is on a grand scale. The Indus (q. v.) traverses the north-west, and drains about 400,000 square miles of country. The Ganges (q. v.), on the north-east, together with its tributaries, drains an area of about 500,000 square miles. The Brahmaputra (q. v.) has a course of upwards of 600 miles from the point where it leaves the Himalaya to that where it enters the Bay of Bengal. The eastern side of I.—the region southward of the Nerbudda, and eastward of the Malabar Ghauts—is watered by eighteen rivers, the principal being the Godavery, 830 miles long; Kistna, 800; Cauvery (Kaveri), 470; Mahanadi, 520; Brahmini, 400; North Pennar, 350; and the South Pennar, 240. About twenty rivers water the western side of India. The most noteworthy are the Nerbudda, 800 miles long; the Tapti, 400—both of which flow into the Gulf of Cambay; the Myhi, 350 miles; Luni, 320 miles; Bunnas, 180 miles; and the Bhadro, 130 miles.

Geology.—From observations that have been made at different points in I., the general features of its geological structure are known. Professor Oldham and a staff of geologists commenced twenty-three years ago a geological survey of I., which has since then been uninterruptedly proceeded with. They have already examined an area four times as large as that of Great Britain, and their inquiries have supplied, for the districts they have dealt with, an accurate knowledge of the mineral resources of India.

I. is bounded on the north-east by the range of the Himalaya, the great water-shed of Central Asia. These mountains consist of granitic rocks which have penetrated the stratified rocks, thrown them up in endless confusion, and metamorphosed them in many places into gneiss, mica-schist, clay-slate, or crystalline limestone. Layers of sandstone and conglomerate extend along the base of the mountains. They are of Miocene age, containing the remains of species of camel, giraffe, hippopotamus, sivatherium, elephant, crocodile, and tortoise. These are extensively developed in the Sewalik Hills. An immense tract of Post-tertiary alluvial deposits covers the whole of the river-basins of the Ganges and the Indus, stretching across the north of I. from sea to sea. The Eastern and Western Ghauts consist of metamorphic rocks, which are continued across the country to the north of the Godavery. Between this transverse band of altered strata and the diluvial deposits of the north, a large tract of country is occupied with Palæozoic rocks, frequently broken through and covered with different kinds of trap, and in some places overlaid with Secondary and fresh-water Tertiary strata. One of the most important labours of Professor Oldham and his geological staff has been the exploration of the great Indian coal-fields. They lie in a region bounded by the Ganges on the north, and extending beyond the Godavery on the south. The coals come from one geological formation called 'Damuda,' from the river Damodar, in the valley of which the chief beds occur. It differs little geologically from the carboniferous beds of England. Iron, copper, and lead are worked in different parts of India. Salt is obtained from the Salt range above referred to, and produced abundantly by evaporation in the salt lakes of the Thur.

Vegetable Productions.—The vegetation of I. is as varied as its soil and climate, and passes from the flora of a tropical to that of an alpine region. The groves of palm that border the coast, and, in the interior, the umbrageous mango topes, are striking features of Indian scenery. Rice is the chief article of food in I., and is produced in all the parts of the country in which irrigation is practised. Maize and wheat are the grains cultivated in the North-western Provinces. Opium is one of the most valuable products of India. In 1871—1872 the value of the chests exported from Bombay and Calcutta to China was £6,850,000. Coffee is largely produced in Ceylon, and the cultivation of the plant is rapidly spreading in Southern India. Tea cultivation is now carried on with success in Assam, and is spreading over all the hill-countries of North-western India. Cinchona, introduced from South America in 1860, has been naturalised with great success. The cost of doing so was £61,719. 'The return,' Mr Markham says, 'represents a value which is simply incalculable and without price;' a cheap supply of quinine being one of the most certain means of averting the fevers that prevail in the hot and moist parts of India. As a commercial speculation, the measure ultimately will prove highly remunerative. The growth of cotton has been much extended since the American war. The finest is produced in Berar. The rhea, or jute plant, is grown in Assam and Bengal, and has recently given rise to an important trade. India-rubber is another important product of Assam, the demand for which is increasing. Within the last fifteen years, great attention has been paid to the importance of preserving the Indian forests. The destruction of the woods was found to give rise to destructive floods, and to render the water-supply uncertain and capricious during the dry season. The Indian cultivators have been rapidly improving in prosperity, and with that improvement there has been an increasing demand for timber for house construction and furniture—a demand further augmented by the requirements of the railways. In order to protect existing forests, and extend the area of the timber-producing districts, the Indian Forest Conservancy Department was organised, the main objects of which were the definition and demarcation of reserved forests, and the prevention of jungle fires—that is to say, of the native practice of burning forests for cultivation, and the cutting and clearing away of creepers round the young trees. The system of preparing candidates for forest service was commenced in 1867, when the first examination was held by the civil service examiners. Since that time, a large number of officers who have studied forestry in England, Germany, and France have been sent to I., and great satisfaction has been expressed with the work they have done.

Animals.—The domesticated animals are horses, asses, mules, oxen, buffaloes, sheep, and elephants. Of wild beasts, the most formidable is the Bengal tiger. The other beasts of prey are leopards, wolves, jackals, panthers, bears, hyænas, lynxes, and foxes. Of poisonous snakes, the cobra da capello, or black-hooded snake, the cobra manilla, and sand-snake are the most common. The number of people killed by wild beasts is a feature of Indian life. In 1869, a tigress killed 127 people, and stopped a public road for many weeks. In 1871, 14,529 were known to have lost their lives in that year by snake-bites. In 1871 the total number of deaths known to have been caused by dangerous animals of all classes was 18,078. It is believed that if systematic returns were kept, the number in British I. would be found to exceed 20,000.

Climate.—In a country extending over 26° of latitude—one extremity of which runs far into the torrid zone, and the other terminates in a range of lofty mountains rising far above the line of perpetual snow—a country embracing within its ample circumference lowland plains, elevated plateaux, and alpine regions, the climate must differ greatly. Hindustan Proper may be said to have three well-marked seasons—the cool, the hot, and the rainy. The cool months are November, December, January, and a part of February; the dry hot weather precedes, and the moist hot weather follows the periodical rains. The climate of Southern I. is greatly regulated by the Monsoons (q. v.). The central table-land is cool, dry, and healthy. At Ootacamund, on the Neilgherries, 7300 feet above the level of the sea, the mean annual temperature is 57° F.; at Madras, 83°; Bombay, 84°; Calcutta, 79°; Bangalore, 74°; and at Delhi, 72°. The fall of rain varies greatly in different parts of India. A map of the Indian rainfall given by Mr Markham in his Report, published in 1873, shews that in the whole of North-eastern I., from the valley of the Sutlej to the mouths of the Irrawaddy, including the sub-Himalayan countries, Assam, and British Burmah, and between the Western Ghauts and the Coromandel coast, exceeds 75 inches. In the interior of the Deccan it is less than 30, and in Multan and Sinde less than 15 inches. The remainder of I. is placed between the extremes represented by these damp and dry belts, but is, as compared with Europe, an arid country. Hence the necessity of tanks and irrigation canals to supply moisture to the soil, and to obviate the danger of dry seasons.

Inhabitants.—Three races widely distinguished from each other inhabit India. In the north-east are Mongols, resembling the Tibetans, and Burmese; in the south, Dravidians, the relation of whom to other great branches of the human family is still a subject of dispute; and in the north-west, Aryans

It is supposed that at a remote epoch a branch of the Aryan race (q. v.) entered the peninsula from the north-west, established themselves first in the Punjab, and thence gradually diffused themselves as a dominant race over the whole of Northern and Central I., imbuing the subject population more or less completely with their religious system and their language, and thus forming the Hindus. Tribes still inhabiting the mountainous districts and jungles are supposed to be outstanding islands of the aboriginal population that resisted the tide of Hindu conquest and civilisation. The Hinduising influence extended feebly, if at all, into the Deccan, the great majority of whose inhabitants, therefore, are supposed not to belong ethnologically to the Aryan race.

Professor Friedrich Müller, the latest writer on the general ethnology of I., distributes the Indian races according to their languages as follows:

A. *Mongols*—(1) Tibetans, subdivided into Tibetans Proper, in upper terraces of the Himalaya; and, south of them, the sub-Himalayan tribes, speaking Lepcha, Kiranti, Limbu, Murmi, &c. (2) The Birman or Lohitic races, speaking Burmese of Aracan, Kooch, Dhimal, Bodo, Garo, Miri, Singpho, Naga, Kuki, &c. (3) The Thai, or Siamese races, speaking Ahom (Assam), Khamti, &c.

B. *Dravidians*, subdivided into—(1) The Munda branch—Kol (in Chota Nagpore), Sontal, Ramusi, Warali, Bheel, &c. (2) The Dravida branch proper—Tamul, Telinga, Canarese, Malayala, Tulava, Toda, Gond, Khond, Rajamahal, Kol, Brahui (in Beloochistan). (3) The Singhalese branch in Ceylon, including the Veddahs. The Tamul, Telinga, Canarese, Malayala, Tulava, and Singhalese are spoken by cultivated races; the other languages by rude hill-tribes.

C. *Aryans*, subdivided into—(1) The races of Dardistan and the north-western frontier, including the Siah-posh Kaffirs, and other rude tribes. (2) The Hindus, including the cultivated races speaking the following languages: Cashmiri, spoken in Cashmere; Punjabi, in the Punjab; Hindi, in various dialects sometimes described as languages, spoken in the western plain of the Ganges and Malwa; Sindhi, in Sinde; Cutchi, in Cutch; Gugerati, in Gugerat; Mahrati, in the North-west Deccan, south of the Vindhya Mountains; and Bengali, spoken in the plain of the Ganges, east of the bend of the river at Rajmahal; and the Orya, Assami, and Nepauli, all resembling the Bengali, and spoken in Orissa, Assam, and Nepaul by the Hindu section of the inhabitants. For an account of the connection of these languages with the old Prakrit dialects of India, see SANSCRIT and PALI.

The word Hindu is used in various senses, and it is important to guard against the confusion that may thence arise. It is applied (1) to the people speaking the Hindi dialect of the North-western Provinces; (2) to the Aryans of Northern India; (3) To the cultivated races of India, both Aryan and Dravidian, who profess the Hindu religion, and have been influenced by the Indian civilisation common to both. The cultivated peoples of India professing the Hindu religion, or Hindus in the third sense, not only differ in language in different provinces of I., but in customs and dress. The Mohammedan population, on the other hand, in all parts of India, wear the same dress, affect the same customs, and speak one language—Hindustani or Urdu, a dialect which sprang up at the Mohammedan court of Delhi, and which is a highly cultivated form of Hindi intermixed with a large number of Persian and Arabic words. It is the language generally used by the British government in official business. In several provinces, however, attempts have been recently made to substitute for it the local languages, such as Sindhi and Assami, many of which have received little literary cultivation.

The returns published with reference to books published in I. in 1872 unfortunately do not refer to all the provinces, but they give some idea of the relative importance of the native languages. In the North-west Provinces, out of 317 books published, 90 were in Hindustani or Urdu, 53 in Hindi, 56 in Persian, 47 in Arabic, and 33 in English. In the Madras Presidency, out of 508 published, 177 were in Tamil, 115 in Telugu, 26 in Malayalim, 22 in Canarese, and 70 in English. In Bombay Presidency, out of 779 books, 214 were in Mahrati, 243 in Gugerati, and 157 in English. In Bengal, 759 native books were published, but in what languages is not stated.

In I. there are rude tribes belonging to the Mongol, Dravidian, and Aryan races. The Siah-posh Kaffirs and kindred tribes of Dardistan are undoubted Aryans, who know nothing of Hindu culture. The Mongols north and east of the Terai, in the same way, have none of the culture of Bhotan, Tibet, and China. They have caused much trouble on the Assam frontier, where several districts are excluded from the operation of regular laws, and the deputy-commissioner of Assam now holds an annual meeting of the hill-tribes. From 1854 to 1865, the Angami Nagas made 19 raids into the plains, and killed 236 people; but in the latter year a military post was occupied in their country, and the raids have ceased. The hill-tribes of the Dravidan race are also in the lowest stage of savagery. Among the most important and best known of them are the Bheels, who are found in Candeish; and the Khonds and Koles, who inhabit Orissa. The former were wont to live by plunder, and used to burst out of their jungles like tigers, committing the most frightful excesses; but in 1825, after various methods of subduing them had been unsuccessfully tried by the British government, it was resolved to tempt them into military service. A Bheel corps was raised, into which all the wilder spirits were drafted, and the result has been a very decided improvement in the habits and disposition of the rest of the people. Roads have now been made through their country, and property is quite safe. The Khonds and Koles, however, are perhaps a more interesting race, since they have preserved more completely what may be regarded as the primitive religion of Hindustan. Forced into the jungles and mountains of Central I. by the victorious advance of the Aryan race from the north-west, they have preserved (in part at least), in their almost inaccessible retreats, the grim religion that prevailed in the peninsula before Brahmanism was heard of. That religion may be briefly characterised as Devil-worship. The Khonds sacrifice only to malignant deities, such as Siva the Destroyer, the goddess Kali, and the God of the Earth, whom they seek to propitiate by human sacrifice, principally of children, who, however, are not taken from their own race, but kidnapped from neighbouring tribes. Successful efforts have been made by the British government to suppress these practices.

To the present civilised inhabitants of I., who, although generally a mixed race of Dravidian and Aryan origin, now form many distinct nations, no general statement can apply. The acute but timid Bengali resembles little the warlike Sikh of the Punjab, or the fierce Afghan of Rohilcund; and the patient weaver of Dacca is wholly unlike the high-spirited Rajpût of Central India. The Sikh is a born soldier, who despises the Hindu, and hates the Mussulman. He cares nothing for caste, and is brave, faithful, and independent. The Mohammedans of I. are degenerate followers of the Prophet, and their religion is a strange mixture of the doctrines of the Koran with the idolatry of Asia. The Parsees, a mercantile and educated class, seated at Bombay and along the west coast of I., are the descendants of the fugitive fire-worshippers of Persia (see PARSEES). Of the morality of the civilised races of I. in general, Mr Markham says that, whatever may be said of the larger towns, the residents of villages are 'singularly temperate as a rule, chaste, honest, peaceful, singularly docile, easily governed, and patient.'

Two of the most striking peculiarities of the social condition of the Hindus are the institution of Caste (q. v.) and the *Village-system*. The latter is very simple. A village in Hindustan does not mean a collection of houses at a particular spot, but corresponds rather to what is called a township in America. It is a district embracing an area of some hundreds or thousands of acres of land, and is under the administration of native functionaries, the principal of whom is the *potail* (head-inhabitant), a kind of chief magistrate, who superintends the affairs of the community, settles disputes, attends to the police and the collection of taxes. Among the other functionaries may be mentioned the *curnum*, who keeps a register of the produce and the names of the proprietors, and draws up all deeds of sale, transfer, &c.; the Brahman, or village priest; and the schoolmaster. Besides these, every village has its astrologer, smith, carpenter, potter, barber, doctor, dancing-girl, musician, and poet, all of whom are rewarded for their labours out of the produce of the village lands. 'Under this simple form of municipal government, the inhabitants of the country have lived from time immemorial. The boundaries of the village have been but seldom altered; and though the villages themselves have been sometimes injured, and even desolated by war, famine, and disease, the same name, the same limits, and even the same families, have continued for ages. The inhabitants give themselves no trouble about the breaking up and division of kingdoms; while the village remains entire, they care not to what power it is transferred, or to what sovereign it devolves; its internal economy remains unchanged; the potail is still the head-inhabitant, and still acts as the petty judge and magistrate, and collector or renter of the village.'

Religion.—Hinduism or Brahmanism is the religion of the great majority of the inhabitants of India. Mohammedanism comes next, and it appears, from the last census, that the number of persons professing this creed is much greater than had been supposed. Of the 66,000,000 forming the population of Bengal, 21,000,000 are Mohammedans. In the Punjab, 9,000,000 are Mohammedans and 6,000,000 Hindus. In Oude, there are 1,000,000 of Mohammedans to 10,000,000 of Hindus. In the North-western Provinces, there are 25,000,000 of Hindus to 4,000,000 of Mohammedans. In the whole of I., it is believed there are nearly three times as many Hindus as Mohammedans. The Sikh religion (see SIKHS) is professed, according to the census for the Punjab, by 1,000,000 of the inhabitants. They hate alike the Hindus and the Mohammedans. Buddhism at one period prevailed very generally throughout I.; it is now confined to Bhotan, Ceylon, and the Burmese frontier. Several of the forms of religion prevalent among the natives of I. are treated of apart (see BUDDHISM, MOHAMMEDANISM, PARSEES, SIKHS); what we shall here specially consider is that variety of creeds which is derived from Brahmanic sources, and known as the Hindu religion, or Hinduism. The term Hinduism, however, must not be taken as restricted to those forms of the Brahmanic religion which are in existence now; we have to look upon it as comprising all the phases of this creed up to its earliest period.

We may divide Hinduism into three great periods, which, for brevity's sake, we will call the Vedic, Epic, and Purânic periods, as our knowledge of the first is derived from the sacred books called the *Veda;* of the second, from the epic poem called the *Râmâyana*, and more especially from the great epos the *Mahâbhârata;* while the chief source of our information relative to the last period is that class of mythological works known under the name of *Purânas* and *Tantras.* It is necessary here to guard the reader against attempting to connect dates with the earlier of those periods. It has not been uncommon for writers on this subject to assign thousands of years before the Christian era as the starting-points of various phases of Hindu antiquity; others, more cautious, marked the beginnings of certain divisions of Vedic works with 1200, 1000, 800, and 600 years B. C. The truth is, that while Hindu literature itself is almost without known dates, owing either to the peculiar organisation of the Hindu mind, or to the convulsions of Indian history, the present condition of Sanscrit philology does not afford the scholar the requisite resources for embarking with any chance of success in such chronological speculations. This question of Hindu chronology will be more particularly considered in the article VEDA. In the meantime, the utmost stretch of assumption which in the actual condition of Sanscrit philology it is permitted to make is, that the latest writings of the Vedic class are not more recent than the 2d c. before Christ. A like uncertainty hangs over the period at which the two great epic poems of I. were composed, although there is reason to surmise that the lower limits of that period did not reach beyond the beginning of the Christian era. The Purânic period, on the other hand, all scholars are agreed to regard as corresponding with part of our medieval history.

If the *Rig-Veda*—the oldest of the Vedas, and probably the oldest literary document in existence—coincided with the beginning of Hindu civilisation, the popular creed of the Hindus, as depicted in some of its hymns, would reveal not only the original creed of this nation, but throw a strong light on the original creed of humanity itself. Unhappily, however, the imagination, indulging in such an hypothesis, would have as little foundation to work on as that which would fix the chronological position of this Veda. The Hindus, as depicted in these hymns, are far removed from the starting-point of human society; nay, they may fairly claim to be ranked among those already civilised communities experienced in arts, defending their homes and property in organised warfare, acquainted even with many vices which only occur in an advanced condition of artificial life. See VEDA. Yet in examining the ideas expressed in the greatest number of the Rig-Veda hymns, it cannot be denied that they are neither ideas engendered by an imagination artificially influenced, nor such as have made a compromise with philosophy. The Hindu of these hymns is essentially engrossed by the might of the elements. The powers which turn his awe into pious subjection and veneration are—*Agni*, the fire of the sun and lightning; *Indra*, the bright, cloudless firmament; the *Maruts*, or winds (see MARUT); *Sûrya*, the sun (see SÛRYA); *Ushas*, the dawn (see USHAS); and various kindred manifestations of the luminous bodies, and nature in general. He invokes them, not as representatives of a superior being, before whom the human soul professes its humility; not as superior beings themselves, which may reveal to his searching mind the mysteries of creation or eternity, but because he wants their assistance against enemies—because he wishes to obtain from them rain, food, cattle, health, and other worldly goods. He complains to them of his troubles, and reminds them of the wonderful deeds they performed of yore, to coax them, as it were, into acquiescence and friendly help. 'We proclaim eagerly, *Maruts*, your ancient greatness, for the sake of inducing your prompt appearance, as the indication of (the approach of) the showerer of benefits;' or: 'Offer your nutritious viands to the great hero (*Indra*), who is pleased by praise, and to *Vishnu* (one of the forms of the sun), the two invincible deities who ride upon the radiant summit of the clouds as upon a well-trained steed. *Indra* and *Vishnu*, the devout worshipper glorifies the radiant approach of you two who are the granters of desires, and who bestow upon the mortal who worships you an immediately receivable (reward), through the distribution of that fire which is the scatterer (of desired blessings).' Such is the strain in which the Hindu of that period addresses his gods. He seeks them, not for his spiritual, but for his material welfare. Ethical considerations are therefore foreign to these instinctive outbursts of the pious mind. Sin and evil, indeed, are often adverted to, and the gods are praised because they destroy sinners and evil-doers; but one would err in associating with these words our notions of sin or wrong. A sinner, in these hymns, is a man who does not address praises to those elementary deities, or who does not gratify them with the oblations they receive at the hands of the believer. He is the foe, the robber, the demon—in short, the borderer infesting the territory of the 'pious' man, who, in his turn, injures and kills, but, in adoring Agni, Indra, and their kin, is satisfied that he can commit no evil act. Yet we should be likewise wrong did we judge of those acts of retaliation by the standard of our own ethical laws. So far, indeed, from reflecting unfavourably on the internal condition of the Hindu community, the features of which may be gathered from these hymns, they seem, on the contrary, to bespeak the union and brotherhood which existed amongst its members; and the absence, in general, of hymns which appeal to the gods for the suppression of internal dissensions or public vices, bears, apparently, testimony to the good moral condition of the people whose wants are recorded in these songs.

It may be imagined that the worship of elementary beings like those we have mentioned was originally a simple and harmless one. By far the greatest number of the Rig-Veda hymns know of but one sort of offering made to these gods; it consists of the juice of the Soma or moon-plant, which, expressed and fermented, was an exhilarating and inebriating beverage, and for this reason, probably, was deemed to invigorate the gods, and to increase their beneficial potency. It was presented to them in ladles, or sprinkled on the sacred Kusa grass. Clarified butter, too, poured on fire, is mentioned in several hymns as an oblation agreeable to the gods; and it may have belonged to this, as we hold, primitive stage of the Vedic worship.

There is a class of hymns, however, to be found in the Rig-Veda which depart already materially from the simplicity of the conceptions we are referring to. In these, which we conceive to be of another order, this instinctive utterance of feeling makes room for the language of speculation; the allegories of poetry yield to the mysticism of the reflecting mind; and the mysteries of nature becoming more keenly felt, the circle of beings which overawe the popular mind becomes enlarged. Thus, the objects by which Indra, Agni, and the other deities are propitiated, become gods themselves; Soma, especially, the moon-plant and its juice, is invoked as the bestower of all worldly boons. The animal sacrifice—the properties of which seem to be more mysterious than the offerings of Soma, or of clarified butter—is added to the original rites. We will quote a few verses from the second book of the Rig-Veda, which may illustrate the essential difference between this order of hymns and those we alluded to before. It is the horse of the sacrifice which is invoked by the worshipper, and its properties are praised in the following strain:

'Thy great birth, O Horse, is to be glorified; whether first springing from the firmament or from the water, inasmuch as thou hast neighed, for thou hast the wings of the falcon and the limbs of the deer. Trita harnessed the horse which was given by Yama, Indra first mounted him, and Gandharba seized his reins. Vasus, you fabricated the horse from the sun. Thou, horse, art Yama: thou art Aditya, thou art Trita by a mysterious act: thou art associated with Soma. The sages have said there are three bindings of thee in heaven,' &c.

Mystical language like this doubtless betrays the aberration of the religious instinct of a nation; but it also reveals the fact, that the pious mind of the Hindus was no longer satisfied with the adoration of the elementary or natural powers; it shews that religion endeavoured to penetrate into the mysteries of creation. This longing we find, then, expressed in other hymns, which mark the beginning of the *philosophical creed of the Vedic period*. The following few verses may tend to illustrate the nature of this third class of hymns, as they occur in the oldest Veda: 'I have beheld the Lord of Men,' one poet sings, 'with seven sons [i. e., the seven solar rays], of which delightful and benevolent (deity), who is the object of our invocation, there is an all-pervading middle brother, and a third brother [i. e., Vâyu and Agni, the younger brothers of Aditya, the sun], well fed with (oblations of) clarified butter. They yoke the seven (horses) to the one-wheeled car [i. e., the orb of the sun, or time, or a year]; one horse [i. e., the sun], named seven, bears it along: the three-axled wheel [i. e., the day with its three divisions, or the year with three seasons—hot, wet, and cold; or time—past, present, and future] is undecaying, never loosened, and in it all these regions of the universe abide. . . . . Who has seen the primeval (Being) at the time of his being born? What is that endowed with substance which the unsubstantial sustains? From earth are the breath and blood, but where is the soul? Who may repair to the soul to ask this? Immature (in understanding), undiscerning in mind, I inquire of those things which are hidden, (even) from the gods, (what are) the seven threads which the sages have spread to envelop the sun in whom all abide?' Another poet sings: 'Then there was no entity or non-entity; no world, or sky, or aught above it; nothing anywhere in the happiness of any one, involving or involved; nor water deep or dangerous. Death was not, nor was there immortality, nor distinction of day or night. But THAT breathed without afflation, single with her (*Swadhâ*) who is within him. Other than him, nothing existed (which) since (has) been. . . . . Who knows exactly, and who shall in this world declare, whence and why this creation took place? The gods are subsequent to the production of this world, then who can know whence it proceeded, or whence this varied world arose, or whether it uphold itself or not?

He who in the highest heaven is the ruler of this universe, does indeed know; but not another one can possess this knowledge.'

As soon as the problem implied by passages like these was raised in the minds of the Hindus, Hinduism must have ceased to be the pure worship of the elementary powers. Henceforward, therefore, we see it either struggling to reconcile the latter with the idea of one supreme being, or to emancipate the inquiry into the principle of creation from the elementary religion recorded in the oldest portion of Vedic poetry. The first of these efforts is principally shewn in that portion of the Vedas called *Brâhmana* (see VEDA), the second in the writings termed *Upanishad* (see UPANISHAD). In the *Brâhmanas*—a word of the neuter gender, and not to be confounded with the similar word in the masculine gender, denoting the first Hindu caste—the mystical allegories which now and then appear in what we have called the second class of Vedic hymns, are not only developed to a considerable extent, but gradually brought into a systematic form. Epithets given by the Rig-Veda poets to the elementary gods are spun out into legends, assuming the shape of historical narratives. The simple and primitive worship mentioned in the hymns becomes highly complex and artificial. A ponderous ritual, founded on those legends, and supported by a far more advanced condition of society, is brought into a regular system, which requires a special class of priests to be kept in a proper working order. Some of the Vedic hymns seem to belong already to the beginning of this period of the Brâhmana worship, for in the second book of the Rig-Veda several such priests are enumerated in reference to the adoration of Agni, the god of fire; but the full contingent of sixteen priests, such as is required for the celebration of a great sacrifice, does not make its appearance before the composition of the Brâhmanas and later Vedas. Yet, however wild many of these legends are, however distant they become from the instinctive veneration of the elementary powers of nature, and however much this ritual betrays the gradual development of the institution of castes—unknown to the hymns of the Rig-Veda—there are still two features in them, which mark a progress of the religious mind of ancient India. While the poets of the Rig-Veda are chiefly concerned in glorifying the *visible* manifestations of the elementary gods—in the Brâhmanas, their ethical qualities are put forward for imitation and praise. Truth and untruth, right and wrong—in the moral sense which these words imply—are not seldom emphasised in the description of the battles fought between gods and demons; and several rites themselves are described as symbolical representations of these and similar qualities of the good and evil beings, worshipped or abhorred. A second feature is the tendency, in these Brâhmanas, of determining the *rank* of the gods, and as a consequence, of giving prominence to one special god amongst the rest; whereas in the old Vedic poetry, though we may discover a predilection of the poets to bestow more praise, for instance, on Indra and Agni, than on other gods, yet we find no intention, on their part, to raise any of them to a supreme rank. Thus, in some Brâhmanas, *Indra*, the god of the firmament, is endowed with the dignity of a ruler of the gods; in others, the *sun* receives the attributes of superiority. This is no real solution of the momentous problem hinted at in such Vedic hymns as we quoted before, but it is a semblance of it. There the poet asks 'whence this varied world arose'—here the priest answers that 'one god is more elevated than the rest;' and he is satisfied with regulating the detail of the Soma and animal sacrifice, according to the rank which he assigns to his deities.

A real answer to this great question is attempted, however, by the theologians who explained the 'mysterious doctrine,' held in the utmost reverence by all Hindus, and laid down in the writings known under the name of *Upanishads*. It must suffice here to state that the object of these important works is to explain, not only the process of creation, but the nature of a supreme being, and its relation to the human soul. In the Upanishads, Agni, Indra, Vâyu, and the other deities of the Vedic hymns, become symbols to assist the mind in its attempt to understand the true nature of one absolute being, and the manner in which it manifests itself in its worldly form. The human soul itself is of the same nature as this supreme or great soul: its ultimate destination is that of becoming re-united with the supreme soul, and the means of attaining that end is not the performance of sacrificial rites, but the comprehension of its own self and of the great soul. The doctrine which at a later period became the foundation of the creed of the educated—the doctrine that the supreme soul, or (the neuter) Brahman, is the only reality, and that the world has a claim to notice only in so far as it emanated from this being, is already clearly laid down in these Upanishads, though the language in which it is expressed still adapts itself to the legendary and allegorical style which characterises the Brâhmana portion of the Vedas. *The Upanishads became thus the basis of the enlightened faith of India.* They are not a system of philosophy, but they contain all the germs whence the three great systems of Hindu philosophy arose; and like the latter, while revealing the struggle of the Hindu mind to reach the comprehension of one supreme being, they advance sufficiently far to express their belief in such a being, but at the same time acknowledge the inability of the human mind to comprehend its essence. For the different periods which must be distinguished in the composition of these works, and for the gradual development of the general ideas briefly adverted to here, we refer the reader to the article UPANISHAD.

The EPIC period of Hinduism is marked by a similar development of the same two creeds, the general features of which we have now traced in the Vedic writings. The popular creed strives to find a centre round which to group its imaginary gods, whereas the philosophical creed finds its expression in the groundworks of the *Sânkhya*, *Nyâya*, and *Vedânta* systems of philosophy. In the former, we find two gods in particular who are rising to the highest rank, Vishnu and Siva; for as to Brahmâ (the masculine form of Brahman), though he was looked upon, now and then, as superior to both, he gradually disappears, and becomes merged into the philosophical Brahma (the neuter form of the same word), which is a further evolution of the great soul of the Upanishads. In the *Râmâyana*, the superiority of Vishnu is admitted without dispute; in the great epos, the *Mahâbhârata*, however, which, unlike the former epos, is the product of successive ages, there is an apparent rivalry between the claims of Vishnu and Siva to occupy the highest rank in the pantheon; but Sanscrit philology will first have to unravel the chronological position of the various portions of this work, to lay bare its groundwork, and to shew the gradual additions it received, before it will be able to determine the successive formation of the legends which are the basis of classical Hindu mythology. Yet so much seems to be clear even already, that there is a predilection during this Epic period for the supremacy of Vishnu; and that the policy of incorporating rather than combating antagonistic creeds, led more to a quiet admission, than to a warm support of Siva's claims to the highest rank. For the character of these gods, for the relation in which the conception of these beings stands to that of the Vedic time, for the new ideas which they impersonate at the Epic period, and for the group of mythological beings connected with both of them, we refer the reader to the respective articles. We will point, however, to one remarkable myth, as it will illustrate the altered position of the gods during the Epic period. In the Vedic hymns, the immortality of the gods is never matter of doubt; most of the elementary beings are invoked and described as everlasting, as liable neither to decay nor death. The offerings they receive may add to their comfort and strength; they may invigorate them, but it is nowhere stated that they are indispensable for their existence. It is, on the contrary, the pious sacrificer himself who, through his offerings, secures to himself long life, and, as it is sometimes hyperbolically called, immortality. And the same notion prevails throughout the oldest Brâhmanas. It is only in the latest work of this class, the *S'atapatha-Brâhmana*, and more especially in the Epic poems, that we find the inferior gods as mortal in the beginning, and as becoming immortal through exterior agency. In the *S'atapatha-Brâhmana*, the juice of the Soma plant, offered by the worshipper, or at another time clarified butter, or even animal sacrifices, impart to them this immortality. At the Epic period, Vishnu teaches them how to obtain the *Amrita*, or beverage of immortality, without which they would go to destruction; and this epic *Amrita* itself is merely a compound, increased by imagination, of the various substances which in the Vedic writings are called or likened to *Amrita*, i. e., a 'substance that frees from death.' It is obvious, therefore, that gods like these could not strike root in the religious mind of the nation. We must look upon them more as the gods of poetry than of real life; nor do we find that they enjoyed any of the worship which was allotted to the two principal gods, Vishnu and Siva.

The philosophical creed of this period adds little to the fundamental notions contained in the Upanishads; but it frees itself from the legendary dross which still imparts to those works a deep tinge of mysticism. On the other hand, it conceives and develops the notion, that the union of the individual soul with the supreme spirit may be aided by penances, such as peculiar modes of breathing, particular postures, protracted fasting, and the like; in short, by those practices which are systematised by the Yoga doctrine. The most remarkable Epic work which inculcates this doctrine is the celebrated poem *Bhagavadgítâ*, which has been wrongly considered by European writers as a pure Sânkhya work, whereas *S'ankara*, the great Hindu theologian, who commented on it, and other native commentators after him, have proved that it is founded on the Yoga belief. The doctrine of the reunion of the individual soul with the supreme soul, was necessarily founded on the assumption, that the former must have become free from all guilt affecting its purity before it can be re-merged into the source whence it proceeded; and since one human life is apparently too short for enabling the soul to attain its accomplishment, the Hindu mind concluded that the soul, after the death of its temporary owner, had to be born again, in order to complete the work it had left undone in its previous existence, and that it must submit to the same fate until its task is fulfilled. This is the doctrine of *metempsychosis*, which, in the absence of a belief in grace, is a logical consequence of a system which holds the human soul to be of the same nature as that of an absolute God. The beginning of this doctrine may be discovered in some of the oldest Upanishads, but its fantastical development belongs to the Epic time, where it pervades the legends, and affects the social life of the nation. See METEMPSYCHOSIS.

The PURÂNIC period of Hinduism is the period of its decline, so far as the popular creed is concerned. Its pantheon is nominally the same as that of the Epic period. Brahmâ, Vishnu, and Siva remain still at the head of its imaginary gods; but whereas the Epic time is generally characterised by a friendly harmony between the higher occupants of the divine spheres, the Purânic period shews discord and destruction of the original ideas whence the Epic gods arose. Brahmâ withdraws, in general, from the popular adoration, and leaves Vishnu and Siva to fight their battles in the minds of their worshippers for the highest rank. The elementary principle which originally inhered in these deities is thus completely lost sight of by the followers of the Purânas. The legends of the Epic poems relating to these gods become amplified and distorted, according to the sectarian tendencies of the masses; and the divine element which still distinguishes these gods in the Râmâyana and Mahâbhârata, is now more and more mixed up with worldly concerns and intersected with historical events, disfigured in their turn to suit individual interests. Of the ideas implied by the Vedic rites, scarcely a trace is visible in the Purânas and Tantras, which are the text-books of this creed. In short, the unbridled imagination which pervades these works is neither pleasing from a poetical, nor elevating from a philosophical point of view. Some Purânas, it is true—for instance, the *Bhâgavata*—make in some sense an exception to this aberration of original Hinduism; but they are a compromise between the popular and the Vedânta creed, which henceforward remains the creed of the educated and intelligent. They do not affect the worship of the masses as practised by the various sects; and this worship itself, whether harmless, as with the worshippers of Vishnu, or offensive, as with the adorers of Siva and his wife Durgâ, is but an empty ceremonial, which, here and there, may remind one of the symbolical worship of the Vedic Hindu, but, as a whole, has no connection whatever with the Vedic scriptures, on which it affects to rest. It is this creed which, with further deteriorations, caused by the lapse of centuries, is still the main religion of the masses in India. The opinion these entertain, that it is countenanced by the ritual, as well as by the theological portion of the Vedas, is the redeeming feature of their belief; for, as nothing is easier than to disabuse their mind on this score, by reviving the study of their ancient and sacred language, and by enabling them to read again their oldest and most sacred books, it may be hoped that a proper education of the people in this respect, by learned and enlightened natives, will remove many of the existing errors, which, if they continued, must inevitably lead to a further and, ultimately, total degeneration of the Hindu race.

The philosophical creed of this period, and the creed which is still preserved by the educated classes, is that derived from the tenets of the Vedânta philosophy. It is based on the belief of one supreme being, which imagination and speculation endeavour to invest with all the perfections conceivable by the human mind, but the true nature of which is, nevertheless, declared to be beyond the reach of thought, and which, on this ground, is defined as not possessing any of the qualities by which the human mind is able to comprehend intellectual or material entity. See VEDÂNTA.

Hindu Sects.—This designation applies to the sects which arose during the third period of Hinduism. They suppose that their worship is countenanced by the Vedas; but its real origin is derived from the *Purânas* and *Tantras*. See these articles. There are three chief divisions of these sects—the adorers of Vishnu, of Siva, and of the wives or female energies of these gods. See VAISHNAVAS, SAIVAS, and SÂKTAS. Besides these great sects, there are some of limited extent and total insignificance, such as the worshippers of *Agni*, the god of fire; of *Sûrya*, the sun-god; of *Ganesa*, the god of wisdom, and the obviator of impediments. For a detailed account of these and similar sects, see the first volume of the *Works of the late H. H. Wilson*, containing a Sketch of the Religious Sects of the Hindus.

For an account of the various divisions of I., see articles on the various provinces referred to in the preceding article. See also INDIA, BRITISH; INDIA, NATIVE STATES OF; INDIA, FRENCH; INDIA, PORTUGUESE.

For an account of the philosophy, literature, architecture, &c., of I., see SANSCRIT LITERATURE MIMÂNSÂ, NYÂYA, SÂNKHYA, VEDÂNTA. For the history of I., see following article.

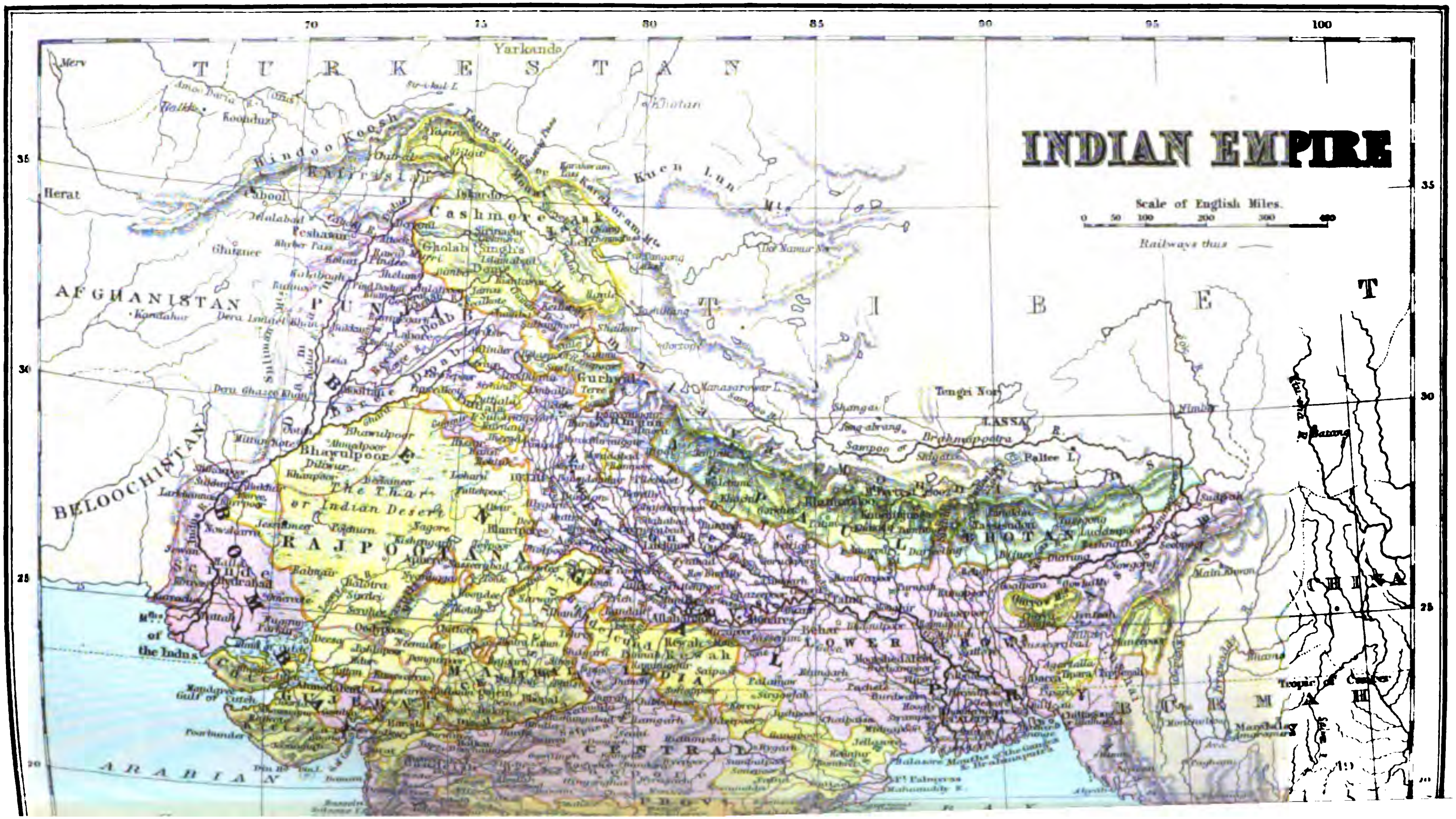
INDIA, BRITISH, is the name given to those parts of Hither and Further India placed under the administration of the viceroy or governor-general of India. It does not include Ceylon, which, although a British possession, has its government entirely separate from that of Hindustan; but it extends along the eastern coast of the Bay of Bengal to 10° S. lat., and thus includes part of Further India or Indo-China.

The following are the returns of the census of 1871–72 for the provinces under British rule; those for the Punjab, Oude, and Berar being, however, from 3 to 6 years antecedent to that date:

Territories and Provinces under the Administration of	Area in English Sq. Miles.	Population.	Average Pop. per Sq. Mile.
Governor-general of India—			
Ajmere, ...	2,661	316,032	119
Coorg, ...	2,000	168,312	84
Berar, ...	17,334	2,231,565	129
Mysore, ...	27,077	5,055,412	187
Governor of Madras, . .	138,318	31,281,177	226
" Bombay, .	124,462	16,349,206	131
Lieutenant-governor of Bengal,	157,598	60,467,724	397
" North-west Provinces, . .	81,403	30,781,204	378
" Punjab, . .	101,829	17,611,498	173
Chief Commissioner of Oude,	23,992	11,220,232	468
" Assam, . .	53,856	4,132,019	99
" Central Provinces,	84,968	8,201,519	97
" British Burmah,	88,556	2,747,148	31
Total, . . .	904,049	190,563,048	211

Government.—By an act of parliament, which received the royal assent 2d August 1858, Queen Victoria was declared Empress of India, and various regulations were enacted for the better government of the country, which are now in force. Under these and more recent enactments, the home-government is vested in a secretary of state, who is a member of the English cabinet. He is assisted by an under-secretary and a council of 15 members. The Indian executive government is administered by the viceroy or governor-general appointed by the crown, and acting under the control of the secretary of state for India. The viceroy is appointed by the crown for a term of six years, and is assisted by a council of five ordinary members, three appointed by the secretary of state, two by her majesty's warrant. Each of them has charge of a department of the executive. The commander-in-chief may be constituted an extraordinary member of the council. The legislative council is composed of the members of the executive, together with from 6 to 12 members, one half of whom must be unconnected with the public service. They are nominated for two years by the viceroy. British I. is now divided into the provinces mentioned in the preceding table. It was formerly divided into the three Presidencies of Bengal, Madras, and Bombay; and in ordinary language, and even in official documents, the name of Presidency is still given to the provinces of Madras and Bombay. As regards military matters, the old threefold division may be said to subsist, but it must be kept in mind that British I. is now divided into the 4 territories under the governor-general, and the 8 provinces, enumerated in the preceding table, and that each has its own civil government, and is independent of the others. The two governments of Madras and Bombay are under the rule of governors appointed by the crown, and assisted by executive and legislative councils. They communicate only with regard to important matters with the home government through the governor-general. As regards affairs of minor importance, they correspond directly with the secretary of state for India. The Lower Provinces of Bengal, the North-west Provinces, and the Punjab are administered by lieutenant-governors appointed by the governor-general, subject to the approbation of the secretary of state for India. In Bengal, the lieutenant-governor is assisted by a legislative council. Oude, Assam, the Central Provinces, and British Burmah are governed by chief-commissioners appointed by the Indian government. Ajmere was separated from the government of the North-west Provinces in 1871, and placed under the direct control of the governor-general. Berar, also known under the name of the assigned districts of Hyderabad, Mysore, and Coorg are administered by commissioners appointed by the governor-general. All the governments of India are split into provinces, over each of which a commissioner is placed, and these are in turn divided into districts under a judge and collector. The provinces are distinguished into regulation and non-regulation provinces. In the former the revenue is collected and justice is administered according to fixed methods. In the latter, power is reserved by legislative enactment to modify these as occasion requires. Resident political agents are appointed by the British government at the courts of the native princes. The *Covenanted Civil Service* is composed of Europeans who conduct the general administration in the Indian provinces. Since 1854 the members have been recruited from the successful candidates at competitive examinations instituted for the purpose, held in London. The *Uncovenanted Civil Service*, appointments to which are made by the authorities in I., is composed of Europeans, Eurasians (the class sprung from native mothers by European fathers), and natives. Municipalities in I. were first created for the three presidency towns, and it was not till 1850, 1856, and 1868 that acts were passed under which a large number of Indian towns have obtained municipal institutions, which are gradually diffusing the habit of self-government over the whole country.

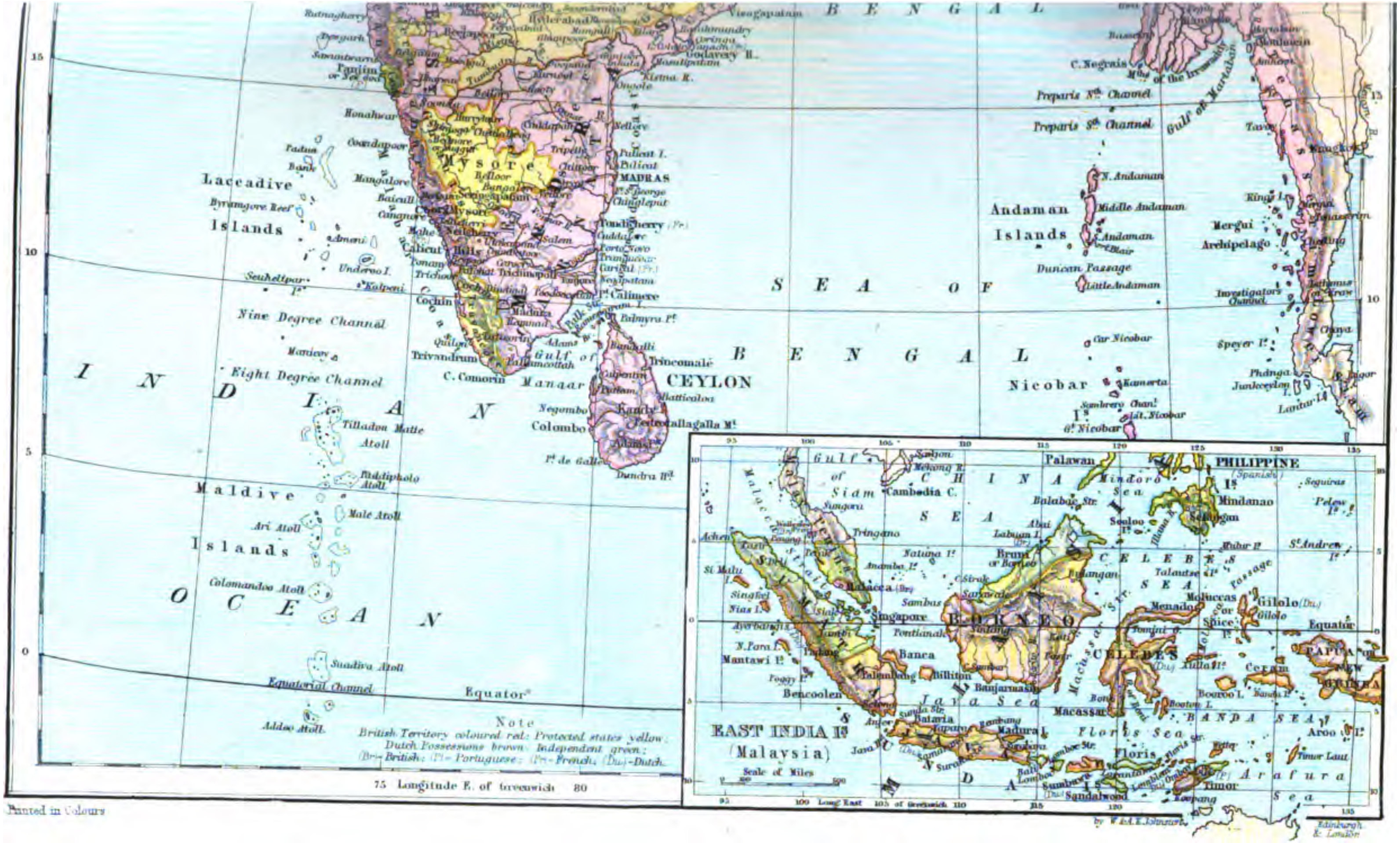
Military Force.—The Indian military service, like the civil service, underwent a thorough reorganisation, consequent on the great mutiny, and the transfer of the government of the country from the East India Company to the Crown. In 1872, the established military force of British I. numbered 190,264, including officers; of whom about 123,470 were natives, and 60,632 English (exclusive of officers). I. is divided into three military divisions, which, although named after the three old



INDIAN EMPIRE

Scale of English Miles.

Railways thus



Printed in Colours

W. & R. CHAMBERS, LONDON & EDINBURGH.

presidencies of Bombay, Madras, and Bengal, and perpetuating their names, have not exactly the same limits. Of the native troops, 47,000 belonged to the Bengal army, 27,000 to the Madras army, and 24,000 to the Bombay army. The British forces are chiefly stationed in the Punjab, and along the valley of the Ganges. In 1872, there were 37,000 English soldiers in these provinces, of whom 12,000 were in the Punjab, 10,400 were in the Bombay Presidency, and 12,200 in that of Madras.

The Police in British I. include a force of 190,000 constables or regular policemen, and the village watchmen who aid them. The minimum age of admission is 17, the maximum 21. Each district has a jail and a police superintendent; and the districts are grouped, for police purposes, into circles under deputy-inspectors-general, while the whole police force in each province is under an inspector-general. The constabulary is a purely civil force, subject in all respects, except internal discipline, to the civil authorities.

Administration of Civil Justice.—In 1861, by an act of parliament, high courts of judicature were established at each presidency and in the North-west Provinces, under the control of a chief-justice, and as many other judges, not exceeding fifteen, as her Majesty may appoint. In 1871—1872, there were 1,088,153 civil suits in I., and there can be no doubt that the machinery for litigation supplied by the courts is much employed. Sir G. Campbell, however, fears that the tendency to uphold the bare doctrines of law—the literal fulfilment of contracts alleged to have been entered into by ignorant and improvident people—leads to great hardship in cases which affect poor men and benefit the rich and litigious. The Civil Procedure Code of India offers facilities for litigation which are apt to be abused. Sir George Campbell, in illustration of the views entertained of legal proceedings by some classes of Indian litigants, gives the following account of a litigation between the members of a family originally belonging to one of the hill-tribes. One of the parties, after litigating through all the courts of I., got a decree in the highest court. But there was an appeal to the Privy Council, and the suitor's funds were exhausted. So they caught an old man, carried him to the top of a hill, and sacrificed him to propitiate the gods who rule the decisions of the Privy Council. The Civil Procedure Code worked such mischief among the Sontals, that the people were exasperated, and had to be removed from the operation of laws applicable generally in Bengal.

Revenue, Expenditure, &c.—The annexed table shews the gross amount of the public revenue and expenditure of British I., with the surplus or deficiency of revenue in each of the under-mentioned years:

Years ended	Gross Revenue.	Total Expenditure.		Gross Expenditure.		Surplus (+) or Deficiency (—) of Revenue.	
		In India.	In England.	Exclusive of Public Works Extraordinary.	Including Public Works Extraordinary.	Exclusive of Public Works Extraordinary.	Including Public Works Extraordinary.
1869	49,262,691	43,225,587	10,181,747	52,036,721	53,407,334	—2,774,030	—4,144,643
1870	50,901,081	42,791,013	10,591,018	50,782,412	53,382,026	+ 118,669	—2,480,945
1871	51,413,686	41,015,502	10,083,004	49,930,696	51,098,506	+1,482,990	+ 315,180
1872	50,110,215	40,486,818	8,127,694	46,986,038	48,614,512	+3,124,177	+1,495,703

The gross amount of the public revenue and expenditure in each province in British I., exclusive of receipts and expenditure in England, for the year ending 31st March 1872, is shewn below:

	Revenue.	Expenditure.
	£	£
Territories and Departments under the Government of India, . .	2,779,337	13,228,205
Bengal, ...	16,740,427	5,664,569
North-west Provinces, . .	5,769,706	2,447,065
Oude, ...	1,553,309	605,185
Punjab, ...	3,634,067	2,340,934
Central Provinces, ...	1,039,326	749,728
British Burmah, ...	1,218,102	655,560
Madras, ...	8,092,427	5,827,104
Bombay (including Sinde), . .	9,061,851	7,245,250
Totals, ...	49,888,552	38,763,600

The revenues and expenditure of the Eastern Settlements, and of Hyderabad assigned districts, or the Berars, are separated from the revenues and expenditure of British I., and are not included in the above statement, which is taken from the annual Statistical Abstract for British India (1873).

Revenue, Expenditure, &c.—The chief items of the revenue for the year ending 1872 were the following, in the order of their importance: land revenue, £20,520,337; opium, £9,253,859; salt, £5,966,595; customs, £2,575,990; stamps, £2,476,333; excise on spirits and drugs, £2,369,109. The land-tax alone produces the half of the whole revenue. In I. the government has always been considered the owner of the soil, and the actual cultivators pay a rent or tax, in collecting which different systems have hitherto been followed in different parts of the country, known as the *Zemindari Settlement*, *Ryotwar*, and *Mouzawar* or *Village Settlement*. The latter is the oldest and the simplest system. Each village under this arrangement was regarded as a separate municipality, and each was assessed by the government at a particular sum, for the due payment of which the headman of the village was considered responsible. The individual distribution of the burden of taxation rested with the village authorities, and government, provided it received its regular dues through the *potail*, interfered no further. The origin of the Zemindari and Ryotwar Settlements requires some explanation. When the English first entered upon the administration of the country, they found that the practice of native sovereigns, their predecessors, had been to farm out the land revenues of the country to the nobles of the court, or to wealthy bankers, who annually paid a fixed amount into the royal treasury, and collected the government dues on their own behalf, from the actual cultivators of the soil. These farmers of the revenue were termed Zemindars. The question for the English rulers arose, whether or not they were to consider these men as proprietors. In Bengal and Bahar they were so recognised, and confirmed in their position, the government holding them responsible for the payment of the dues on their estates, and regarding the cultivators on the farms as their tenants. This was Lord Cornwallis's Zemindari Settlement. In Madras and Bombay, the opposite course was pursued. Claims of the middlemen, or farmers of the revenue, to enjoy any proprietary rights were totally ignored; and under Sir Thomas Monro, the ryotwar system was introduced, by which government makes a separate settlement with each individual cultivator or *ryot*, who is recognised as the virtual proprietor of the land, or tenant direct under government, so long as he pays the land-tax annually charged on his estate or farm. In 1871, under the administration of Lord Mayo, there was created a new department of revenue, agriculture, and commerce. It has charge of all questions relating to land revenue and settlements, works of agricultural improvement, silks and fibres, forests, commerce, trade, and the industrial arts. It has also under its charge the collection of statistics, placed under another new department, the statistical survey of I., of which the director-general is Dr Hunter. His book on Orissa (see below) is a first instalment of the work done. A series of leading questions has been issued by the director-general, shewing exactly what information is required from residents in the different districts. A connected account of each district will be prepared from the returns, and these will be in turn condensed by the director-general into an imperial statistical account of India. 'This survey,' says Mr Markham, 'forms an epoch in statistical enterprises, and its practical results will be most important.'

Currency.—In British I., accounts are kept in rupees, annas, and pie—16 annas going to the rupee, and 12 pie to the anna. The coins are rupees (value 2*s.* sterling), and half and quarter and half-quarter rupees, in silver; and in copper $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{12}$ of an anna. The currency of I., however, is chiefly silver, of which a large amount is coined annually. The coinage bears the impress of Queen Victoria as Empress of I. in the native costume. In 1861, an act was passed by the government of I., providing for the issue of a paper currency by means of promissory-notes. The amount of notes in circulation in 1873 was £11,235,061.

The public debt of I. in I. and England in 1872 amounted to £112,314,760, on which the interest paid was £533,329. The amount of the debt in England was £38,991,700, and the amount of interest paid, £1,807,066; in I. it was £73,323,060, the interest being £3,529,263.

Commerce.—The following table shews the number and tonnage of vessels and steamers engaged in the foreign and coasting trade of British I. in the year ending March 31, 1872, those entered or cleared with ballast not included:

	Entered.		Cleared.	
	Vessels.	Tons.	Vessels.	Tons.
British, . . .	3,048	2,498,849	3,611	2,731,715
Foreign, . .	2,175	429,029	2,098	417,904
British India, . .	4,281	656,713	4,071	639,617
Native Craft, .	11,705	488,325	10,896	471,486
	21,209	4,072,916	20,676	4,260,722

The total value of the merchandise imported into British I. in 1872 was £31,083,747; of treasure, £11,573,813. The chief items were—coal and coke, £514,794; cotton manufactures, £17,484,887; metals of all kinds, manufactured and unmanufactured, £2,390,775; railway materials, £513,246; salt, £913,975; raw silk, £651,595; silk mannfactures, £480,948; spirits, £560,485; sugar and saccharine matter, £709,779; wines, £495,783; wool, manufactures of, £514,194. The total value of the exports in 1872 was as follows: Indian produce or manufactures, £61,697,225; foreign merchandise, £1,488,622; treasure, £1,476,093. The chief exports in the same year were the following: Coffee, £1,380,410; cotton wool, £21,272,430; cotton, manufactures of, £1,191,683; dyes of all kinds, £3,956,869; grains and pulse, £4,865,748; hides and skins, £2,515,860; jute and manufacture of jute, £4,299,767; opium, £13,365,228; seeds, £2,728,127; silk, £1,130,706; tea, £1,482,196; wool, £906,698. The greater part of the trade of I. is carried on with Great Britain—but there is also an extensive commerce with Ceylon, the Straits Settlements, China, Australia, the Persian Gulf, the Red Sea, and several of the European States.

Roads and Railways.—Since 1836 great trunk-roads have been constructed in various parts of India. The most remarkable is that from Calcutta to Peshawer, 1400 miles long. The importance of these great works has now diminished, owing to the extension of a great railway system in India. The chief railways now open are the East Indian, from Calcutta to Delhi; the Indian Peninsula, which forms a branch to Bombay; the Delhi, Punjab, and Sinde, which will ultimately connect the system with the mouth of the Indus; the Bombay and Baroda, which runs north from Bombay; the Madras Railway, running south-east to Madras, and thence south-west to Beypûr on the Coromandel Coast. Up to March 1872, £90,009,622 had been expended by the guaranteed railway companies, and £8,000,000 were required to complete their lines. The gross receipts in 1871 were £6,146,130, the working expenses £3,302,050; leaving a net profit of £2,844,080, of which £2,839,338 was earned by the guaranteed lines. The guaranteed interest was £4,422,243, so that there was a loss of £1,582,905 to the state. As the railways, however, are now almost completed, it is expected that the cessation of heavy outlay on construction will improve their financial position. The construction of roads and tramways from the chief stations, now proceeding, will also add to the traffic and increase the profits. The electric telegraph is now in working order along every line of railway, and connects all the important cities of British I., this Indian system being connected by three lines with England.

Irrigation Works and Canals.—We have already referred to the importance of irrigation in I., and the great attention given to the subject within late years. Our space will not permit us even to enumerate the great works recently undertaken in the basins of the Indus, Ganges, Mahanaddy, and Tapti, and in other parts of I., to supply water to the rich but parched soil, and thus extend the area of cultivation. Several of the canals are adapted for navigation as well as irrigation—and when works now in progress in Sirhind have been completed, there will be navigable communication from the Ganges to the Sutlej, and down the Indus to Kurachee. To give the greatest possible efficiency to the action of the government in relation to the extension of canals, an inspector-general of irrigation works has been appointed, with irrigation secretaries in the various provinces.

Disease in India.—The climate and sanitary condition of I. give rise to pestilences which at intervals carry desolation over the country, whilst disease in its worst form is never absent. Hospitals, richly endowed and admirably regulated, supported as well by government as by private munificence, exist in all the large towns; and great efforts are constantly made to bring the benefits of medical skill and knowledge within reach of the poorer classes. In all parts of the country dispensaries have been opened, where medicines are given out, and patients advised. Much of the disease of I. is due to bad water and bad drainage; and where a new water-supply has been introduced, and drains have been made, as in Calcutta, the improvement in the health of the inhabitants has been marked. Nearly 2 millions of persons were vaccinated in I. in 1872. Mortality is fearfully aggravated by the passion of the people for pilgrimages. All ages and sexes traverse vast areas, and die by hundreds on the route. The Mohammedan pilgrims go in numbers to Mecca, Kerbela, and Jerusalem; and a large proportion never return.

Emigration and Colonisation.—From the table at the head of this article, it appears that the population of British I. is very unequally distributed. While Bengal resembles a city in the density of its population, the adjoining provinces of Assam and Burmah, although no less fertile, have a very small number of inhabitants. The recurrence of famines in this overpeopled district shews the importance of encouraging emigration. The tea-planters are now attracting large crowds into Assam and other districts. In 1871 the number despatched was 7022 against 4863 in 1870, and the number is increasing. In Burmah there were 97,679 coolie immigrants in 1871—1872. The distant emigration from India has become very important in recent years, and to regulate it the Indian Emigration Act (vii. of 1871) was passed, consolidating all previous laws for the protection of the emigrant coolies. One condition with respect to emigration from India to the British colonies is, that there shall be 40 women to every 100 men. In 1871—1872, the number of emigrants who left Calcutta for the West Indies was 8231, and the condition as to the proportion of the sexes was fully complied with. In the same year 3383 returned to Calcutta. As a rule, the Indian emigrants improve their condition by service in the West Indies. It is thought that, except to a few limited districts, colonisation from England must ever be impracticable in India on account of the unfavourable character of the climate; for the European race settled in the country rapidly degenerates, and in a few generations becomes effete, and bodily and mentally enervated. A constant stream of British capital, however, and fresh directing energies in its application, is the great want, and what would secure, as nothing else can, the development of its unlimited resources. Indigo and sugar factories, and coffee and tea plantations, have been the principal undertakings in which independent British capital and energy have been hitherto embarked, and the results have been most satisfactory.

Christianity in India.—India was one of the earliest fields of Christian missions. Tradition assigns it as the scene of the apostle Thomas's labours and martyrdom. Whether this was the case or not, we find a Syrian church planted in Malabar in Southern India, which undoubtedly had a very early origin. The Jesuit missionaries, from the middle of the 16th c. onwards, had a large success in India. See XAVIER, FRANCIS. The Catholic missions now confine their attention to their Christian converts. They are divided into two branches—the Portuguese or Goa branch, and the Jesuit mission. The number of the former in Bombay is not known; they number elsewhere 48,000. The Jesuit converts exceed half a million in Madras, Pondicherry, and Travancore. The earliest Protestant missionaries in India came from Holland and Denmark. With the latter mission the eminent Schwartz was connected. England's first missionary effort was put forward by the Society for the Propagation of the Gospel, and the Christian Knowledge Society, which commenced in the beginning of the 18th c., by aiding the Danish mission already established in Southern India. Subsequently, the East India Company adopted the policy of excluding missionaries altogether from their territories; but since the beginning of this century, when these restrictions were withdrawn, a great work has been entered on, in which all denominations are represented. In Bengal, 16,000 ryots profess Protestantism. In Chota Nagpore, within the last twenty years, German missionaries have converted 20,000 Koles. In Oude and Rohilcund, there are 2000 converts. In Southern I., the numbers are much greater. The entire number of Indian Protestants in I. in 1852 was 128,000; in 1862, 213,182; and in 1872, 318,363. Mr Markham, who gives these figures in his Report for 1873, speaking of the Protestant missions, says: 'The government of India cannot but acknowledge the obligations under which it is laid by these 600 missionaries, whose blameless example and self-denying labours are infusing new vigour into the stereotyped life of the great population placed under English rule, and are preparing them to be in every way better men and better citizens of the great empire in which they dwell.' In the Proclamation to the Princes, Chiefs, and People of India, read in the principal cities, on Nov. 1, 1858, it was declared, 'that none shall be in anywise favoured, none molested or disquieted, by reason of their religious faith and observances, but that all shall alike enjoy the equal and impartial protection of the law.' The fullest toleration in matters of faith is enjoyed throughout British India. Fanaticism only, as when it seeks to enforce the burning of widows or Suttee (q. v.), or offers human beings in sacrifice, is curbed by the ruling power. There is no exclusively endowed state-church, but government continue to pay the state grants made to Hindu temples and to Mohammedan mosques. Clergymen of the Church of England, the Church of Scotland, and the Roman Catholic Church, are retained on the government establishment as civil or military chaplains. There are Church of England bishops at Calcutta, Madras, and Bombay.

Education.—The education of the people of I. is based on the system set forth in a despatch of Sir Charles Wood, dated 19th July 1854. The main principle of the despatch was that European knowledge should be diffused through the languages understood by the great mass of the people; but that the teaching of English should always be combined with careful attention to the study of the vernacular languages. With regard to the wealthier classes, it was declared that the time had arrived for the establishment of universities in I., conferring degrees, and based on the model of the university of London. They were not to be places of education, but to test the value of education obtained elsewhere, and to confer degrees in arts, law, medicine, and civil engineering. Such universities have accordingly been established in Calcutta, Madras, and Bombay; and since 1859, government schools have been opened for the instruction of all classes of the Indian people. In each province there is now a director of public instruction, assisted by school inspectors, one of whom has under his care one circle or subdivision of the province. Normal schools for the training of teachers have also been established, and attempts are being made to spread female education. In the end of 1871 there were 25,147 government schools and colleges, having an average attendance of 799,622 pupils, the gross expenditure from imperial and other sources being upwards of £1,000,000. In the North-west Provinces it is calculated that 1 in 11 boys is at school. In other words, there are 250 boys in every 3000 people, and of these 16 are at government schools, 14 at vernacular schools, and 2 learn English. In the same 3000 people, there are 200 girls, and 1 is at school. Much remains to be done.

Administrative Divisions.—The following are the administrative divisions of British India. The Lower Provinces of Bengal, often referred to as Bengal. They include the old Indian provinces of

Bengal Proper, Bahar, Assam, &c., and are divided into 8 regulation provinces—Bagalpûr, Burdwan, Chittagong, Orissa (or Cuttack), Dacca, Nuddea, Patna, Rajshaye; and 3 non-regulation provinces—Assam, Chota Nagpore, and Kooch Bahar. Calcutta is the capital and seat of government; Patna is the town next in importance. *The North-Western Provinces* include 5 regulation provinces—Agra, Allahabad, Benares, Meerut, and Rohilcund; and 2 non-regulation provinces—Jansi and Kumaon. Allahabad is the seat of government, Agra and Benares are important towns. Oude was annexed in 1856; Lucknow is the capital. The Punjab, annexed in 1849, is divided into the following provinces—Amritsur, Umballa, Delhi, Derajat, Hissar, Lahore, Peshawer, Multan, Rawal Pindi, and the Trans-Sutlej States; Lahore is the seat of government, and chief cities are Amritsur and Delhi. The Central Provinces were formed into a chief commissionership in 1861; Nagpûr is the chief town. The Bombay Presidency is split into three parts—a northern and a southern division—and Sinde; the capital of the whole is Bombay. Surat, in the northern division; Poona, in the southern division; and Kurachee, in Sinde, are important places. The Madras Presidency is divided into the Circars, the Carnatic, Coimbatore and Salem, Canara and Malabar; the capital is Madras, and next in importance are Ganjam, Masulipatam, Vellore, and Arcot. British Burmah is divided into Aracan, Pegu, and Tenasserim; the chief towns are Rangoon and Moulmein. The territories placed directly under the central government are Ajmere (chief town of same name), separated from government of N.W. Provinces in 1871; Berar, or assigned districts of Hyderabad (chief town, Akoles); Coorg, annexed in 1834 (chief town, Merkera); and Mysore, for which as a native state only temporarily British, see below.

History.—The oldest history of I. is entirely legendary; it is shrouded in mythical narratives, which, though of the highest interest from a religious and archæological point of view, do not enlighten us as to the dates of the personages concerned, nor as to the *reality* of the facts which they record. Thus, the solar and lunar dynasties spoken of in the epic poems, the *Râmâyana* and *Mahâbhârata*, and in the *Purânas*, as well as other dynasties, like that of Pradyota, S'isunâga, and others mentioned in the *Purânas*, are, for the present, at least, beyond the reach of history, in the sense in which we use this word. The first reliable date to be met with in ancient Hindu history is that of *Chandragupta;* for he is the king whom the Greek historians call *Sandrocottus;* and as he was the ally of Seleucus, we may safely conclude that he reigned about 300 B.C. He belonged to the Manrya dynasty, which contains another distinguished name, that of the king *Asôka*, who plays a prominent part in Buddhist history, and probably reigned from 263 to 226 B.C.; but since the history of this and other dynasties which reigned in different parts of India up to the time of the Mohammedan conquest, concerns more the special student of Hindu antiquity and Indian history than the general reader, we must content ourselves here with referring those who take an interest in it to the admirable work of Professor Christian Lassen, the *Indische Alterthumskunde*, where they will not only find the richest material collected in any one book hitherto devoted to this subject, but also learn to appreciate the difficulties which beset the questions of ancient Hindu history and chronology.

From the Mohammedan Conquest (1001) *to the close of Viscount Canning's administration* (1862).—*House of Ghizni* (1001—1167). The Sultan Mahmûd, sovereign of the small state of Ghizni (q. v.), was the first conqueror who permanently established the Mohammedan power in India. In 1186, the House of Ghizni became extinct, and the Hindu princes fell one by one before a succession of Mohammedan dynasties, whose names and dates are as follows. *Slave Kings of Delhi* (1206—1288).—One of these sovereigns, Altmish, who ascended the throne in 1211, added the greater part of Hindustan Proper to his dominions, and in his reign the Mongols of Genghis Khan devastated the north-eastern parts of India. In Balin's reign (about 1284) the Mongols made a second irruption into Hindustan, but were totally defeated by the monarch's eldest son, the heroic Mohammed, who fell in the action. *The Khiljis and House of Toghlak* (1288—1412).—In 1290, the Mongols made their third and last great irruption into Hindustan, but were almost annihilated by Zafir Khan, whose name became so proverbial among the Mongols, that when their horses started, they would ask them if they saw the ghost of Zafir Khan. In 1397, during the reign of the last of the Toghlak kings, the Tartar Timur, or Tamerlane, sacked Delhi, and proclaimed himself emperor of India. *The Syuds* (1412—1450). *The House of Lodi* (1450—1526). To the kings of this dynasty succeeded the *Great Moguls* or *House of Timur* (1526—1707). Baber, who had for twenty-two years been sovereign of Cabul, invaded I. for the fifth time towards the end of the year 1525 (see BABER), and after doing battle with Sultan Ibrahim on the plain of Paniput, April 1526, entered Delhi in triumph, and established himself as emperor of the Mohammedan dominions in I. in right of his ancestor Timur. He died in 1530, and was succeeded by his son Humayun. The celebrated Akbar (q. v.), son of Humayun, became emperor in 1556, and reigned for nearly twenty-five years. His son ascended the throne in 1605, and his grandson, Shah Jehan, in 1627. In 1658, Shah Jehan was imprisoned by his son, the famous Aurungzebe (q. v.), who usurped the imperial power. This remarkable man raised the Mogul empire to the highest pitch of greatness and splendour, and was the ablest and most powerful, as well as the most ambitious and bigoted, of his race. The death of Aurungzebe took place in 1707, and the decay of the empire, which had begun a few years before then, proceeded rapidly. 'A succession of nominal sovereigns, sunk in indolence and debauchery, sauntered away life in secluded palaces.' Viceroys of the Great Mogul formed their provinces into independent states; whilst Hindu and Mohammedan adventurers carved out kingdoms with the sword. The dismemberment of the Mogul empire opened a wide field for ambition and enterprise to the nations of Europe. The Venetians, the Genoese, the Portuguese, and the Dutch had by turns traded with I.; and in 1602, the English appeared on the scene. See EAST INDIA COMPANY.

In 1653, Madras was raised into a presidency, and in 1668, the island of Bombay—which was the dowry of Charles II.'s queen, the Infanta Catherine of Portugal—was transferred by the crown to the Company. The invasion of the Persian, Nadir Shah, in 1738, who sacked Delhi, slaughtered its inhabitants, and carried away the Peacock Throne, and vast treasure, hastened the fall of the Mogul empire.

1745—1761.—Great jealousy existed between the English and French, who had also established themselves in India. On the declaration of war between England and France, hostilities commenced in the Madras presidency, nor were they terminated by the peace of Aix-la-Chapelle, in 1748. The struggle in the Carnatic was continued with ardour, under pretext of supporting the claims of rival native princes to sovereignty. Clive (q. v.), the first and most famous name on that great muster-roll of British soldiers and statesmen who have thrown such lustre on the British occupation of I., laid the foundation of his country's supremacy in the East. His memorable defence of Arcot in 1751, and his subsequent victories, broke the spell of French invincibility. The next memorable event was the siege and capture of Calcutta, on the 20th June 1756, by Suraja Dowlah, grandson of Ali Verdi Khan, and governor or subahdar of Bengal. The prisoners, 146 in number, were confined in the small garrison prison or Black Hole, of whom only 23 survived till the morning. Clive quickly took command of an expedition fitted out at Madras, recovered Calcutta (1757), and, assisted by Admiral Watson, prosecuted the war with his usual vigour, till after a hollow peace and a renewal of hostilities, Suraja Dowlah was completely defeated by Clive in the memorable battle of Plassey, 23d June 1757. Meer Jaffir, Suraja Dowlah's commander-in-chief, was placed on the musnud by the English, who from this time ruled Bengal as well as Bahar and Orissa.

Political Progress of East India Company (1764—1773).—After the battle of Buxar, fought in 1764 with Sujah Dowlah, the usurping vizier of Oude, the Mogul emperor, Shah Alum, who had previously been in the power of the defeated Sujah Dowlah, claimed the protection of the British. He confirmed the Company in their possessions, and granted them the collectorate or perpetual *dewannee* of Bengal, Bahar, and Orissa, on condition of receiving the sum of £260,000 per annum. During the subsequent financial difficulties of the Company, they repudiated this and other conditions which they had guaranteed to Shah Alum; and the cost to the Company of maintaining their authority and standing army prevented them from undertaking public works and developing the resources of the country. The Regulating Act was passed in 1773, and a governor-general was appointed. In 1765, Clive purged the Indian government of oppression, extortion, and corruption, and from that, his last visit, dates the purity of the administration of our eastern empire.

Administration of Warren Hastings (1773—1785).—Warren Hastings was the first governor-general of India. A new power, the Supreme Court of Judicature, appointed by the Regulating Act, came into operation during his administration. This council arrogated to itself authority exceedingly embarrassing to the governor-general, to whom it was very hostile. Hastings used very unscrupulous, and at times very unjustifiable means to replenish the East India Company's exchequer, but, by his energy and talent, he averted dangers that threatened to annihilate the British supremacy in India. The powerful Mussulman sovereigns, Hyder Ali and the Nizam of the Deccan, assisted by French officers, combined with the Mahrattas against the English; Sir Eyre Coote broke up the confederacy, and defeated Hyder Ali in 1781. In 1782, the Supreme Court of Judicature was deprived of its independent powers, and the policy of Hastings was successful both in the council and in the field. In 1784, Mr Pitt instituted the Board of Control.

Marquis Cornwallis (1786—1793).—Lord Cornwallis, who succeeded Warren Hastings, was both governor-general and commander-in-chief. His administrative measures were important, and consisted most notably in fixing the land-rent throughout Bengal on that system of land tenure known as Zemindari, and reforming the judicial system. In 1790, Lord Cornwallis, with the Nizam, the Mahrattas, and the Rajah of Coorg for allies, made war on Tippoo, Sultan of Mysore, who had invaded Travancore, then under British protection. Terms were dictated to Tippoo at his capital, Seringapatam, and he was compelled to cede half his dominions to the Company.—The Marquis Cornwallis was succeeded by Sir John Shore (1793—1798), whose rule was in no respect memorable.

Marquis Wellesley (1798—1805).—The British empire in the East, like that of Napoleon I. in Europe, could only be maintained by constant fighting; it was the price paid for empire, and to stand still was to retrograde. Tippoo Sahib broke his faith by intriguing against the English both with the French and with native princes: his bad faith cost him his crown and his life. In May 1799, Seringapatam was captured, and Tippoo slain. The Hindu dynasty, displaced by Hyder Ali, was restored, and the administration carried on most successfully for the youthful rajah by Colonel Wellesley (afterwards Duke of Wellington). In the famous battle of Assaye, in 1803, he defeated the Mahrattas under Scindia; and the victories of Lord Lake in Northern I. extended very considerably the dominions of the Company. The policy of the Marquis Wellesley was, however, too aggressive to suit the views of the East India Company, and he was superseded by Lord Cornwallis, who only returned to I. to die. Lord Minto succeeded from 1806 to 1813.

Nothing of much importance occurred until the Marquis of Hastings became governor-general (1813—1823). He waged war against the Pindaris, who were entirely suppressed. He had previously defeated the Gurkhas; and before the close of his brilliant administration, he made the British power supreme in India. The civil administration of the Marquis of Hastings was directed to the amelioration of the moral condition of the people of India.

The next administrations were those of Earl Amherst and Lord William Bentinck. The first was signalised by the Burmese war, the second by the suppression of sutti and the Thugs.

Earl of Auckland (1835—1842).—This governor-general is known chiefly by his unjustifiable and disastrous Afghan policy, ending in the horrible massacre of British troops in the Khyber Pass. See AFGHANISTAN.

Earl of Ellenborough (1842—1844).—The 'army of retribution' proceeded to Cabul soon after Lord Ellenborough took the reins of government. Cabul was sacked, several public buildings razed to the ground, after which the country was evacuated. The conquest of Sinde by Sir Charles Napier, followed by its annexation, also belongs to this administration.

Sir Henry Hardinge (1844—1848).—Lord Ellenborough having been recalled by the East India directors, from alarm at his martial tendencies, Sir Henry Hardinge was sent to take his place. The attention of the new governor-general was, however, soon diverted from works of peace, to do battle with the bravest people of India. Ever since the death of our ally, Runjeet Singh, in 1839, the Punjab had been in a state of disorganisation. The Sikhs, uneasy at our conquests in Sinde and Gwalior, and remembering our discomfiture at Cabul and the Khyber, resolved to anticipate the attack they considered imminent. The first Sikh war commenced on the part of the Punjabees by the passage of the Sutlej, and was followed by the terrible battles of Moodkee, Ferozeshah, Aliwal, and Sobraon, in which, after very hard fighting, the Sikhs were defeated with great slaughter. The war resulted in a British resident and British troops being stationed at Lahore, although the boy-prince, Dhuleep Singh, was acknowledged as Maharajah. The Cis-Sutlej states, the Jullundur Doab, and the alpine region between the Beas and the Sutlej, were annexed.

Marquis of Dalhousie (1848—1855).—The administration of the Marquis of Dalhousie is memorable for the commencement of superb public works, cheap uniform postage, railways, telegraphs, improvements in government, and social progress generally; a second Sikh war (ending in the crowning victory of Gujerat, 21st February 1849), a second Burman war (finished in 1852); and the annexation of four kingdoms, the Punjab, Pegu, Nagpûr, and Oude.

Viscount Canning (1856—1862).—When Lord Canning took the reins of government, everything promised a reign of peace and prosperity. With the early days of 1857 came the first mutterings of the storm that was to sweep over so large a portion of British India. At the commencement of the year, chupattees (cakes of flour and water) were circulated mysteriously through the North-west Provinces; treasonable placards appeared at Delhi, and other suspicious occurrences gave warning of Mohammedan disaffection or conspiracy. The Enfield rifle and its greased cartridge was at this time put into the hands of the sepoys without explanation or precaution; and General Anson, the commander-in-chief, snubbed caste, and was against all concession to the 'beastly prejudices' of the natives. The mutiny broke out at Meerut (32 miles from Delhi), where there were stationed European troops amounting to about 1800 men, besides sappers and miners, and about 2900 native soldiers. On the 23d April, the skirmishers of the 3d Native Cavalry, on parade, refused to touch the new cartridges, although permission was given. to break off the end with the fingers. The 85 mutineers were tried, and sentenced to imprisonment. On the evening of the next day, the native troops rose, liberated their comrades and the felons of the jail, shot down their officers, and the doomed station was given up to conflagration and massacre. The next day, the 11th of May, the Meerut mutineers reached Delhi. There were no European troops to oppose them, and the city fell into their hands, but was retaken by General Archdale Wilson the following September. Nana Sahib of Bithoor, whose claims as the adopted son of the Pishwah had not been recognised by the British government, fanned the insurrection. At the end of June, General Wheeler was forced to surrender to him at Cawnpore, and, in spite of the promise of safe-conduct to Allahabad, all the men were immediately massacred. The women were butchered on the 15th of July by order of the Nana, when he heard of Havelock's march from Allahabad, which began on the 7th of the same month. The Europeans in the Residency at Lucknow were besieged on the 30th of June. Five days afterwards, the commandant, Sir Henry Lawrence, died of his wounds, and his place was taken by Brigadier Inglis, who bravely held out till he was relieved on the 25th of September by the heroic Havelock. The final relief was achieved by Sir Colin Campbell; and on the 17th the city was again in complete possession of the British. By June 1858, no city or fortress of any importance remained in the hands of the mutineers. Oude was entirely reduced by the beginning of the year 1859. The able rebel leader, Tantia Topee, a Mahratta Brahman, was taken, tried by court-martial, and hanged. During the mutiny, valuable assistance and protection were received from many native chiefs. Honours were, in consequence, bestowed upon Scindia, the Maharajah of Gwalior; Holkar, Maharajah of Indore; the Nizam, and others. The trial of the king of Delhi resulted in his conviction as 'a false traitor to the British government, and an accessory to the massacre in the palace.' It was the fate of the last representative of the East India Company to sentence the last Great Mogul and heir of the House of Timûr 'to be transported across the seas as a felon.' He was transported accordingly, accompanied by his queen and son, to Tongu, in Pegu where he died in 1862.

The transfer of the government of I. to the British crown, and the new constitution already referred to, were the immediate consequences of the mutiny.

The Earl of Elgin (1862—1863).—No event of importance occurred during the brief administration of Governor-general Lord Elgin, who died in November 1863.

Sir John Lawrence (1863—1865).—Towards the close of Lord Elgin's administration, a Mohammedan rising was apprehended in North-western India, and it was considered most desirable that the new viceroy should have practical experience of Indian affairs. Sir John, afterwards Lord Lawrence, was accordingly appointed viceroy. He conducted the government with prudence and zeal; but unfortunate events occurred during his term of office. A war with Bhotan terminated rather unsatisfactorily for England in 1865; and a dreadful famine occurred in Orissa, caused by a drought and failure of the crops, by which one million and a half of people perished.

Earl Mayo (1869—1872).—The administration of Lord Mayo was inaugurated by a great demonstration at Umballa on 27th March 1869, when the Ameer of Afghanistan was received in state, and received a supply of arms and the first instalment of a money subsidy of £120,000 a year. In returning from Rangoon to Calcutta, Lord Mayo visited a convict establishment in the Andaman Islands, and was assassinated there by one of the prisoners on 23d February 1872. The act had no political significance.

Baron Northbrook (1872).—Lord Northbrook entered on office in May 1872. The chief events of his administration have been 'the Bengal famine,' which, anticipated in good time, had in August 1874 passed over without the fearful consequences of the famine in Orissa during the administration of Sir John Lawrence; and the visit of the Prince of Wales to India (1875).

For further information upon I., the following works may be consulted with advantage: *The History of British India*, by James Mill, with notes and continuation by Horace Hayman Wilson, M.A., F.R.S. (Lond. 1858); *The Indian Empire*, by R. Montgomery Martin (Lond. 1862); *The History of the Indian Revolt*, published by the Messrs Chambers in 1859; *An Account of the Mutinies in Oude, and of the Siege of the Lucknow Residency*, &c., by Martin Richard Gubbins (Lond. 1858); *The Marquis of Dalhousie's Administration of British India*, by Edwin Arnold, M.A. (Lond. 1862); Watson and Kaye's *People of India* (Lond. 1866—1870); *Geography of India*, by George Duncan (Madras, 1870); Kaye's *Sepoy War* (1871); Hunter's *Orissa*, and other works on India (Lond. 1872—1874); Markham's *Official Report, exhibiting the Moral and Material Progress of India during* 1871—1872 (printed 1873); *Geography of India*, by J. Hill (Lond. 1824); *History of India*, by Sir H. M. Elliot (Lond. 1872); *The Highlands of Central India*, by Captain J. Forsyth (Lond. 1871); *La Langue et la Littérature Hindoustanie en* 1871, by M. Garcin de Tassy (Paris, 1874).

INDIA, THE NATIVE STATES OF, are divided into those which are entirely independent and those which are more or less under the control of the Indian government. To the former class belong Nepaul (q. v.) and Bhotan (q. v.). To the latter class belong a large number of states, an estimate of the area and population of which is given in the following table:

Native States under the	Area in Sq. Miles.	Population.
Governor-general of India, .	385,296	27,716,852
Lieutenant-governor of Bengal, .	79,156	2,139,565
" " N.W. Provinces,	5,390	1,284,691
" " Punjab, . .	43,877	5,086,502
" " Cent. Provinces,	28,899	1,095,275
Governor of Madras, . . .	31,958	2,371,833
" Bombay, . . .	72,076	6,552,170
Total, ...	646,147	46,245,888

The native princes who profess the Hindu religion are called rajahs and maharajahs; those who are Mohammedan are called nawabs, khans, &c. The following are a few of the most important more or less dependent native states: In the north-west is Cashmere (with Ladakh), under a native rajah (pop. 3,000,000), a mountainous region of the Western Himalaya; the hill states, under a large number of native chiefs (pop. 750,000); Gurhwal, under a rajah (pop. 200,000); Bawalpûr, under a khan, south of Multan (pop. 1,000,000). The Sikh States, the largest of which is Puttiala (pop. 1,250,000), lie between the Jumna and the Sutlej. The Rajpoot States (pop. 8,500,000) number 18, each under a rajah. The states of Malwa are 21 in number: among the most important are Bhopal (pop. 815,000) and the Bundelcund States (pop. 1,142,000). Gwalior, or Scindia's dominions, includes a number of scattered districts (pop. 3,250,000), situated in the valleys of the Tapti, Nerbudda, and Chumbul. The present maharajah attained his majority in 1853, and was then intrusted with the administration. He has governed the country well, and, as stated above, in 1857 remained faithful to England. Indore, or the Holkar's dominions, lies between the Vindhya and Satpura Mountains (pop. 815,000). Gugerat has a pop. of 4,250,000, and Cutch, 500,000: both countries are split up into a number of states. In the Deccan, Hyderabad has an area of 80,000 square miles; the population is about eleven millions. The country is ruled by the nizam or 'Regulator;' but Sir Salar Jung, many years minister of the late nizam, has, during the minority of the present prince, acted as regent, and discharged the difficult duties intrusted to him with very great ability. Cochin has a population of 500,000, and Travancore of 1,000,000. Mysore (pop. 5,055,412) is a native state, but has long enjoyed the advantages of British rule: it is to be restored to native administration on the maharajah, who in 1874 was eleven years of age, reaching majority. He is under the care of an English tutor, the country being administered by an English commissioner. To these states are to be added those situated in the north-eastern provinces—viz., Sikkim, on the slope of the Himalayas, between Nepaul and Bhotan (pop. 62,000), governed by a rajah; Munipûr, between Assam and Burmah (pop. 75,000), under a rajah; and Independent or Hill Zipperah, a country covered with dense jungles, and inhabited by the Kookies, a savage race, whose chiefs pay tribute to a maharajah. No census of the native states having been taken, the estimates of population must be considered as mere approximations to the truth, on which no great reliance is to be placed.

Further information respecting many of the native states of I. will be found under their respective names.

INDIA, French, comprises, at the present time, the following settlements:

Name.	Locality.	Area in Sq. Miles.	Population in 1869.
Chandernagore,	On the Hooghly River,	189	261,449
Karikal, .	Coromandel coast,		
Pondicherry,	Coromandel coast,		
Yanon, .	Orissa coast, .		
Mahé, . .	Malabar coast,		

INDIA, Portuguese, is now confined to the territories indicated in the annexed table:

Name.	Locality.	Area in Sq. Miles.	Population.
Goa, &c.,	Western coast, . .	1441	474,234
Damaun,	Concan coast, . .	94	53,283
Diu, .	South coast of Kattywar,		

INDIA RUBBER. See Caoutchouc.

INDIAN ARCHITECTURE. The styles of art which have existed at different times in India, as in other countries, vary with the religion prevalent at the time. The earliest faith of which we have any architectural monuments is that of Buddhism (q. v.). About 250 B.C., Asoka, a powerful monarch, became a strenuous supporter and propagator of Buddhism, and to his zeal we owe the oldest architectural remains of India. From his time to the present day, the sequence is unbroken, and the whole history of Buddhist architecture can be most distinctly traced either in India or in Ceylon, Java, and Tibet. The whole subject is as yet, however, but imperfectly illustrated, the best account of the Indian styles being that contained in Fergusson's *Handbook of Architecture*, and his other works.

The Buddhist remains are of two kinds: 1. Commemorative monuments, called Stupas or Topes (q. v.); the earliest stupas are single pillars, bearing evident traces of a western origin, and thus affording a clue to the history of Indian art. 2. Temples (chaityas) and monasteries (viharas). Of the chaityas and viharas, no built examples remain; they are all excavated out of the solid rock. There are no less than 40 or 50 groups of these monuments, each group comprising from 10 to 100 distinct excavations. A few of these belong to other religions, but the great majority are Buddhist, and nearly the whole are monasteries, not over 20 to 30 being temples. The oldest are at Bahar and Cuttack in Bengal (200 B.C.), but they are few in number, nine-tenths of the caves being in the Bombay presidency. This probably arises from the nature of the material in which they are cut, the eastern caves being in a hard granite, and those of the west being in a very uniform and comparatively soft amygdaloid. The latter date from the beginning to about the 10th c. of the Christian era. The cave-temple at Karli is one of the largest, and is of a good style. See section in art. Buddha. In plan and general arrangements, it strongly, though no doubt accidentally, resembles a Christian basilica, with nave, aisles, and vaulted roof, and an apse with the shrine in the place of the altar. There is also an outer hall or atrium, and a gallery like the rood-loft. On the roof, are numerous wooden ribs, attached to the vault; these and other portions indicate that the building from which the cave was copied was wooden, which may account for the absence of earlier built examples. This cave is 126 feet long, 45 feet 7 inches wide, and 40 to 45 feet high.

The vihara or monastery caves are very numerous, as was required by the enormous number of Buddhist priests. The oldest and simplest examples are in Bengal, but the finest are in Western India. They consist of a central hall, with cells round three sides, and a verandah on the fourth side, next the open air; opposite the central entrance, there is usually a large cell or shrine, containing an image of Buddha. There are fine caves at Ajunta, Baugh, &c., many of them beautifully carved and painted. The pillars are most elaborately ornamented, and have the bracket capitals which distinguish all Indian architecture. From the absence of any built example, there has been great difficulty in forming a correct idea of the exterior of the buildings from which these caves were copied. By following the style into other countries where the religion has prevailed at different times, Mr Fergusson has been able to trace it up to the present day, and to establish by analogy the probable external appearance of the early Buddhist architecture.

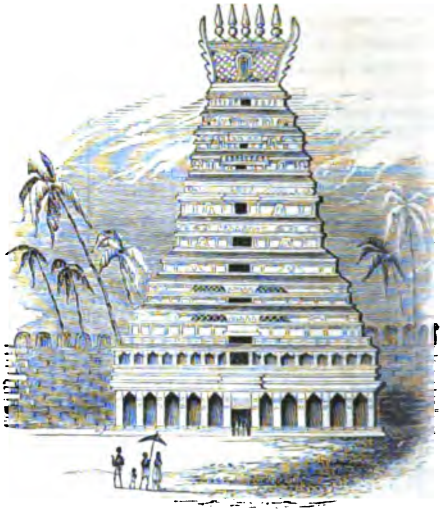
The temple of Brambanam, in Java, seems to shew the original form of built cells. They are quite detached, and arranged in a square round a central temple—evidently suggesting the arrangement in the caves at Ajunta. Some rock-cut temples which have an exterior (at Mahavellipore), shew the cells attached to the main building. In Burmah, where the monastic system still prevails, the monasteries, which are of wood, are built in stages in a pyramidal form. The temple of Boro Buddor (q. v.), in Java, has a similar arrangement, consisting of a large number of cells or niches in tiers; but in place of being occupied by priests, they are filled with cross-legged Buddhas, a conversion quite common in later Hindu architecture. In many styles of architecture, the niches or other subordinate parts are frequently copies on a small scale of the façade of the building itself. Thus, for instance, the windows with pillars and pediments in classic architecture, are a repetition of a temple end. The niches inside the caves, containing statues of Buddhist saints, are in a similar manner imitations of the main façade. In the same way externally, the Burmese pagodas and Hindu temples are ornamented all over with models of the buildings themselves.

Mr Fergusson has thus traced, in fuller detail than our space will allow, the transformations that have taken place in Buddhist architecture, which, whatever its artistic qualities may be, has at least the very interesting feature of being a style which has existed from 200 years before Christ up to the present day.

The other styles of Indian architecture are illustrated by the temples of the Jainas and those of the Hindus. The former seems to have been an imitation of the Buddhist temples without the cells for the priests. Their religious structures consist of a sanctuary surmounted by a spire; in front of this, a pillared vestibule, with a dome, and round the whole an arcaded enclosure, with cells all round, containing images. The cells are also surmounted with spires, and the arcades with domes are often repeated to a considerable number within one enclosure. The most striking feature of this style is the dome, which is constructed by horizontal jointing, not with regular arches. The domes, with the pillars, bracket capitals, &c., are all elaborately decorated.

Hindu architecture is divided into two styles—northern and southern. All the finest examples are southern, and are found south of Madras. The temples consist of the temple or vimana, in front of which is the pillared porch or mantopa, the gate pyramids or gopuras, forming the entrances to the enclosure, and the pillared halls or choultries. In the south, the temple is always pyramidal, and in many stories; in the north, the outline is curved, and in one story. The finest example is the pagoda of Tanjore. It is 82 feet square at base, and 14 stories, or about 200 feet, in height.

The gopuras are similar to the pagodas, but oblong in place of square.



Gopura, or Gate:
Leading into the enclosure of the temple at Seringham.

The pillared halls are very wonderful structures, containing sometimes as many as 1000 columns, and as these are all elaborately carved, and all different, the labour of their construction must have been enormous. They are used for many purposes connected with Hinduism, their most important use being as nuptial halls, in which the mystic union of the divinities is celebrated. The general arrangement of these halls sometimes produces a good effect; but from their flat roofs, they cannot equal the beauty of the domed arcades of the Jains. These buildings are of various dates, from the commencement of the Christian era to the last century, and it is remarkable that the oldest examples are the finest—the style growing gradually more and more debased, till, at the present day, it has become, like the religion, a mass of absurdity and obscenity. The celebrated rock-cut temple, called the Kylas, at Ellora (q. v.), belongs to this style.

When the Mohammedans conquered India, they imitated the style of the country in their mosques, and afterwards the Hindus borrowed from them, and thus a mixed style was created, which, in the palaces, tombs, &c., of the native princes, produces picturesque effects. The Mohammedans also covered the country with specimens of their Moorish style, which will be treated under SARACENIC ARCHITECTURE.

Some of the finest buildings of India are the ghauts or landing-places, with their broad flights of steps; the reservoirs or bowlees, and dams, all ornamented with temples, kiosks, stairs, &c.; but our space will not permit us further to describe them. There is one very remarkable fact connected with Indian architecture, viz., that although the form of the arch is constantly used—in domes, arcades, &c., especially in the style borrowed from the Moslems—yet the radiating arch construction is never adopted. The architraves are supported on bracketed capitals, which project, bracket over bracket, till the space is spanned by one lintel. This leads to many beautiful results in the early styles, and in the later mixed style, the bracketed cornices are amongst its finest features.

INDIAN ARMY. See East India Army.

INDIAN CORN. See Maize.

INDIAN FIG. See Prickly Pear.

INDIAN FIRE, a bright white signal-light, produced by burning a mixture of 7 parts of sulphur, 2 of Realgar (q. v.), and 24 of nitre.

INDIAN GRASS MATTING, or **INDIAN MATTING,** a kind of matting imported in large quantities from Calcutta, is made from a species of Papyrus (q. v.), *P. Pangorei*, called *Madoorkati* in Bengal, and there very abundant. The stalks of the plant, when green, are split into three or four pieces, which, in drying, contract so that the edges come almost into contact; and when woven into matting, they shew nearly the same beautiful shining surface on both sides.

INDIAN INK. The cakes of this substance, which is a mechanical mixture, and not, like the true inks, a chemical compound, are composed of lampblack and size or animal glue, with a little perfume. The lampblack must be remarkably fine, and is said to be made in China by collecting the smoke of the oil of sesame. A little camphor (about 2 per cent.) is also found in the ink made in China, and is thought to improve it. This substance is used in that country with a brush both for writing and for painting upon paper of native manufacture, while, in this country, it is extensively employed for designs in black and white, and all intermediate shades of colour. Much curious information on this pigment may be found in Merimée's treatise, *De la Peinture à l'Huile.*

INDIAN OCEAN, one of the five grand divisions of the universal ocean, is bounded on the S. by a line drawn from the Cape of Good Hope to the most southerly extremity of Tasmania or Van Diemen's Land. Its other limits, reckoning from the last-mentioned point, are Van Diemen's Land, Australia, the Indian Archipelago, Farther India, Hindustan, Persia, Arabia, and Africa. Gradually narrowing from south to north, the I. O. forks at Cape Comorin into the Bay of Bengal on the east, and the Arabian Sea on the west, the latter again branching off into two arms, the Persian Gulf and the Red Sea, which reach respectively the mouth of the Euphrates and the neighbourhood of the Mediterranean. These details exclude the waters of the Indian Archipelago, as belonging rather to the Pacific Ocean. As above defined, the I. O. stretches in lat. from 43° 35′ S. to 30° N., and in E. long. from 18° 29′ to 146° 12′. It contains thousands of islands, or rather tens of thousands. Of these, Madagascar is the largest, and at about the same distance from it to the east as the continent of Africa is to the west, lie Bourbon or Reunion towards the south, and Mauritius towards the north. Next in size to Madagascar, and, in fact, the only other island of any considerable magnitude, is Ceylon. As a channel of commerce, this ocean would appear to have been the first to find a place in history, inasmuch as the earliest voyage on record beyond the land-locked Mediterranean—that of Solomon's navy—did certainly extend further than the Straits of Bab-el-Mandeb. In this respect, it virtually maintained its superiority during fully 2000 years, being habitually traversed, in the line of the crow's flight, between Arabia and Hindustan, while coasting voyages alone were known in the Atlantic. This comparatively bold navigation was suggested and facilitated by the periodical monsoons of the northern part of the I. O., blowing, as they do, alternately from the south-west and the north-east.

INDIAN SHOT (*Canna Indica*), a plant common in almost all tropical countries; a herbaceous perennial, with a creeping root-stock (*rhizome*), and a simple stem, formed by the cohering bases of the large, tough, ovate-oblong leaves. It belongs to the natural order *Marantaceæ*. It derives the name I. S. from the seed, which is hard, round, and about the size of a very small pea, and is sometimes used as shot. The seed yields a beautiful red colour. The root-stocks are very large, spongy, and jointed, and are used in Brazil for emollient poultices in tumours and abscesses. The root-stocks of some of the other species of *Canna* are more valuable, yielding the starch called Tous-les-mois (q. v.).

INDIAN TERRITORIES, a phrase of vague meaning, is peculiar to the geography of America. Originally and naturally, it indicated such portion of each country as had not yet been colonised, a portion which, of course, was constantly diminishing. In this sense, therefore, the words necessarily varied in extent of application from year to year. In 1821, however, the I. T. of British America were defined by statute as comprising only the unsettled wildernesses beyond the Hudson's Bay Company's chartered domain, which was itself generally held to be identical with the basins of all the feeders of Hudson's Strait and Hudson's Bay. Due west, this vast region bordered on Russian America, while from the parallel of 54° 40′ southward to that of 42°, it touched the Pacific Ocean. Subsequently to 1821, this maritime section was partly ceded to the United States, and partly erected into the colony of British Columbia, so that the I. T. of the present day nowhere reach the sea excepting on the ice-bound shores of the north. Within this limited range, too, they have practically lost their statutory character, being virtually released (see Hudson's Bay Company) from the restrictive system of trading-licences. Hitherto, perhaps, the change has been merely nominal, for, independently of the influences, moral and physical, of long possession, the Hudson's Bay Company finds, in distance and seclusion, a guarantee stronger than any parliamentary title. If competition is likely to be powerless for years to come, colonisation is sure to be so for ages under the combined prohibitions of soil and climate. The I. T. stretch in N. lat. from about 52¼° to about 70°, and in W. long. from about 103° to the international boundary between Russia and England of 141°. They consist chiefly of the valleys of the Back, the Coppermine, and the Mackenzie. Beyond all the analogies of civilised communities, the native population is incredibly sparse and scanty, certainly not exceeding, at an extravagant estimate, 10,000 in number, exclusively engaged in hunting and fishing; while less than 500 strangers of every description are scattered abroad in hovel-like forts, hundreds of miles distant from each other. The I. T. form part of the diocese of Rupert's Land, established in 1849; but it is only since 1858 that they have actually become the scene of missionary operations.

INDIAN TERRITORY, a country reserved by the government of the United States for the Indian tribes removed west of the Mississippi, and those living there. It lies between 33° 30′ and 37° N. lat., and 94° 20′ and 103° W. long., being 370 miles long by 220 wide, with an area of 74,127 square miles. It is bounded on the N. by Kansas, E. by Arkansas, S. and W. by Texas, from which it is separated on the south by the Red River. It is a beautiful country, with vast fertile plains, watered by innumerable streams, including the Red River, the Arkansas, and their branches. The climate is genial, producing cotton, tobacco, maize, wheat, and fruits. Coal, iron, zinc, copper, salt, and petroleum springs abound. Its population of about 70,000 consists of Cherokees, Creeks, Seminoles, Choctaws, Chickasaws, and remnants of smaller tribes. The principal tribes are in a high state of civilisation, and, except the Seminoles, all possess a written constitution and code of laws. In 1874, there were 6 high schools, and 88 day schools among the Cherokees, Choctaws, and Chickasaws. Many of the Indians cultivate large plantations.

INDIAN YELLOW, or **PURREE**, is a colouring matter highly esteemed by artists. It is exported from the East Indies in masses of three or four ounces in weight, which are of a dark brown colour externally, but of a bright orange yellow in the interior. It is generally believed to be a urinary sediment of the camel or buffalo, after the animal has fed on decayed and yellow mango leaves. Its odour is peculiar, and resembles that of castoreum. This substance consists chiefly of the magnesian salts of an acid termed *purreic* or *euxanthic acid*. It is almost insoluble in cold water or alcohol, but is soluble in hot alcohol and in ether; it also dissolves freely in boiling dilute hydrochloric acid, from which stellate groups of acicular crystals of euxanthic acid ($HO,C_{42}H_{17}O_{21}$) are deposited on cooling. Alkaline solutions dissolve this acid, and form a yellow liquid. A solution of euxanthate of potash when mixed with the solutions of the salts of the earths, gives brilliant yellow, sparingly soluble precipitates, and, with acetate of lead, it forms a yellow insoluble lake.

By dry distillation, this acid yields a yellow, crystalline sublimate of *purrenone* or *euxanthone* ($C_{40}H_{12}O_{12}$), water and carbonic acid being evolved; and, with nitric acid, it yields several nitrogenous bodies of considerable interest, in a purely chemical point of view, but of no practical importance.

INDIA'NA, one of the United States of America, organised in 1816, with a governor and legislature, extends from 37° 47′ to 41° 46′ N. lat., and from 84° 49′ to 88° 2′ W. long., having a length of 275 miles, a breadth of 135 miles, and an area of 33,809 square miles, or 21,637,760 acres. It is bounded on the N. by Michigan state and lake, E. by Ohio, S. by Kentucky, from which it is separated by the Ohio River, and W. by Illinois. The state is divided into 92 counties. The capital is Indianapolis, near the centre, and its chief towns are Evansville, New Albany, Madison, Vincennes, Terre Haute, Lafayette, Fort Wayne, and its only lake-port, Michigan City. The population in 1800 was 4875; in 1810, 24,520; in 1820, 147,178; in 1830, 343,031; in 1840, 685,866; in 1850, 988,416; in 1860, 1,350,941 (of which nearly half were immigrants from other states, and from Germany and Ireland); and in 1870, 1,680,637. The state is level, with sluggish streams and great prairies. It is chiefly drained by the Wabash River and its branches. There are 7700 square miles of coal, portions of which, on the Ohio, are cannel coal of excellent quality. The soil is of wonderful fertility, and the climate is like that of the south of France, with colder winters, and the hills on the Ohio are covered with fine vineyards. The staple productions are wheat, maize, cattle, swine, tobacco, fruits, wine, &c. In 1869, mines of coal and iron were found, and also quarries of building-stone. There are over 3000 miles of railway, and a canal of 467 miles, uniting the Ohio River with Lake Erie. There is a state university, a normal school, numerous common schools and churches, and about 200 periodicals. Vincennes, on the Wabash, was settled by the French in 1702. Early in this century, the settlements were disturbed by Indian hostilities; the Indians were defeated in 1811 by General Harrison, and the territory was rapidly peopled.

INDIANA'POLIS, a city and capital of Indiana, United States of America, is built on the west fork of White river, near the centre of the state, 109 miles north-west of Cincinnati. It is a regularly built and beautiful city, with a handsome state-house, court-house, jail, and state asylums for the blind, deaf and dumb, and insane. It has a university, 2 female colleges, 33 churches, 8 banks, several printing-offices, hotels, woollen factories, iron-foundries, planing-mills, and flour-mills, with abundant water-power. It is the terminus of eight radiating railways. In 1840, the population was 2692; in 1870, 48,244.

INDIANS, AMERICAN, the collective name now generally given to the various nations and tribes inhabiting North and South America, at the time of their discovery by the Spaniards, and to such of their descendants as survive at the present day. The name of Indians was first given to the natives of America from the mistaken notion of the early voyagers, Columbus himself included, that the newly found continent was in reality a part of India. This was soon shewn to be an error; but the name of Indians, thus wrongly applied to the inhabitants, continued to be used in every narrative of voyage and discovery, and has descended even to our own times, only that we now qualify it in some measure by speaking of them as *American Indians*.

In the classification of Blumenbach, the American Indians are treated as a distinct variety of the human race; but in the threefold division of mankind laid down by Dr Latham, they are ranked among the Mongolidæ. Other ethnologists also regard them as a branch of the great Mongolian family, which, at a remote period of the world's history, found its way from Asia to the American continent, and there remained for thousands of years separate from the rest of mankind, passing meanwhile through various alternations of barbarism and civilisation. Morton, however, the distinguished American ethnologist, and his disciples Nott and Gliddon, claim for them a distinct origin, one as indigenous to the continent itself as its fauna and flora. Prichard, whose views generally differ from those of Morton, acknowledges that, 'on comparing the American tribes together, we find reasons to believe that they must have subsisted as a separate department of nations from the earliest ages of the world. Hence, in attempting to trace relations between them and the rest of mankind, we cannot expect to discover proofs of their derivation from any particular tribe or nation in the old continent. The era of their existence as a distinct and insulated race must probably be dated as far back as that time which separated into nations the inhabitants of the Old World, and gave to each branch of the human family its primitive language and individuality.' Dr Robert Brown, in his *Races of Mankind*, the latest authority on the subject, attributes to the American race an Asiatic origin. He says: 'Not only are the Western Indians in appearance very like their nearest neighbours, the North-eastern Asiatics, but in language and tradition, it is confidently affirmed, there is a blending of the people. The Eskimo, on the American, and the Tchuktchis, on the Asiatic side, understand each other perfectly.' In fact, modern anthropologists incline to think that Japan, the Kuriles, and the neighbouring regions may be regarded as the original home of the greater part of the American race. It is also admitted by anthropologists, that between these various tribes, from the Arctic Sea to Cape Horn, there is greater uniformity of physical structure and personal characteristics than is seen in any other quarter of the globe. The 'Red Men,' as they are called, of the United States and Canada, differ in many respects from the Guranis of Paraguay, and both from the wild tribes of California, but all exhibit the clearest evidence of belonging to the same great branch of the human family. Upon this point, the testimony of a writer like Humboldt is very important. 'The Indians of New Spain,' says Humboldt, 'bear a general resemblance to those who inhabit Canada, Florida, Peru, and Brazil. . . . . We think we perceive them all to be descended from the same stock, notwithstanding the prodigious diversity of their languages. In the portrait drawn by Volney of the Canadian Indians, we recognise the tribes scattered over the savannahs of the Apure and the Carony. The same style of features exists in both Americas.' The Mongolian cast of features is most marked in the tribes nearest the Mongol coast, i. e., on the shores of the Pacific, and gets less noticeable as we go eastward. Their traditions, too, indicate that the tribes on the eastern seaboard came from the west, and the western tribes even came from regions still further west.

Generally, the physical characteristics of the American Indians are as follows: a square head, with a low but broad forehead, the back of the head flattened, full face, and powerful jaws; cheekbones prominent; lips full; eyes dark, and deeply set; the hair long, not absolutely straight, but wavy, something like a horse's mane, and like that, of a glossy hue; little or no beard—where it does appear, carefully eradicated with tweezers; colour of the skin reddish or copper; height of the men about the average, but looking taller from their erect posture and slender figure; the women rather shorter, and more inclined to obesity, but many of them with symmetrical figure and pleasing countenance; hands and feet of both men and women small.

As before said, however, there being some hundreds of tribes among the American Indians, there are many departures from these general characteristics, not only in individuals, but entire septs. 'The Americans,' says Prichard, 'are not all of the hue denominated *red*, that is, of a copper colour; some tribes are as white as many European nations; others brown or yellow; others are black, or, at least, they are described by travellers as very much resembling in colour the negroes of Africa. Anatomists have distinguished what they have termed the American form of the human skull: they were led into this mistake by regarding the strongly marked characteristics of some particular tribes as universal. The American nations are spread over a vast space, and live in different climates, and the shape of their heads is different in different parts. Nor will any epithet derived from their habits of life apply to all the tribes of this department. The native Americans are not all hunters: there are many fishing tribes among them; some are nomadic; others cultivate the earth, and live in settled habitations; and of these, a part were agriculturists before the arrival of the Europeans; others have learned of their conquerors to till the soil, and have changed the ancient habits of their race, which, as we may hence infer, were not the necessary result of organisation or congenital and instinctive propensity.' Dr Morton's views on this subject substantially agree with those of Prichard; and both concur in adopting the test of language as a proof of one common origin for the various native tribes of both North and South America. The linguistic conclusion, now generally acquiesced in, is thus briefly stated by Mr Albert Gallatin: 'Amidst that great diversity of American languages, considered only in reference to their vocabularies, the similarity of their structure and grammatical forms has been observed and pointed out by the American philologists. The result appears to confirm the opinions already entertained on that subject by Mr Du Ponceau, Mr Pickering, and others; and to prove that all the languages, not only of our own Indians, but of the native inhabitants of America, from the Arctic Ocean to Cape Horn, have, as far as they have been investigated, a distinct character common to all, and apparently differing from any of those of the other continents with which we are most familiar.'

The next question that comes under consideration is: Whence does it arise that, with all this similarity of physical conformation and language, there should have been only two nations among so many millions—namely, the Mexicans and Peruvians—who attained to any high degree of civilisation? When the Spaniards entered Mexico, they found in it a rich, powerful, and warlike nation, living in walled cities, in which were palaces and other sumptuous residences. They were ruled over by an emperor or king, whose sway extended over many other nations besides his own. They worshipped the sun, and had an organised hierarchy; they had also fixed laws, were acquainted with many of the arts and sciences, especially astronomy; they practised agriculture, worked mines, and displayed considerable skill in manufactures, both industrial and ornamental. The nation thus discovered was that of the Aztecs, who professed to have among them evidences of antiquity dating as far back as the year 554 of our era. A few years later, in Peru, the Spaniards found another nation, also exceedingly rich, numerous, and powerful, with a civilisation fully as much extended as that of the Aztecs, yet differing from that in many essential particulars. This was the nation of the Quichuas, frequently termed Incas (more correctly *Yncas*), associated with whom were the Aymaras, whose country had been subjugated by the Incas two or three centuries before the arrival of Pizarro in Peru. Each of these nations—the Mexicans and Peruvians—is supposed to have slowly developed its own civilisation during a long process of ages. In every other part of America, European settlers and explorers have found only complete or semi-barbarism. Such was the case in Virginia; such in New England, Canada, the Hudson's Bay Territory, California, and Patagonia. In Central America, however, there have been found extensive remains of architecture and other traces of civilisation, which would seem to date back to even a more remote period than that of the Mexican or Peruvian empires. Immense artificial mounds also exist in the valley of the Mississippi and elsewhere throughout America, supposed to be the work of the ancestors of the present wandering tribes. If so, there may be some truth in the theory of Dr Martius, a distinguished German ethnologist, 'that the nations of the New World are not in a state of primitive barbarism or living in the original simplicity of uncultivated nature, but that they are, on the contrary, the last remains of a people once high in the scale of civilisation and mental improvement, now almost worn out and perishing, and sunk into the lowest stage of decline and degradation.' Dr Prichard appears inclined to the same view, adding: 'Attentive observers have been struck with manifestations of greater energy and mental vigour, of more intense and deeper feeling, of a more reflective mind, of greater fortitude, and more consistent perseverance in enterprises and all pursuits, when they have compared the natives of the New World with the sensual and volatile, and almost animalised savages who are still to be found in some quarters of the old continent. They have been equally impressed by the sullen and unsocial character, by the proud apathetic endurance, by the feeble influence of social affections, by the intensity of hatred and revenge, and the deep malice-concealing dissimulation so remarkable amid the dark solitudes of the American forests.'

Dr Robert Brown adopts a geographical classification of the American tribes, which is, on the whole, the least unsatisfactory. There are Arctic tribes; north-western tribes inhabiting the region west of the Rocky Mountains between California and Alaska; Californian tribes; Indians of the Central Plains; Prairie tribes; North-eastern Indians; Canadian Indians; and Central American Indians. The chief existing tribes are: Eskimo, Cowichans, Tsongeisths, Nanaimos, Quakwolths, Nuchultaws, Koskeemos, Seshahts, Nittinahts in Vancouver Island; Hydahs (Queen Charlotte Islanders); Tsimpsheans, Bellacoolas, Chilcoatins, Shuswaps in British Columbia; Cyuse, Snakes, Klamaths in Oregon; the Digger or Californian Indians, the most degraded of all the tribes; the Comanches, Apaches, Navajos, Hualpais, Yampas in the Central Plains; the Moqui, Pueblos, Pimas, Papagos in New Mexico; Utahs, Pahutas, Pahides, Soshones, Loo-coo-rekahs, Goships, Cheynnes, Arraphoes, Kwivas, Arickarees, Poncas, Yanktons, Gros-Ventres, and Sioux or Dahcotahs, Assiniboines, Blackfeet, Crows, Omahas, Ottoes, Pawnees, &c., are all Prairie tribes; the Delawares, Mo-hee-con-neughs (Mohicans), Oneidas, Tuskaroras, Senecas, Shawnees, Cherokees, Chocktaws, Creeks, Seminoles, Osages, Kaskias, Weeahs, Potowatomies, Quapaws, Peorias, Kanzans, Sanks, Foxes, Puncas, &c., in the north-eastern states; the Crees, Santeux' or Ojebways, Chippewayans, the Sacliss or Shewhapmuch in Canada; Tehuantepecs, Mosquitos, Smoos, Twakas, Toonglas, Payas, Ramas, and Cookras in Central America.

The Indians are year by year decreasing in numbers. The government agents' reports are not very reliable, as they tend to over-estimate the Indian population. Dr Robert Brown gives some carefully prepared approximate statistics in his *Races of Mankind*, which are the most recent published. He says: 'In California and the states north of it I question if there are now over 10,000 or 12,000 Indians; while in the British possessions the number may be 30,000.' A fair estimate would probably give Alaska 20,000; British Columbia, 20,000; Vancouver's Island, 9000; Canada, 5000; California, Oregon, and states north of it, 10,000; prairie lands west of the Rocky Mountains, 10,000; other portions of the United States, 2000; in New Mexico and Central America, 20,000. This would give us a total of about 110,000 for the whole of North America, exclusive of half-breeds, &c. Some twenty tribes have become partially civilised, and live by agriculture, under the protection of the American government, on what are called 'Indian Reservations.' There are in these Indian communities many men and women whom education has developed into most valuable, intelligent, and even polished members of a highly civilised community. Two tribes (Chocktaws and Cherokees) have become wholly civilised, and have a settled form of government modelled on that of the United States. The Cherokees stand alone amongst modern nations in having produced a second Cadmus, one Sequoyah, or George Guess, who actually invented an alphabet. It must be stated, however, that fully one-half of these civilised tribes are, like Sequoyah, half-breeds. Even whites marrying Chocktaw or Cherokee women, are admitted, if they choose, into these tribes.

Again, M. d'Orbigny has classified the Indians of South America under three great groups, viz., the Andian group, the Mediterranean group, and the Brasilio-Guarani group; and these he subdivides into thirty-nine distinct nations; viz., '1. Quichua; 2. Aymara; 3. Chango; 4. Atacama; 5. Yuracares; 6. Mocetenes; 7. Tacana; 8. Maropa; 9. Apolista; 10. Araucananian; 11. Fuegian; 12. Patagonian; 13. Puelche; 14. Charrua; 15. Mbocobi; 16. Mataguayo; 17. Abipones; 18. Lengua; 19. Samucu; 20. Chiquito; 21. Saraveca; 22. Otuke; 23. Curuminaca; 24. Covareca; 25. Curaves; 26. Tapiis; 27. Curucaneca; 28. Paiconeca; 29. Corabeca; 30. Moxo; 31. Chapacura; 32. Itonama; 33. Canichana; 34. Movima; 35. Cayuvava; 36. Pacaguara; 37. Itenes; 38. Guarani; 39. Botocudo.' Other classifications have been attempted, but all more or less arbitrary. Morton is content with two grand divisions, viz., the 'Toltecan Nations' and the 'Barbarous Tribes,' the former embracing the ancient Mexicans and Peruvians, and the latter all the uncivilised or semi-civilised tribes from the extreme north to the extreme south. The Toltecans are said to be the builders of the remarkable series of mounds found throughout North America.

On this subject the reader may consult the works of Prichard, Latham, Morton, Humboldt, Du Ponceau, D'Orbigny, Gallatin, Schoolcraft, Catlin, Pickering, Prescott, Stephens, Tschudi, Fremont, and G. M. Sproat, a recent ingenious writer on western tribes. The ablest recent original authority is Dr Robert Brown's *Races of Mankind* (vol. i.).

INDI'CTION, a period or cycle of 15 years, the origin of which is involved in obscurity. Connecting the original meaning of the word, viz., 'the imposition of a tax,' with its signification in chronology, several writers have propounded theories explanatory of its origin, none of which, however, are supported by a tittle of evidence. It began to be used in reckoning time, chiefly by ecclesiastical historians, during the life of Athanasius; it was afterwards adopted by the popes, who still continue to use it, and through whose influence it came to be so generally employed during the middle ages, that the dates of charters and public deeds of this era are expressed in indictions as well as in years of the Christian era. The time from which reckoning by indictions commenced, is, according to some, the 15th September 312; according to the Greeks of the Lower Empire, 1st September 312; but when this method was adopted by the popes, it was ordered to be reckoned as commencing 1st January 313. The latter, which is now alone used, is called the *Papal Indiction*. If we reckon backwards to the commencement of the Christian era, it will be seen that 1 A.D. does not correspond to the 1st, but to the 4th year of an indiction—hence, *if to any given year of the Christian era 3 be added, and the sum divided by 15, the remainder will give the position of that year in an indiction*—e. g., 1874 A.D. is the 2d year of an indiction.

INDI'CTMENT is the name given to the written accusation of crime against a person, and upon which he is tried by a jury. An indictment in England commences with a caption, i. e., a description of the style of the court, which, however, is no part of the indictment; then follows the venue or statement of the place where the crime was committed; next follows the accusation, which is in the name of the jurors, i. e., the grand jury. In Scotland, an indictment is also the accusation on which a prisoner is tried; but it runs in the name of the Lord Advocate, addressed to the prisoner. In England, a prisoner is not entitled, before trial, to a copy of the indictment or a list of the witnesses against him, except in treason; but he can in most cases procure a copy of the depositions of witnesses, if these were taken before a magistrate, at a trifling expense. But many cases are not inquired into at all before a magistrate, so that this reasonable advantage is not given uniformly in England.

In Scotland, on the other hand, a prisoner is in all cases entitled to have a copy of the indictment given to him fifteen days before trial, and also a list of the witnesses to be brought against him.

INDIES. See EAST INDIES and WEST INDIES.

INDIGE'STION, or DYSPE'PSIA, is a term somewhat vaguely applied to various forms of disease of the stomach or of the small intestines in which the natural process of digesting and assimilating the food is deranged.

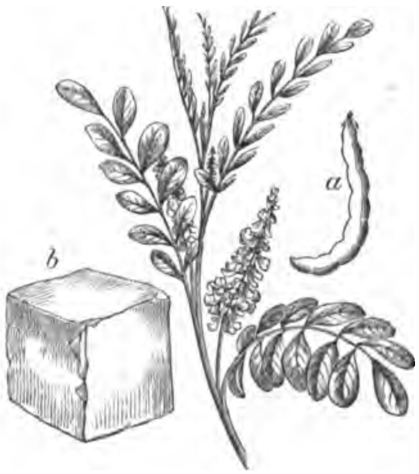
The symptoms of indigestion are by no means constant in all cases. There is often *anorexia* (or want of appetite), but occasionally the appetite is excessive, and even ravenous. Nausea not unfrequently comes on soon after a meal; while in other cases there is no nausea, but after the lapse of a couple of hours, the food is vomited, the vomited matters being very acid, and often bitter, from the admixture of bile. In severe cases, the vomiting has been known to occur after every meal for several months. Flatulence, relieving itself in eructations, is one of the standard symptoms of this affection, the gas that gives rise to this symptom being sometimes evolved from undigested matters in the stomach, and sometimes being apparently secreted by the walls of that viscus. It is very apt to occur in dyspeptic patients if they have fasted rather longer than usual. *Cardialgia* (popularly known as *heartburn*), *Pyrosis* (q. v.), or water-brash, and *Gastrodynia* (commonly designated *spasm* or *cramp* of the stomach, and coming on at uncertain intervals in most severe paroxysms), are other somewhat less common symptoms of indigestion.

The treatment of indigestion is more dietetic than medicinal. The quantity of food which can be dissolved by the gastric juice and intestinal fluids being limited (see DIGESTION), care should be taken that this quantity is not exceeded; moreover, the meals should not succeed each other too rapidly. Mr Abernethy, who was a great authority on this subject, laid great stress on the principle, that the stomach should have time to perform one task before another was imposed upon it, and he always recommended his patients to allow six hours to intervene between any two meals. With regard to the nature of the food best suited to dyspeptic persons, it may be safely asserted that a mixture of well-cooked animal and vegetable food is in general more easily digested than either kind taken exclusively. Mutton, fowls, and game are the most digestible kinds of animal food; and pork and all cured meats, such as salted beef, ham, tongue, &c., should be avoided. Raw vegetables, such as salads, cucumbers, &c., must also be prohibited. In most cases, dyspeptic persons would probably do well to avoid all stimulating drinks; but in some cases, a little cold, weak brandy and water, or a glass of old sherry, or a little bitter ale, may be taken with advantage. But upon all points of eating and drinking, a sensible patient must be mainly influenced by his own experience. The unquestionable benefit which dyspeptic patients often derive from a visit to a hydropathic establishment is due perhaps not so much to any specific action of the water, as to the well-regulated diet, the withdrawal of the mind from personal cares, and the change of scene. A six weeks' or two months' tour among the mountains of Scotland or Switzerland will in the same way often do a dyspeptic patient more good than he could have experienced from any amount of physicking at home.

A few words must be said regarding the mode of treating the most urgent of the individual symptoms. Loss of appetite may be remedied by the employment of bitters, such as quinine, gentian, chiretta, &c., or of mineral acids, or of both combined. Nausea and vomiting may be treated with hydrocyanic acid, chloroform, and creasote in very small doses. Two or three drops of dilute hydrocyanic acid in an effervescent draught are often an effectual remedy. In intense vomiting, the amount of food taken at a time must be reduced to the lowest possible limit. A tablespoonful of milk, mixed with lime-water, will sometimes remain on the stomach after all other kinds of food have been rejected. There is no better remedy for flatulence than peppermint-water; if it fails, a drop of cajeput oil on a lump of sugar may be tried. When the eructations are attended with an odour of rotten eggs—that is to say, when sulphuretted hydrogen is evolved from the decomposition of matters in the stomach—an emetic is the best cure. The remedies for the pain in the stomach vary with the character of the pain; bismuth, nitrate of silver, and opium are often serviceable, but should not be taken without advice. A teaspoonful of the aromatic spirit of ammonia in a wine-glass of camphor mixture, often gives instantaneous relief, and if not too often resorted to, can be taken with impunity.

INDIGI'RKA, a river of Siberia, in the government of Jakutsk, rises in the Yablonoi or Stavonoi Mountains, and after a northerly course, estimated at 750 miles, through a frozen desert studded with a few villages, falls into the Arctic Ocean in lat. 71° N., and long. 150° E.

I'NDIGO (Gr. *Indikon*, Indian), a most important vegetable dyestuff, yielding a beautiful blue and very durable dye, the basis also of the best black dye in woollen cloths. It has been used in India from a very early period, and was imported thence by the ancient Greeks and Romans, but was lost to Europe during great part of the middle ages—although the cultivation of the plant and preparation of the dye were described by Marco Polo in the 13th c.—until re-introduced by the Dutch about the middle of the 16th century. Its use in England, France, and Saxony was then for a considerable time



Indigo Plant (*Indigo tinctoria*):
a, pod; *b*, block of indigo.

prevented by a strong prejudice against it, arising from the difficulty experienced in fixing the colour. Since this has been overcome, the cultivation of plants producing indigo, long confined to India, has extended to many other tropical and subtropical countries, as Egypt, the West Indies, Mexico, Brazil, &c. These plants generally belong to the genus *Indigofera*, of the natural order *Leguminosæ*, sub-order *Papilionaceæ*. The keel of the corolla is furnished on both sides with an awl-shaped spur. The species of this genus number at least 150, and are natives of almost all tropical and subtropical countries. Of these, *I. tinctoria* is the species most generally cultivated in India. It is a half-shrubby plant, 2—3 feet high, with pinnate leaves, which have five or six pair of long-obovate, dull, bluish-green leaflets, and racemes of axillary pale red flowers.

The province of Tinnevelly produces a great quantity of indigo. Bengal produces, on an average, about nine millions of pounds annually. The sum which Europe annually pays for indigo is estimated at eight or ten millions of pounds sterling.

Indigo is, however, obtained from plants of other genera, particularly from *Wrightia tinctoria* (natural order *Apocynaceæ*), East Indies; *Baptisia tinctoria* (natural order *Leguminosæ*), North America, which yields indigo of a pale colour and very inferior quality; *Tephrosia tinctoria* (natural order *Leguminosæ*), Malabar; and *T. Apollinea*, Egypt and Nubia; *Marsdenia tinctoria* (natural order *Asclepiadaceæ*), in Sylhet; and *Polygonum tinctorium* and *P. Chinense* (natural order *Polygonaceæ*), China and Japan.—*Wrightia tinctoria* is a large shrub, indigenous to great part of India and to Ceylon, yielding indigo of the finest quality, and is recommended by Dr Roxburgh for cultivation, as less dependent than the common indigo plants on rain and irrigation. It grows very freely, and throws out shoots rapidly on their being cut away. —In times when East Indian indigo was not known, or was brought to Europe only in small quantity, the same dyestuff was obtained from WOAD (q. v.).—A coarse kind of indigo, called Bastard Indigo, was also at one time made in North America from the young shoots of *Amorpha cærulea*.

The Manufacture and Applications of Indigo.—The indigo plant, in its general appearance, is not unlike the lucerne of our fields. The seed is sown in drills about 10 inches apart, and soon makes its appearance above ground, when it requires incessant care to keep the weeds down, which otherwise would soon choke so tender a crop. In about three months, the plants begin to flower, and are then cut down, but soon shoot up again, and yield a second cutting, sometimes a third, the same year. Formerly, indigo was carefully dried after being cut, and even fire-heat was sometimes used for the purpose, but now—at least in India—the practice is abandoned, and it is found in every respect better to use the plant whilst fresh and green. The first process is to pack a large vat full of the freshly cut indigo; heavy wooden beams are placed on the top to press it and fix it down; and water is then let into the vat, enough just to cover it. Being left in this state for from ten to twelve hours, fermentation is set up, and much gas disengaged, the water becoming a light-green colour. The green liquor is then run off into the second vat, which is placed below the level of the first, in which, whilst the fermentation process is being repeated upon a fresh supply in the first vat, it is violently agitated by being beaten with poles: this causes the *grain*, as it is called, to separate, and the green matter suspended in the liquor becomes blue and granular. When this operation is sufficiently advanced, the contents of the vat are allowed to settle, and its sediment is then run into the third vat, which is below the level of the second; from which it is pumped into a boiler. The boiler is slightly heated and then allowed to stand for a few hours, during which time the indigo settles down, and as much clear water as possible is drawn off from above it. The boiler is then again heated, and this time up to the boiling-point; after which its contents are allowed to run on to a frame of wood, lined with 'long-cloth' sheeting, where they remain to drain till about the consistence of very thick cream, when they are removed, and subjected to very heavy screw pressure; and when as hard and dry as ordinary soap, are cut by brass wire on a frame into cubes about three inches square; and these are laid out, so as not to touch each other, on the shelves of the drying-house. Finally, the cakes are cleaned one by one, and tightly packed in boxes for the market.

This dye is, without doubt, the oldest in use; the Greeks and Romans obtained a knowledge of its use from India, where its employment has been very general for a great length of time. Much obscurity involves indigo and its early use, in consequence of the variation in its name; for instance, the Tamools of India call the plant *Averie*, and the dye itself *Neelum*; in Sanscrit, the plant is *Vishashodani*, and the dye *Nili* and *Nilini*, whence the *Anil* of the Portuguese. The Malays call the dye *Tarum*, and the Arabs, *Neel*.

Commercially speaking, indigo may be said to be the produce of India and Central America, as these are the only localities which supply the recognised form of the article. In India, the chief seat of the indigo manufacture, Bengal is the most important district. The total quantity received in Great Britain in 1861 was nearly 80,000 cwts.—a vast quantity, when it is borne in mind with what difficulty it is cultivated and manufactured. When pure, indigo has a rich, dark-blue colour, almost purple; it is in small cubes or parts of cubes, and its fracture shews a tendency to break up into square pieces, and indicates cracks in its substance, often filled up with a film of whitish efflorescence, probably the lime used in precipitating it. It has neither taste nor smell, and its specific gravity is about 1·50; if rubbed with any hard substance, it gives a streak with a bright coppery lustre. The varieties recognised in commerce are—1st, Bengal, which, from the care taken in its preparation, and the large scale on which it is made in that district, is the best; and its various gradations of quality, ten in number, varying from 9s. to 5s. per pound, are always kept distinct. In other sorts, they are usually much mixed. 2d, Madras and Kurpah; 3d, Oude; 4th, Manilla; 5th, Java; and 6th, South American. The last is packed in serons or cases of dried ox-skin, and its qualities are distinguished as follows: 1st, Flores; 2d, Sobres; and 3d, Cortes; all the others are in wooden chests, containing about 250 lbs. each.

Few materials are of greater importance to the dyer than indigo, and none require the exercise of more care and skill in using. Being insoluble in water, it requires the action of other solvents to render it capable of penetrating the fibres of the materials to be dyed. The method generally employed is the following: The indigo is broken into small lumps, and these are soaked in hot water, and left for at least 48 hours, in order that the moisture may soak through and soften them; after which they are put into the indigo-mill, which is a levigating machine, consisting of a vessel in which a roller is made to work by machinery, so as to rub down the indigo, mixed with plenty of water, to a very fine paste. This is a tedious operation; therefore, in large establishments, there are usually numerous mills in the grinding-room. When sufficiently ground, the paste is removed to the dyeing-vat, where to one part of indigo is added one part of lime and three-fourths of sulphate of copper; these are well mixed with sufficient water to fill the vat, and the dyer then proceeds to dye either cotton, linen, or silk goods. See DYEING. After being dyed, the goods are dipped into a bath of diluted sulphuric or hydrochloric acid, which gives brightness and purity to the colour; they are then finished by washing in a stream of pure water, and drying.

Green indigo, called *Lo-kao* by the Chinese, is a substance resembling indigo, which is obtained from a tree called *Hom-bi;* it is highly valued by the Chinese artists as a pigment, and also gives a beautiful permanent green colour to cotton and silk cloths; it is, however, so costly, that it never can, unless differently prepared, be used as a dyeing material. The fact that the Chinese dye cotton cloths with it, is accounted for by the nature of the process of preparing the lo-kao, which is this: A well-macerated decoction of the bark of the hom-bi tree is largely diluted with water mixed with a little lime; pieces of cotton cloth are then dipped into the vat, and taken out and exposed to the sun, which changes them to a bright green; they are then placed in perfectly clean water, and agitated until the water has removed all the free colouring matter; this water is then evaporated, and the small sediment left is the lo-kao. It is the cotton cloths thus used that are sold as green-dyed goods. It is said that a similar dye stuff is obtained from another tree called *Pa-bi*, and although this, as made by the natives, is much too costly to use in European dyeing, yet probably, if better means of obtaining it can be pointed out, it may become an important article of commerce.

Chemistry of Indigo.—The plants which yield indigo present no indication, when growing, that they contain any *chromogen*, or matter capable of yielding pigment, nor is it definitely known in what form the indigo exists in the vegetable tissues.

The indigo of commerce is by no means a homogeneous body. Its essential and most important constituent is *Indigotin* or *Indigo Blue*, but it likewise contains *Indigo Brown*, *Indigo Red*, and other ingredients.

Indigo Blue, or *Indigotin* ($C_{16}H_5NO_2$), is obtained from commercial indigo by extracting the ingredients with which it is mixed by acetic acid, alkalies, and boiling alcohol. It occurs either as a dark-blue amorphous powder, or in purple crystalline scales, with a metallic lustre. It is devoid of smell and taste, and is insoluble in water, alcohol, ether, dilute acids, and alkalies. When carefully heated, it may be sublimed without decomposition. Among the products of its destructive distillation are hydrocyanate and carbonate of ammonia, aniline, &c. Indigo blue dissolves without any evolution of gas in strong sulphuric acid, forming a blue solution of *sulphindigotic acid*, which is extensively used for dyeing cloth, under the name of *Saxony Blue*.

Under the action of reducing agents, such as alkaline fluids containing sulphate of iron, or a mixture of grape-sugar, alcohol, and strong soda lye, indigo blue becomes converted into *Indigo White* or *Reduced Indigo*, which forms a yellow solution in alkaline fluids, but which, on free exposure to the air, absorbs oxygen, and is reconverted into indigo blue. Indeed, this is the best method of obtaining the latter in a state of purity from commercial indigo, of which it should form about 50 per cent.

Indigo blue occurs in small quantity in the urine of man, the horse, and the cow, and occasionally in the milk of the cow, when these fluids have been exposed for some time to the action of the air; but Schunck obtained it from the urine in so many cases (in the urine of 39 persons out of 40), that Indican (or the chromogen yielding indigo blue) must be regarded as a normal urinary constituent. See M. Schunck's paper in *The Memoirs of the Literary and Philosophical Society of Manchester*, 1857, vol. xiv., or Day's *Chemistry in its Relations to Physiology and Medicine*, 1860, pp. 310—312.

Indigo White or *Reduced Indigo*, in a state of purity, occurs in white flakes, which are devoid of taste or smell, are perfectly neutral, and are insoluble in water, but dissolve in alcohol, ether, and alkaline solutions. Its composition is represented by the formula $C_{16}H_6NO_2$, and as it only differs from indigo blue, $C_{16}H_5NO_2$, in containing one more equivalent of H, it may be considered as the hydride of the latter. If yarn or woven goods be immersed in an alkaline solution of this substance till they are thoroughly saturated, and are then exposed to the air, indigo blue is formed within the fibres of the tissue. The blue dye thus obtained is very intense and permanent. From its property of becoming blue on exposure to the air, indigo white is a sensitive test for the presence of free oxygen.

Many compounds of great chemical interest have been derived from indigo blue. It was from indigo that aniline (now so largely employed in the production of the pigments known as *mauve* and *magenta*) was first obtained.

INDO-GERMANIC LANGUAGES. See ARYAN LANGUAGES.

INDO'RE, a Mahratta principality of Hindustan, consists of several detached tracts, some of them lying very remote from each other. With an aggregate area of 8318 square miles, and an aggregate population of about 800,000, the territory, as a whole, is traversed from east to west by the Nerbudda, and also by the Vindhya Mountains, their loftiest point within its limits being 2500 feet above the sea. The revenue is nearly a quarter of a million sterling; and the armed force amounts to about 20,000 men. Besides the capital, the chief towns are Rampûra, Mehadpore, Dhi, Pitlaud, Mundlaisir, Bhanpûra, and Mhow. I. is peculiarly the country of the Bheels, one of the wildest and most savage of the aboriginal tribes of India. The country, including all between its extremes, stretches in N. lat. from 21° 18′ to 24° 46′, and in E. long. from 74° 39′ to 76° 26′. The climate is sultry, the thermometer ranging from 60° to 90° F. in the shade.

INDORE, the capital of the principality of the same name, is situated in 22° 42′ N., and long. 75° 50′ E., on the left bank of the Kuthi. It stands about 2000 feet above the level of the sea, and is estimated to contain 15,000 inhabitants. This place, mean and insignificant enough in itself, acquired considerable notoriety in connection with the grand revolt of 1857. Though Holkar, the rajah, remained faithful to the British government, yet his troops mutinied on 1st July, holding their prince as a prisoner in his own palace, and butchering many Europeans, men, women, and children, in cold blood. I. is of modern erection, having been founded in 1767; and its original namesake, now Jemnah, still exists on the opposite bank of the river.

INDO'RSED, ENDORSED, or ADDORSED, terms applied in Heraldry to two animals placed back to back. Two keys, two wings, &c., may also be indorsed, and a pelican is always drawn with his wings indorsed.

INDO'RSEMENT, the term generally used to denote the writing of the name of the holder on the back of a bill of exchange or promissory note, on transferring or assigning it to another. Signing the name 'A. B.' alone is a blank indorsement; and if the transferee is named, it is a special indorsement. The usual form is, 'Pay C. D. or order. (Signed) A. B.' In Scotland, it is, 'Pay the contents to C. D. or order. (Signed) A. B.' When personal liability is to be avoided, the words 'without recourse' are added. The word indorsement is also frequently used in English law, to denote any matters written or indorsed on the back of writs or deeds, as indorsements on declarations, on writs of summons, &c.

I'NDRA (from the Sanscrit *id*, which probably meant 'to see, to discover,' hence literally, 'he who sees or discovers,' scil., the doings of the world) is the name of one of those Hindu deities that were worshipped more especially in the Vedic period of the Hindu religion, but enjoyed a great legendary popularity also in the Epic and Purânic periods. See INDIA, sect. *Religion*. In that class of R'ig-Veda hymns which there is reason to look upon as the oldest portion of Vedic poetry, the character of I. is that of a mighty ruler of the bright firmament, and his principal feat is that of conquering the demon *Vr'itra*, a symbolical personification of the cloud which obstructs the clearness of the sky, and withholds the fructifying rain from the earth. In his battles with Vr'itra, he is therefore described as 'opening the receptacles of the waters,' as 'cleaving the cloud' with his 'far-whirling thunderbolt,' as 'casting the waters down to earth,' and 'restoring the sun to the sky.' He is, in consequence, 'the upholder of heaven, earth, and firmament,' and the god 'who has engendered the sun and the dawn.' And since the atmospherical phenomena personified in this conception are ever and ever recurring, he is 'undecaying' and 'ever youthful.' All the wonderful deeds of I., however, are performed by him merely for the benefit of the good, which in the language of the Veda means the pious men who worship him in their songs, and invigorate him with the offerings of the juice of the Soma plant. See INDIA, sect. *Religion*. He is therefore the 'lord of the virtuous,' and the 'discomfiter of those who neglect religious rites.' Many other epithets, which we have not space to enumerate, illustrate the same conception. It is on account of the paramount influence which the deeds of I. exercise on the material happiness of man, that this deity occupies a foremost rank in the Vedic worship, and that a greater number of invocations are addressed to him than to any other of the gods. But to understand the gradual expansion of his mythical character, and his ultimate degradation to an inferior position in the Hindu pantheon of a later period, it is necessary to bear in mind that, however much the Vedic poets call I. the protector of the pious and virtuous, he is in their songs essentially a warlike god, and gradually endowed by imagination, not only with the qualities of a mighty, but also of a self-willed king. The legends which represent him in this light seem, it is true, to belong to a later class of the R'ig-Veda hymns, but they shew that the original conception of I. excluded from his nature those ethical considerations which in time changed the pantheon of elementary gods into one of a different stamp. Whether the idea of an incarnation of the deity, which, at the Epic and Purânic periods, played so important a part in the history of Vishnu, did not exercise its influence as early as the composition of some of the Vedic hymns in honour of I., may at least be matter of doubt. He is, for instance, frequently invoked as the destroyer of cities—of seven, of ninety-nine, even of a hundred cities—in he is not only repeatedly called the slayer of the hostile tribes which surrounded the Aryan Hindus, but some of the chiefs slain by him are enumerated by name. The commentators, of course, turn the 'robbers' and their 'chiefs' into demons, and the cities into celestial abodes; but as it is improbable that all these names should be nothing but personifications of clouds destroyed by the thunderbolt of I., it is, to say the least, questionable whether events in the early history of India may not have been associated with the deeds of I. himself, in a manner as, at the Epic period, mortal heroes were looked upon as incarnations of Vishnu, and mortal deeds transformed into exploits of this god.

The purely kingly character of I. assumes a typical shape in the *Aitareya-Brâhmana*, where his installation as lord of the inferior gods is described with much mystical detail; and from that time he continues to be the supreme lord of the minor gods and the type of a mortal king. During the Epic and Purânic periods, where ethical conceptions of the divine powers prevail over ideas based on elementary impressions, I. ceases to enjoy the worship he had acquired at the Vedic time, and his existence is chiefly upheld by the poets, who, in their turn, however, work it out in the most fantastical detail. Of the eight guardians of the world, he is then the one who presides over the east, and he is still the god who sends rain and wields the thunderbolt; but poetry is more engrossed by the beauty of his paradise, *Swarga*, the happy abode of the inferior gods, and of those pious men who attain it after death in consequence of having, during life, properly discharged their religious duties; by the charms of his heavenly nymphs, the *Apsarasas*, who now and then descend to earth, to disturb the equanimity of austere penitents; by the musical performances of his choristers, the *Gandharvas*; by the splendour of his capital, *Amarâvatî*; by the fabulous beauty of his garden, *Nandana*, &c. A remarkable trait in this legendary life of I. is the series of his conflicts with Krishna, an incarnation of Vishnu, which end, however, in his becoming reconciled with the more important god. As the god who is emphatically called the god of the hundred sacrifices (*S'atakratu*), I. is jealous of every mortal who may have the presumption of aiming at the performance of that number of sacrifices, for the accomplishment of such an intention would raise the sacrificer to a rank equal to that which he occupies. He is therefore ever at hand to disturb sacrificial acts which may expose him to the danger of having his power shared by another Indra. According to the Purânas, the reign of this god I., who is frequently also called *S'akra*, or the mighty, does not last longer than the first *Manwantara*, or mundane epoch. After each successive destruction of the world, a new I. was created, together with other gods, saints, and mortal beings. Thus, the I. of the second Manwantara is *Vipas'chit*; of the third, *Sus'ânti*; of the fourth, *S'ivi*; of the fifth, *Vibhu*; of the sixth, *Manojava*; and the I. of the present age is *Purandara*. When represented in works of art, I. is generally seen riding on his elephant; and where he is painted, he is covered with eyes.

INDRÂNI', a name of the wife of the Hindu god Indra (q. v.).

INDRE, a central department of France, formed out of the western portion of the old province of Berri, lies immediately south of the department of Loir-et-Cher. Area, 2679 sq. m., of which about [illegible] are in tillage and pasture. Pop. (1872) 277,[illegible]. The department is well watered, the chief rivers being the Indre, the Creuse, and its tributary the

Anglin. The surface is for the most part flat, and the land is generally fertile, producing large crops of wheat and barley. The two principal resources of the department, however, are its vineyards and its flocks. The climate, except in the district of La Brenne, is mild and healthy. The principal manufactures are woollen and linen cloths, hosiery, scythes, paper, and porcelain. Iron mines are worked. The department is divided into four arrondissements—Châteauroux, Le Blanc, Issoudun, and La Châtre. The capital is Châteauroux.

INDRE, a river of France, rises on the northern border of the department of Creuse, flows north-west through the departments of Indre and Indre-et-Loire, and joins the Loire 17 miles below Tours, after a course of 136 miles, for the last 40 of which it is navigable.

INDRE-ET-LOIRE, an inland department of France, formed out of the ancient province of Touraine, lies north-west of the department of Indre. Area, 2340 sq. miles, of which more than one-half is arable; pop. (1872) 317,027. The department is watered by the Loire, the chief river, and by its tributaries, the Cher, the Indre, and the Vienne, all of them navigable. The Loire, to prevent inundations, which otherwise would be frequent and disastrous, is banked in by dykes throughout its course in this department. See LOIRE. In the south, the surface is hilly, and either waste or wooded, but in the other districts it is undulating or flat, and very fertile. Of the products, which include an abundant yield of the ordinary bread-stuffs, wine, of which about 14,000,000 gallons are made in ordinary years, is one of the most important. The chief manufactures are bar-iron, powder, files, woollen cloth, silk, and leather. The department is divided into the three arrondissements of Tours, Chinon, and Loches; capital, Tours.

INDU'CIÆ LEGA'LES, in Scotch Law, means the number of days which a defender has to answer a summons. The term is not used in England, the phrase being 'so many days to answer, to plead, &c.'

INDU'CTION of clergyman, a term used in England and Ireland to denote the investing or giving possession of a benefice to a clergyman. In England and Ireland, this is done by a mandate from the bishop to the archdeacon or corresponding official to make the induction. The inductor takes the clergyman by the hand, and lays it on the ring-key or latch of the church-door, then opens the door, and puts him into the church, and generally the church bell is tolled, to give notice to the parishioners. In Scotland, the presbytery induct the minister.

INDUCTION, the name for one of the great processes of scientific discovery and proof. It has been seen under GENERALISATION, that when we rise from particular facts to generalities, the result may take one of two forms—a general *notion*, or a general *proposition*: 'circle' is a notion; 'the circle is the line that encloses the largest space,' is a proposition. The mode of arriving at such general affirmations, truths, or laws, is what is called induction. The strict meaning of the term is 'the operation of *discovering* and *proving* general propositions;' while deduction, on the other hand, is the method of *applying* general propositions once discovered to particular cases, considered to be included within their scope. By induction we establish the law that heat expands bodies; by deduction we apply it to explain why a clock is slower in summer than in winter, owing to the changes of the length of the pendulum.

Induction is the only process of real inference—in other words, by it we proceed from the known to the unknown; or from a limited range of facts, we affirm what will hold in an unlimited range. All things that we do not know by actual trial or ocular demonstration, we know by an inductive operation. Deduction is not real inference in this sense, since the general proposition already covers the case that we apply it to; in a proper deduction, the conclusion is more limited than the premises. By the inductive method, we obtain a conclusion much larger than the premises; we adventure into the sphere of the unknown, and pronounce upon what we have not yet seen. This operation necessarily implies a certain hazard; and it may be easily supposed that there are precautions requisite in working it. Nothing is more common than the making of bad inductions; and accordingly it is now considered a part of logic to lay down the rules for the right performance of this great operation.

A preliminary question arises—How can we ever be entitled to dogmatise beyond the sphere of our actual experience; to conclude, for instance, that five miles below the surface of the earth, there is heat enough to make water boil? The answer to this question supplies us with what is called the *ground of induction*, which is the fact, now established by the experience of centuries, *that nature is uniform*. What has happened once, will happen again, provided the same circumstances and situation of things are exactly repeated. At a former period of the world's history, there might have been doubts on this matter, and opinions were actually held that implied a want of perfect uniformity, but now those doubts are dispelled, except, perhaps, with reference to a single question—viz., the freedom of the will (see FREE WILL). Accordingly, the problem to be solved is to ascertain what is the order of nature in the instances accessible to our observation.

The uniformity of nature is a compound of many separate uniformities. In other words, there are different departments or classes of phenomena, each determined by separate laws. Thus, we have mathematical, physical, chemical, physiological laws, the statement of which severally constitutes the subject-matter of each of these sciences. Now, a distinction is observable, which is of some importance as regards the method of inductive investigation. Some of the phenomena thus conjoined under uniform principles are properties *simultaneously* existing, as the properties of mathematical figures; others are *successions*, and affirm order in time, the most important of all which is that peculiar succession denominated cause and effect. See CAUSE. The problem of inductive inquiry is in a great measure occupied with this one department, although there are also inductions respecting contemporaneous or conjoined properties. Natural history is in part made up of affirmations of simultaneous properties, as, for example, the anatomical structure of animals, and in part of affirmations of cause and effect, as in all the operations that sustain life, and determine reproduction, growth, and death.

Respecting the whole of the phenomena implied under Causation, the principle of nature's uniformity is embodied in one great and comprehensive statement, called the law of causation; the import of which is, that whatever begins to exist is uniformly preceded by something else, to which it invariably succeeds. Events do not arise of themselves, or out of nothing; and although there is such a thing as Plurality of Causes, everything that arises is preceded by some other thing as a cause, and always follows when that cause occurs; there being supposed no counteracting agency. The aim of the scientific inquirer, then, is to single out from the mass of circumstances that have accompanied and preceded any event, some one or more that invariably precede the occurrence of that event, which being found, are thenceforth known as its cause. This has to be accomplished by a process technically called *elimination*, by which is understood a series of operations intended to separate everything that is indifferent to the production of the phenomenon, until we arrive at some one thing or more that cannot be removed without making the effect to cease.

Mr John Stuart Mill, in his *Logic*, has illustrated in detail the methods to be adopted for making sure that we have singled out the true causative circumstance from among the many that may precede a given effect. They resolve themselves mainly into two. 'One is, by comparing together different instances in which the phenomenon occurs. The other is, by comparing instances in which the phenomenon does occur, with instances *in other respects similar* in which it does not. These two methods may be respectively denominated the Method of Agreement, and the Method of Difference.'

The Method of Agreement supposes that we make it a study to *vary the circumstances* under which the supposed phenomenon is produced. Either by observation of cases presented in nature, or by artificially contriving new cases, in other words, by experiment, we do our utmost to obtain the effect in a great many different connections, whereby we ascertain what things are indifferent to it. Whatever circumstance can be excluded, the phenomenon still happening, or can be absent notwithstanding its presence, is not connected with it in the way of causation. The accidental or indifferent circumstances being thus eliminated, if only one remains, that is the cause; if the elimination does not go so far, but leaves three or four circumstances or agents, we can only say that the cause is among them. Mr Mill enunciates the Method of Agreement in a formal canon, or rule of induction, to the following effect: *If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree is the cause* (*or effect*) *of the given phenomenon.*

If we could always obtain the requisite variety of circumstances for the exclusion of all indifferent adjuncts, this method would fully answer the ends of inductive inquiry. But this is not always to be had, and even when practicable, the operation is often very laborious. When the other method (Difference) can be applied, the desired end is reached by a shorter route. If, instead of excluding the indifferent agencies one by one, we can contrive an experiment, or make an observation, that excludes *one* agency or circumstance, followed by the cessation of the effect, we conclude at once that what has thus been left out is the cause, or an essential condition or part of the cause. Whenever we are so fortunate as to light upon two instances suited to this method, we establish causation at once and beyond all question. The *experimentum crucis* of Bacon was something of this nature; only it supposed that a question lay between two alternative or competing agencies, which an experiment had been hit upon for deciding; such an experiment behoved to be one of Difference. This method is embodied in the following canon: *If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance, except one, in common, that one occurring only in the former, the circumstance in which alone the two instances differ is the effect, or cause, or a necessary part of the cause, of the phenomenon.*

These are the two leading methods, but there are certain cases met by a procedure somewhat different. Sometimes we have a phenomenon made up of causes partly known and partly unknown. It is then possible to subduct the effects due to the known causes, and what remains will be attributed to the remaining agencies. This is expressed by Mr Mill in the following rule or canon: *Subduct from any phenomenon such part as is known by previous induction to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents.* The more our knowledge is extended, the more able are we to proceed upon this method, termed the Method of Residues. 'It is by this process, in fact,' says Sir John Herschel, 'that science in its present advanced state is chiefly promoted.'

There remains a class of laws wherein the application of any of those three methods is rendered impracticable, from the circumstance, that the agency in their case is irremovable and indestructible, so that we cannot obtain any cases where it is entirely absent. Such an agent is heat, which can never be entirely separated from any body, so as to ascertain, by comparing cases of its presence with those of its absence, what effects are due to it. So we can never get out of the sphere of the earth's attraction. The difficulty hence arising is surmounted by observing the *variations of degree* of the cause, and whether there be a corresponding variation in the degree of the effect. Thus, we infer that heat is the cause of the expansion of bodies, and that its total absence would lead to their maximum condensation and consolidation, by watching the effects of any additions or subtractions of a body's temperature. Solids, liquids, and gases (with certain limited and special exceptions) are found expanding steadily as they are heated, and contracting as they are cooled; and this is to us a sufficient justification for considering that the law in question holds good. This process is termed by Mr Mill the Method of Concomitant Variations, and is expressed by him in the following terms: *Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation.*

There are many problems growing out of the applications of induction to the great variety of natural phenomena, the main principles being nevertheless the same. An important extension of the means of scientific discovery and proof arises after a certain number of general laws have been discovered, and when phenomena can be shewn to be results of the operation of one or more of such laws. Thus, the great induction of universal gravity was applied *deductively* to explain a great many facts besides those that enabled the induction to be made. Not merely the motions of the planets about the sun, and the satellites about the planets, but the remote and previously unexplained phenomena of the tides, the precession of the equinoxes, &c., were found to be inferences from the general principle. This mode of determining causes is called the Deductive Method. When several agents unite in a compound effect, there is required a process of calculation to find from the effects of the causes acting separately the combined effect due to their concurrent action, as when the path of a projectile is deduced from the laws of gravity and of projectile force. It is the deductive stage of science that enables mathematical calculation to be brought into play with such remarkable success as is seen in astronomy, mechanics, &c. See DEDUCTION.

The circumstance that phenomena may result from a concurrence of causes, leads to the distinction between ultimate laws and derivative or subordinate laws. Thus, gravity is an ultimate law; the movement of the planets in ellipses is but a subordinate law. These inferior laws may be perfectly true within their own limits, but not necessarily beyond certain limits, of time, place, and circumstance. A different adjustment of the two forces that determine a planet's motion, would cause a circular or a parabolic orbit; and therefore it is, that when phenomena result from a combination of ultimate laws acting under a certain arrangement, they are not to be generalised beyond the sphere where that arrangement holds. These inferior laws are sometimes mere inductions that have not been resolved into their constituent laws, and then they go under the name of 'Empirical Laws.' Thus, in the hands of Kepler, the elliptic orbit of the planets was only an empirical generalisation, ascertained by the Method of Agreement; Newton converted it into a derivative law, when he shewed that it resulted from the more general laws of gravity, &c. The earlier stages of induction present us with many of those empirical laws; in some subjects—as physiology, medicine, &c.—the greater number of inductions are of this character. The cure of disease is especially an example of this: hardly any medicine can have its efficacy traced to ultimate laws of the human system. Hence the uncertainty attending the application of remedies to new cases, and also the want of success that often attends them in circumstances where we think they ought to succeed.

Induction applies to other laws than those of causation—namely, to uniformities of co-existence. For the illustration of these, as well as the other parts of induction, see Mill's *Logic*, book iv.

INDUCTION OF ELECTRIC CURRENTS.

The discovery of the power of electric currents to induce currents in neighbouring conducting circuits is due to Faraday. His researches on the subject, named by him *volta-electric* induction, were published in the Philosophical Transactions (1831—1832). Henry (1832) observed that when contact was broken in a long galvanic circuit a bright spark occurred, which did not occur when the circuit was short. This was shewn by Faraday (1834) to be due to the extra current induced by the various parts of the circuit in each other. Bachhoffner and Sturgeon (1837) shewed the superior action, in induction apparatus, of a bundle of iron wires to that of a solid bar of iron. Henry (1841) studied the inductive action of induced currents of different orders. De la Rive designed, in 1843, an electro-chemical condenser, consisting of a primary coil, which, by means of the extra current, could enable a single galvanic cell to decompose water. The same decomposition, however, had been effected by Wright in 1840. Ruhmkorff constructed (1850 or 1851) the first so-called *induction coil*, the excellence of which was chiefly attained by the proper insulation of the secondary coil. Fizeau (1853) increased immensely the power of the coil, by providing it with a condenser. Of late years, coils of great power have been constructed, rivalling, if not exceeding, the most powerful electric machines in length and power of spark.

The fundamental law of current induction may be thus shewn. Two long copper wires, *pp* (fig. 1) and *ss*, are fixed so as to be parallel and close to each other. The extremities of the one, *pp*, are in connection with the poles of a galvanic battery, E, and those of the other, *ss*, with the binding-screws of a galvanometer, G. The instant the circuit of the battery is completed, and the current sent along *pp*, a current in the opposite direction is induced in the wire *ss*, which is shewn by the deflection of the needle of the galvanometer. This induced current is only momentary, for though the current continues to circulate in *pp*, the needle soon falls back to its original position of rest, and the wire *ss* gives free passage to other currents, and appears to be in no way affected. If, now, when the needle is at rest, the battery circuit be broken, and the current in *pp* stopped, another momentary current is indicated by the galvanometer needle, but in this case in the same direction as the inducing current. The inducing wire and current are called *primary*, and are so distinguished from the induced wire and current, which are termed *secondary*. The passive condition of the wire while thus under induction has been described by Faraday as electro-tonic. An electric throb, so to speak, marks the setting in of this state, and another its vanishing; the former in the opposite direction to that of the inducing current, and the latter in the same direction. If the primary wire, *pp*, be movable, so that it can be suddenly brought near to, and withdrawn from the secondary, *ss*, while the battery current passes steadily, currents are induced as in the former case, the approach of the wire being marked by an inverse current, and its withdrawal by a direct one. As long, however, as the primary wire remains in any one position, all evidence of electricity in the secondary wire disappears; but if in this position the strength of the primary current should be increased or diminished, momentary currents in the secondary wire would again mark the changes in the primary, the increase causing an inverse, and the decrease a direct current. Hence we conclude, that *a current which begins, a current which approaches, or a current which increases in strength, induces an inverse momentary current in a neighbouring conducting circuit,* and that *a current which stops, a current which retires, or a current which decreases in strength, induces a direct momentary current in a neighbouring circuit.* For inverse, the word *negative*, and for direct, the word *positive*, are frequently employed in reference to induced currents.

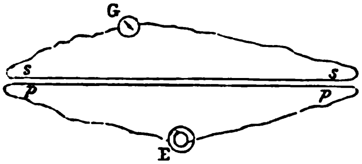


Fig. 1.

In experiments like the above, it is much more convenient to wind the primary and secondary wires side by side round a bobbin, so as to form a coil, as in fig. 2. The wires are insulated from each other by a covering of wool or silk. Not only does such a disposition admit of very long wires being used, but it also disposes the wires employed to greater advantage, for each single turn of the primary wire acts not only on the corresponding turn of the secondary wire, but on all the turns near it. The inductive effect of such a coil is much greater than that which would be obtained by the same extent of wires running side by side in a straight or crooked line. It is not even necessary that the two wires

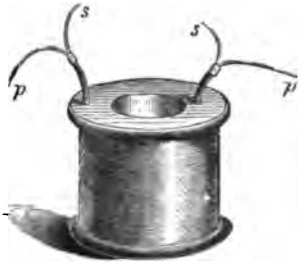


Fig. 2.

be wound round together, each may be wound on a separate bobbin, and the one placed inside the other, as in fig. 3. The primary coil, P, here

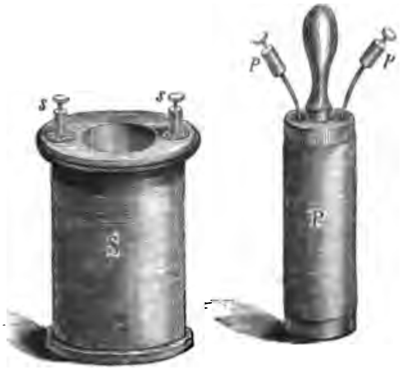


Fig. 3.

represented, is made of wire $\frac{1}{12}$th of an inch in diameter, covered with wool; and the secondary coil, S, of silk-covered wire, about $\frac{1}{80}$th of an inch, and much longer than the primary wire. With two such coils, the illustration of the preceding principles of induction can be conveniently given. If the primary coil be placed in the circuit of a galvanic cell, by two loose and flexible wires, so as to allow of its easy motion, and if the terminal binding-screws of the secondary coil be placed in connection with a galvanometer, when P is inserted into S, a momentary inverse current is indicated, and when it is removed, a momentary direct one; or if, when P remains in S, the strength of the primary current be altered, the needle announces the induction of currents according to the principles stated above. In order, however, to obtain the greatest effect from the secondary coil S, it is necessary, whilst P remains within it, to have some means of continuously completing and breaking the primary current. A contrivance for this purpose is called a *rheotom*, or *current-break*. A simple rheotom may be made of a common file, by holding one wire from the battery against the end of the file, and running the other along the teeth, the current being stopped each time the wire leaves a tooth. In this way, a rapid series of interruptions is effected, each of which is attended by an inverse and a direct current in the secondary wire. A break of the same description, but more constant, may be also made by causing a metal spring to press against the teeth of a metal wheel, both spring and wheel being connected with the battery. As the wheel is turned by a handle, the spring breaks the contact each time it slips from one tooth to another. The most convenient form of break, however, is one which is made self-acting by the action of an electro-magnet, which receives the name of a *magnetic hammer*.

Quantity and Tension of Induced Currents.—Let us place the coil P within S; let P, along with a self-acting rheotom, be put in the circuit of a galvanic cell, and let S be connected with a galvanometer. The interruption in the primary current being effected by the rheotom with great rapidity, the induced inverse and direct currents are sent with corresponding rapidity through the coil of the galvanometer. If this last be of a short and thick wire, so as not to tax the tension of the current transmitted, the induced currents will not deflect the needle; or if they should happen, through the unsteady action of the break, to do so, it only oscillates round its position of rest. This proves that *the quantity of electricity transmitted by the induced inverse and direct currents is the same*, for they each exert the same influence on the needle. But if the coil of the galvanometer consist of a long fine wire, the needle is kept deviated in a direction which argues the action of the direct current. This leads us to conclude, that *both currents, though equal in quantity, are unequal in tension, the direct current having the highest tension*, for it has more power to force its way through the fine wire of the galvanometer than the inverse. Other proofs of the same principles may be easily furnished.

The difference of the tension of the two induced currents is accounted for in this way: when a change takes place in the primary current, the quantity of the electricity induced by it in the secondary wire is the same whether this change takes place quickly or slowly; the tension, however, is very different. When the change takes place slowly, the total quantity of electricity in circulation continues to pass as slowly, and there is little in motion at one time; but when the same occurs quickly, it is sent with momentum, so to speak, and the quantity in circulation at one time is as much greater, in comparison with the former case, as the time is shorter. It is this quick dispatch of electricity which constitutes the tension of the current. Now, as it takes some time before the primary current is fully established, the inverse induced current is slow and of low tension; but when the contact is broken, the primary current ceases much more suddenly than it began, and the direct induced current is quick and of high tension. This view of the matter is borne out by experiment, for it is found, that *whatever favours the suddenness of the changes of the primary current, heightens the tension of the currents induced by these changes*. The break, from this circumstance, forms an important element in the construction of all induction apparatus.

The inductive power of the primary coil is immensely increased by placing a bundle of soft iron rods or wires in the centre of it. The magnetism which begins and ceases in these at each passage of the current acts in conjunction with the inducing force of the coil. The centre of the bobbin P (fig. 3) is hollow, to receive a bundle of this kind. The greater part of the inductive action is due to the iron core, and the induced currents got with and without it are not to be compared in point of energy. A solid bar of soft iron may also be used, but with much less advantage, for the induced currents which linger in it after the stoppage of the main current, acting themselves inductively, impair the suddenness with which the current disappears from the primary wire and magnetism from the core. The thin layer of oxide which forms on the rods insulates them sufficiently from one another, and prevents the formation of such currents. It is partly for the same reason that metal tubes cannot be used for bobbins for either primary or secondary coils. If such were used, *closed circuits* would be formed in them, the reaction of which would prolong the changes of the primary inducers, and consequently impair the tension of the secondary current. Metal bobbins would not be open to this objection if they had a longitudinal slit, which would make the transverse section a broken ring and circuit.

The excitation of magnetism in the core is the principal aim of the primary coil, and as a strong current is essential to that object, it is made of thick wire and of moderate length. In the secondary coil, the tension of the induced current alone is aimed at, and with this view it is made of as thin wire as can be made, so as to admit of as many turns as possible being brought within the influence of the core and primary coil. The electric conformation of the secondary coil is sometimes looked upon in the same light as that of a galvanic battery. The total electro-motive force of the coil is the sum of that of all the turns in it, in the same way that the electro-motive force of the battery is proportionate to the number of cells.

Extra Current.—Not only does a galvanic current induce electricity in a neighbouring circuit, but it also acts inductively on itself. When contact is broken in a battery circuit, the galvanic spark is seen. See GALVANISM. When the wire is short, the spark is feeble, but it increases in brilliancy with the length of the circuit, and this becomes particularly observable when the wire is wound round in a coil. This certainly does not arise from the current being strong with the long wire, and weak with the short one, for quite the reverse is the case, as might be shewn with the aid of a galvanometer. The real cause of the superior brilliancy of the galvanic spark with the long circuit is to be found in the induction of the primary current on the various parts of itself, exciting, as they are called, *extra currents* in the primary wire. It has been fully attested by experiment, that at the instant *a galvanic current begins and ends, extra currents are induced by the action of the several parts of its circuit upon each other, that at the beginning of the current being inverse, and that at the end direct.* As the extra current inverse acts opposite to the main current, it does not appear as a separate current, but only retards the instantaneous passage of the main current. The extra current direct succeeds the main current, and has consequently a separate existence. It is what is generally referred to when the extra current is spoken of. This extra current is of much higher tension than the original current. The effect of the extra current on the direct induced current of the secondary coil is to lessen very decidedly its tension. If a way be made for the extra current, the tension of the induced current falls prodigiously. In a large coil-machine, which gives freely sparks of one or two inches in length, when the two portions of the break are joined by a thin wire, so as to allow the extra current to pass, sparks will not travel between the two poles, however near they are brought. When no such communication exists, a portion of the extra current leaps over between the separating parts of the break, and in so far diminishes the intensity of the secondary current. The condenser of the coil-machine, to be afterwards described, has for its object the absorption or suppression of the extra current, but the manner in which it effects this is not yet properly explained. The prejudicial effect of the extra current on the induced current is easily understood, when we bear in mind that it prolongs the cessation of the magnetism of the core and of the current in the primary coil, and thus impairing the suddenness of this change, reduces the tension of the induced current.

Induction Coil.—The essential parts of this apparatus have been already described in detail. A primary coil with its core of iron wire, and a secondary coil exterior to, and insulated from a primary coil, form the main portion of the instrument. The primary coil is connected with the poles of a galvanic battery, and in the circuit, a rheotom is introduced, to effect the interruptions of the current essential to its inductive action. The only parts not yet referred to are the condenser and the commutator. The condenser consists of several sheets of tinfoil and oiled silk, laid alternately the one above the other. The first, third, fifth, &c. sheets of tinfoil are connected by strips of the same material; so are the second, fourth, and sixth, &c.; the whole forming a condensing apparatus like a Leyden jar, the odd sheets forming the one coating, and the even sheets the other. Each set of sheets is connected with one of the wires of the primary coil. The condenser is generally placed in the sole of the instrument, and does not meet the eye. The commutator consists of an ivory cylinder covered with conducting plates on two sides, and is so constructed that it can break contact, or transmit the current through the coil in either direction.

An induction coil, as constructed by Ladd of London, is represented in fig. 4. The forms under which the instrument appears are very various, and the one in the figure only serves to shew the general requirements in its construction. The two binding-screws, *p* and *n*, are for the battery-wires; C is the commutator. The two coils, W, lie horizontally on the sole of the instrument, S. The secondary coil alone is seen, the primary being within it and out of view. The breaking hammer, being behind the coil, is likewise not shewn. The condenser is contained by the box which constitutes the sole, and a conducting connection is established between its coatings and the wires of the primary coil. The terminations of the secondary coil are fixed to the heads of the glass pillars, P, P′, which are furnished with pointed rods capable of universal motion. The excellence of the instrument depends on the proper insulation of the secondary coil. The bobbin must be made of glass, gutta-percha, or (best of all) vulcanite, so as to prevent the induced electricity from reaching the ground by the primary coil. Care must also be taken to insulate the different parts of the secondary coil from each other. If this were not done, the spark which completes the secondary current, instead of taking place at the rods, the place at which it is wanted, would pass within the coil itself. It is necessary, in consequence, to have each layer of the coil insulated from the other, by interposing gutta-percha paper, and cementing it with a hot iron to the sides of the bobbin. The induced current must thus pass through all the turns of the wire, and is prevented from shortening its course by leaping over one or more layers of the coil.

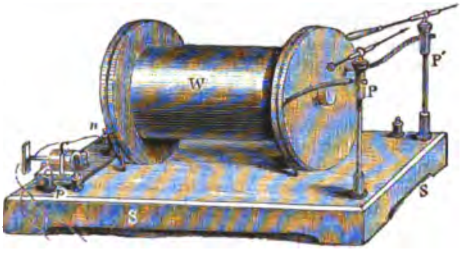


Fig. 4.

Experiments with the Induction Coil.—Say that we experiment with a coil like the one shewn in fig. 4, about one foot long and nearly six inches in diameter, which yields readily sparks of from four to five inches with a battery of six Bunsen cells. After connecting the battery-wires, and setting the commutator so as to complete the contact, let us place the movable rods within an inch of each other. An uninterrupted rush of sparks is transmitted between the points of the rods. The sparks are not the clear single sparks of the electric machine, but seem to be made up of several sparks occurring at the same instant, which are white and crooked. These are enveloped in a luminous haze, which, on closer examination, wears the appearance of a congregation of the spiral sparks, the convolutions of which are in constant rotation. This hazy spark can be blown away by the breath, and separated from the white spark which cannot be so removed. As the rods are withdrawn from each other, it disappears, and when they stand above three inches apart, the spark resembles in every respect the forked single spark of a powerful electric machine. When the points are withdrawn beyond striking distance, electric brushes still play between them, which become visible in a darkened room. If the hand be brought near the rod connected with the exterior end of the coil, sharp stinging sparks, two or three inches in length, are got. The rod connected with the inner end does not yield them so readily, and this is the same whether it be the positive or negative pole. When a gold-leaf electroscope is brought near, the leaves part energetically from each other; and when a spark is received by it from one of the rods, it remains permanently charged. When, however, the knob of the electroscope is brought into actual contact with either of the rods, this action ceases, because the induced currents, inverse and direct, neutralise each other. When the knob touches, both currents affect the leaves equally; but when it is at some distance, the direct current alone has tension enough to act. Each pole of the induction coil is the seat of two opposite electricities, alternating with each other, alike in quantity, but differing in tension, and this accounts for the resemblances and differences between the coil and machine electricities. When the poles are put in connection with the coatings of a Leyden jar, the sparks passing between the points are much more brilliant, and the sharp snap of the simple spark grows into a loud report. The Leyden jar effects a condensation of the electricity of each direct current, and each spark discharge takes place in shorter time, and consequently with greater intensity. The condensed spark punctures paper and the like with great facility, but it is of very low heating power. The uncondensed spark, more particularly the hazy spark, got when the poles are near each other, kindles paper, gunpowder, coal-gas, and other combustibles with readiness and certainty. It is from this property of its spark that the induction coil is of so great use in mining operations. The two ends of the wires coming from the coil are fixed near each other without touching, and are imbedded in a charge of gunpowder at a safe distance from the operator. The wires are insulated by gutta-percha, and when the induced current is sent through them, sparks pass through the gunpowder between the ends of the wires, and set fire to it. When several charges have to be ignited simultaneously, the spark of the coil-machine is considered much more reliable than the action of a powerful galvanic battery in heating thin wires connecting the ends of the battery-wires. See GALVANISM. The power of the direct induced current of even large induction coils to deflect the magnetic needle, and to effect chemical decomposition, is very insignificant. This shews that it is very much inferior to the inducing current in quantity, however much it may be superior in tension. The physiological effect, on the other hand, is tremendous, and the experimenter must take care not to allow any part of his body to form the medium of communication between the poles, as the shock so got might be dangerous, if not fatal.

When the induced current is made to pass through nearly vacuous spaces, a very splendid effect is produced. The *Electric Egg* (fig. 5) is employed to display this. It consists of a glass vessel in the shape of an egg, with an open neck above, and another below. Brass fittings are attached to these. The lower opening is fitted with a stop-cock, a can be screwed to the plate of an air-pump. A brass rod and ball rise a short way into the eg The fittings above are intended to allow of a rod ending in a ball passing up and down air-tight, so that the two balls can be conveniently set at different distances. When the egg is exhausted, and the wires from the coil are attached, the one above, and the other below, a luminous glow extends between the balls, which is wide in the middle, and contracts at either extremity. When the exhaustion has reached one-twelfth of an inch, as shewn by the gauge of the air-pump, black bands are seen to lie horizontally in the light, so as to wear the appearance of stratification, as shewn in the figure. These occur more readily when a drop or two of turpentine, alcohol, or ether have been introduced into the egg. The cause of the stratification is as yet a matter of speculation. The ball which forms the negative pole is enveloped in a covering of blue light. The glow, which is of a beautiful mauve tint, appears to proceed from the positive ball, and reaches nearly to the negative ball, from which it is separated by a well marked non-luminous space. By means of the commutator, these appearances at the balls can be instantly transposed. Serving the same purpose as the electric egg, there is a great variety of vacuous tubes hermetically sealed and ready for use at any time. These have been first filled with particular gases, and then exhausted, and they exhibit lights of various tints according to the gas contained by them.

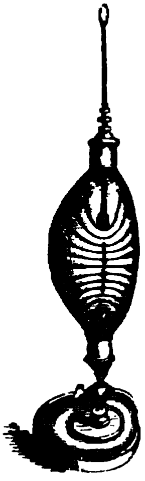


Fig. 5.

INDU'LGENCE, in Roman Catholic theology, means a remission, by church authority, to a repentant sinner, of the *temporal* punishment which, in the Catholic theory, remains due after the sin and its eternal punishment have been remitted. A doctrine which has been the subject of so much angry controversy, and which may be regarded as the chief among the proximate causes of the Reformation, deserves very careful consideration. We must confine ourselves, however, to a brief authentic explanation of the doctrine such as it is held by Roman Catholics, together with a history of the practice in the various ages of the church.

By the discipline of the first centuries, a severe course of penitential observance was exacted of all who fell into any grievous crime, especially apostasy, murder, and adultery, such sinners being excluded from church communion for various periods, in some cases even till the hour of death. These penitential observances, which Protestants regard as purely disciplinary, were designed, according to the Catholic view, as an expiation, on the part of the penitent, for the *temporal* punishment which, after sin and the *eternal* punishment due to it have been remitted by God, still remains to be undergone; and some of the most acrimonious of the early controversies, the Montanist and the Novatian, arose as to the power of the church to relax these penitential observances, and to admit grievous sinners to communion. These ancient relaxations (of which they regard that referred to in 1 Cor. v. 5 and in 2 Cor. ii. 10 as a type) are considered by Catholics as examples of the modern indulgence; and the practice which grew up in the 3d and 4th centuries, and which even then was carried to great extremes, of granting such relaxations on the recommendation of martyrs or confessors, is held by Catholic theologians to be an illustration of that principle of vicarious atonement, according to which, in the theory of indulgences, the church is supposed to supply, from the inexhaustible treasure of the merits of Christ, and of the 'supererogatory' works of the saints, what may be wanting to the completeness of the atonement of the less perfect but yet truly penitent sinner to whom she grants the indulgence. That this practice of relaxation, whatever may have been its real import, was to be used according to the judgment of the bishop as to the disposition of the penitent, is expressly laid down by the council of Ancyra in 308, and by that of Nice in 325. In all cases, however, the person granting the relaxation was to impose certain good works as a partial substitute for the penalty which had been relaxed; and among these works, which had at first been purely personal, came by degrees to be included money payments for certain religious or charitable objects, as the building of a church, or the foundation of a monastery or hospital. The name indulgence appears to have originated late, the first recorded instance of its use being by Alexander II. in the 11th c.; but the institution itself is found in full development during the wars of the Crusades, the serving, or the contributing to service in which, 'provided it were for devotion alone, and not from motives of greed or of glory,' was accepted in the council of Clermont 'as an equivalent substitute for all penance.' Such an indulgence was called 'plenary;' where a portion only of the penitential works was relaxed, it was called 'partial;' and in order to put a bar to their excessive multiplication and to other abuses, Innocent III. declared the power of granting 'plenary indulgences' to be reserved to the pope alone, bishops being only authorised to grant the 'partial' or limited indulgences described above. The fourth Lateran council condemns the 'indiscreet and superfluous' granting of indulgences; and among the abuses which grew up in the church during the western schism, one of the most remarkable was the lavish dispensation of indulgences, in the granting of which the contending popes rivalled each other in prodigality. The last extreme, however, was not reached until the beginning of the 16th c., when, with a view to raising the funds necessary for the erection of the great church of St Peter's at Rome, the pope, Leo X., published a plenary indulgence, the principal condition for the gaining of which was a contribution to this work. Catholic historians contend that in itself such a condition was perfectly justifiable, and that if duly explained to the people, it might be lawfully and even meritoriously complied with; but they admit that many of the preachers of the indulgence, in extolling its natural effects, went to indefensible extremes, and that, even making the fullest allowance for exaggeration, it cannot be denied that grievous abuses both of doctrine and of practice were committed in Germany and in Switzerland. Hence the decree of the council of Trent, while it affirms that the use of indulgences, as being 'most salutary for the Christian people, and approved by the authority of councils, is to be retained in the church,' yet orders that, 'in granting them, moderation be observed, lest, by excessive facility, discipline may be enervated.' Upon the special instructions of this council, all the modern legislation on the subject of indulgences has been founded; but as the decree of the council does not explicitly declare what is the precise effect of an indulgence, it is further explained by Pope Pius VI., in his celebrated bull, *Auctorem Fidei*, that an indulgence, received with due dispositions, remits not alone the canonical penance attached to certain crimes in this life, but also the temporal punishment which would await the penitent after death to be endured by him in purgatory.

From the above explanation, it will be gathered that Catholics do not understand by an indulgence a remission of sin, much less a permission to commit sin, or a promise of forgiveness of future sin. They contend, moreover, that since the benefit of an indulgence can only be enjoyed by a sinner who has repented of sin, and resolved to embrace a new life, the imputation of introducing laxity of principle and easy self-indulgence is entirely unwarranted. And although, for the most part, the good works which are required as the condition of obtaining indulgences may appear easy and even trivial, yet the one indispensable preliminary—sorrow for sin and sincere purpose of amendment—in itself involves the very highest effort of Christian virtue.

On the subject of indulgences, Protestants are accustomed to quote the language used by popes in granting them, in opposition to the views put forth by Roman Catholics in defending them. And nothing is more common than for popes in their bulls of jubilee, to grant *the most plenary and complete indulgence, pardon, and remission of all sins*, on certain conditions specified. And although this grant is made only to 'the faithful who are truly penitent and have confessed,' yet being limited to a certain period, as the year of jubilee, and to certain conditions, as saying certain prayers, visiting certain churches, wearing or kissing a scapular, or the like, it is argued that these cannot but acquire, in the estimation of the people, an importance which is very unfavourable to penitence, virtue, faith, and piety. It is likewise urged that the whole doctrine of indulgences is founded not only on an unwarranted assumption of power given to the church, but also on a doctrine of human works and merits inconsistent with what we are taught in Scripture as to the office of Christ as a Saviour.

I'NDUS (Sansc. *Sindhu*, probably from a root signifying 'to flow'), the great river that bounds Hindustan on the west. It rises in Tibet, near the sources of the kindred Sutlej, in lat. 31° 20′ N., and long. 81° 30′ E. The precise spot is said to be 18,000 feet above the level of the sea, and to be on the north side of the Kailas, a Himalayan peak which overtops it by at least 4000 feet. Its general course, till it forces its way between the Himalaya Proper and the Hindu Kush, is towards the north-west, being pretty nearly at right angles to its general direction through the plains. On reaching Sussi (near the borders of Budakshan), its most northern point, it turns southward, loses itself in the hills, and reappears at Takot in Kohistan, north of the Punjab. After a run of 870 miles, having still 940 miles before it, it becomes navigable at a point which, on other grounds also, is worthy of notice. Here it receives the Cabul, its principal affluent on the right; and here is Atak (Attock), anciently Taxila, the scene of Alexander the Great's passage. About half way from Atak to its mouth, it receives, on the left, the accumulated waters of the Punjab through the single channel of the Punjnud. Each of the 'five water-courses,' as well as the Cabul, is practicable for inland craft to the mountains. Below its confluence with the Punjnud, the I., instead of increasing in volume, becomes gradually less. Its basin is here narrow, so that the affluents are insignificant, while its arid sandy nature causes the river to suffer from absorption and evaporation. This operates still more powerfully from the circumstance, that the river here divides into numerous channels, many of which never return at all to the main stream, while others return much shrunken in volume. This wasting of the waters is, however, not very apparent to the eye, owing to the gradual slackening of the current and the ascent of the tides. At Migani, eight miles north of Hyderabad, commences the Delta Proper, which measures 75 miles upwards, by 130 along the coast of the Arabian Sea. The area of the drainage—its extreme dimensions being respectively 900 miles and 750—has perhaps been over-estimated at 488,000 square miles, fully four times the extent of Great Britain and Ireland.

The value of the I. as a route of traffic is less than that of most other streams of equal magnitude. In the winter, one only of its numerous outlets is at all available for communication with the sea; and even after the melting of the spring snows, there is no passage anywhere for an ordinary sea-going vessel of more than 50 tons. Still, in another respect the river is favourable for navigation, as the fall from Atak to the sea is only 1000 feet in 940 miles.

The I. abounds with fish of excellent quality, and is infested by crocodiles. The alluvium brought down by the stream has been calculated to be sufficient for an annual formation 42 miles long, 27 miles broad, and 40 feet deep. Near Rori, a short distance below the first point of divergence, both the main stream and one of its offsets pass through a ridge of limestone, which must at one time have turned the descending floods laterally into what is now a desert, but bearing the plainest traces of former cultivation.

INDU'SIAL LIMESTONE, a singular variety of fresh-water limestone, found in Auvergne. It is formed of the cases or indusia of caddis-worms, great heaps of which have been encrusted with carbonate of lime, and formed into a hard travertine. Several beds occur, some as much as six feet thick, each cubic inch of which contains as many as ten or twelve cases. See CADDICE. The Auvergne cases are formed of the shells of a minute Paludina, so small that 100 shells may be counted in a single indusium.

INDU'STRIAL ACCESSION, a phrase borrowed by the Scotch from the Roman law to denote the increased value given to a thing by labour and skill being exercised upon it. This phrase includes the case of a person building by mistake on another's land, in which case, in England, though the building was done *bonâ fide*, it belongs absolutely to the owner of the land, who is not bound even to pay for the materials, which he can keep, or their value; but in Scotland, the owner of the land, though entitled to the materials, would be liable to pay for their value.

INDUSTRIAL FRUITS, in Scotch Law, the produce of land which the life-renter is entitled to; called in English law, Emblements (q. v.).

INDUSTRIAL SCHOOLS. This term is used very variously, sometimes being synonymous with ragged schools, in which mechanical arts are taught; sometimes designating ordinary elementary schools, in which agricultural or some other industrial art is taught to the boys during one portion of the school-day, or in which sewing, cooking, washing, and ironing are taught to the girls. In England, Scotland, and Ireland, attempts have been made to attach practical instruction in agriculture to elementary schools for boys, but with very small success, except in the last-named country; there the Glasnevin Agricultural Training School has accomplished much good. See AGRICULTURAL EDUCATION. Nor can it be said that the attempt to attach other industrial arts to national and parochial schools has been attended with better results. The Privy Council on Education gave special grants for many years to schools which combined industrial with literary instruction, but these grants are not continued in the Revised Code. In elementary schools for girls, industrial work, to the extent of sewing, shaping, knitting, and netting, has been almost universally introduced, and forms one of the most important and interesting features of female primary education in Great Britain; but the attempt to connect with these subjects instruction in cooking, washing, and ironing, has been tried as yet only to a limited extent, and has been only partially successful. In ragged schools, on the other hand, no department of the school-work seems to thrive better, partly because it enters so largely into the scheme of instruction, partly because the children are removed from the control of parents, and left solely to the management of the school committee; for the great obstacle in the way of connecting industrial arts with ordinary schools is the unwillingness of parents to see their children engaged in manual occupations during the time which ought, in their opinion, to be devoted solely to intellectual training and the acquisition of literary knowledge. The ragged schools to which we have just referred are recognised by the legislature as 'industrial schools,' to the maintenance of which the Treasury may contribute on the representation of the Home Secretary, and may be defined as schools in which the pupils are lodged, fed, and clothed, as well as taught the elements of an ordinary education, and the practice of some trade. By a statute passed in 1866, children under 14 found begging, &c.; children under 12 charged with offences; refractory children under 14 in charge of parent; and refractory children under 14 in workhouses or pauper schools, may be sent by a magistrate to a certified industrial school. The Education Acts of 1870 and 1872, for England and Scotland respectively, provide that the school-board of any parish or borough may establish and maintain industrial schools, but subject to the provisions of the Industrial Schools Act of 1866. In 1872, the number of industrial schools in England and Scotland was 100, containing 10,905 children, of whom 6688 were in England, 3497 in Scotland.

INDUSTRIAL SOCIETIES are societies which carry on some trade, the profits of which are applied to an object of mutual benefit, resembling the object of Friendly Societies (q. v.). The 'Industrial and Provident Societies Act, 1867,' regulates these societies on improved principles, the first statute having been passed in 1852. Any number of persons not less than seven may establish such a society, for the purpose of carrying on any labour, trade, or handicraft, whether wholesale or retail, except the working of mines and quarries, and except the business of banking, and of applying the profits for any purposes allowed by the Friendly Societies' Acts. The rules of the society must define the object, name, and place of office of the society, and it must in all cases be registered as one of limited liability. The rules must also state the terms of admission of members, mode of holding meetings, voting, transferability of shares, audit of accounts, investment of capital, mode of withdrawing from society, claims of executors, application of profits, appointment and remuneration of managers and officers, and make provision for the custody, use and device, of the seal of the society. They must be forwarded to the Registrar of Friendly Societies of England and Scotland, for his certificate that they are in conformity with law, before they can be acted upon. After registration, a copy of the rules must be delivered to every person who demands them, on payment of one shilling. No member's interest is to exceed £200, but one society may invest its funds with another or others to any amount. The name of the society is to be painted conspicuously on the outside of the office, and put on all bills of exchange, bills of parcels, invoices, receipts, and letters of credit, and a penalty is incurred for neglecting these requirements. These societies are placed on the same footing as friendly societies in respect of the exemption from stamp-duties and income-tax—of settlement of disputes by arbitration or justices of the peace—of compensation to members unjustly excluded—of the power of justices or the county courts in case of fraud, and of the jurisdiction of the registrar. Any member may nominate any person into whose name his interest in the society at his decease shall be transferred, but the society *may*, instead of making such transfer, pay to any nominee the full value of the shares, and *must* pay him the value of any shares, which, if transferred into his name, would increase his interest in the society to more than £200. The society may be wound up like a joint-stock company by the county court of the district, and in the event of its being wound up, past and present members are liable to contribute to the assets to an amount sufficient to pay the debts; but no past member is bound to contribute who has ceased for a year to be a member, or where the debt was contracted after he left the society, or unless the existing members are unable to satisfy the contributions necessary to pay the debts; and no member is liable to pay more than the amount, if any, unpaid on the shares in respect of which he is liable as a past or present member. Every person or member having an interest in the funds is entitled to inspect the books. A general statement of the funds of the society, shewing the assets and liabilities, must be sent to the registrar once every year, and every member and depositor is entitled to demand and receive without payment a copy of such statement from the treasurer or secretary.

INE'RTIA (Lat. 'inactivity'), a term expressive of that indifference to a state of rest or motion which is a universal property of matter, and may be expressed by saying *that a body in motion will continue in motion, and a body at rest will remain at rest, unless acted upon by some external force*. The latter part of this principle was known to the ancients, and by them attributed to a certain repugnance to motion, which was a characteristic of all matter; but it was shewn by Galileo that the former part was equally true and general. This property of matter has been called by Kepler *vis inertiæ*.

INESCU'TCHEON, in Heraldry, a single shield borne as a charge. When there are two or more, they are simply called escutcheons, for an inescutcheon, it is said, must always occupy the fess point of the shield. An inescutcheon is to be distinguished from an escutcheon of pretence, which is not a charge, but a separate coat.

INFALLIBI'LITY, in Controversial Theology, means the immunity from error, in all that regards faith and morals, which is claimed by the Roman Catholic Church, and, at least as regards the past, by the Greek Church, as represented in the decrees of the councils which that church looks upon as ecumenical. The latter claim, however, which does not go beyond that of *inerrancy*, or actual exemption from error up to the present time, differs widely from that of infallibility, as put forward by the Roman Church, which involves not alone an actual historical immunity from error, but also such a positive and abiding assistance of the Spirit of God as will at all times both protect against the possibility of error, and guide and direct in the faithful teaching of all necessary truth. The infallibility claimed by the Roman Church is thus of two kinds, *passive* and *active*—the first (Matt. xvi. 18), in virtue of which the church never can *receive* or *embrace* any erroneous doctrine, no matter by whom proposed; the second, in virtue of which she is charged with the function (Matt. xxviii. 19; Mark xvi. 15; Ephes. iv. 11—16) of permanently *teaching* to the world the essential truths of God, of actively resisting every access of error, and of authoritatively deciding every controversy by which the oneness of belief among the faithful may be endangered. Catholics regard this gift as a natural and necessary accompaniment of the authority in matters of faith with which they believe the church to be invested, and which, if not guided in its exercise by such infallible assistance, would be but a false light, and an attractive but dangerous instrument of delusion.

Such is the notion of infallibility as claimed by the Roman Church. Two very important and practical questions, however, arise regarding it, both of which have been the occasion of much controversy even among Catholics themselves; viz., as to the *subject*, that is, the seat or the organ of this infallibility, and as to the *object*, that is, the matters to which it extends.

As to the first, all Catholics have been agreed that the body of bishops, morally speaking, throughout the church, acting in common with the pope, constitute the most perfect organ of the infallibility of the church; and hence, that when they unite in any way, whether as assembled in a general council or separated in place, their judgment is infallible. Thus, if a doctrinal decree be addressed officially by the pope to the whole church, and be either expressly confirmed or tacitly accepted by the bishops, this decree was held to be infallible. In like manner, if a doctrinal decree, emanating even from a local council, as that of a national, or even a provincial church, should be universally accepted by the pope and the bishops, that decree also was held to be infallible. In a word, wherever there is found the *united* judgment of the pope and the bishops, all agreed in accepting it as the infallible judgment of the church. But should the pope alone judge without the bishops, then arose the well-known dispute of the Gallican and ultramontane divines; the latter affirming, the former denying, the papal judgment to be infallible; but all agreeing that it was not binding *as an article of Catholic faith*, so long as it had not received the assent of the body of the bishops. By the decree of the Vatican Council (1870), this controversy has been decided; and it is now agreed that the doctrinal decrees of the pope teaching *ex cathedrâ* are to be accepted as possessing the same infallibility which attaches to the teaching of the church. See COUNCIL.

On the matters or subjects to which the gift of infallibility extends, Catholics are agreed in one principle, that it embraces all those subjects, and those only, which are necessary for the maintenance of divine truth in the church. Hence, presupposing divine revelation, either written or oral, it embraces all questions of faith and morality, all subjects of general discipline, so far at least as to preclude the introduction, by authority of the church, of any discipline which should be injurious to faith or to morality. On the other hand, it does not embrace questions of science, or matters of fact, or abstract opinions unconnected with religion. On this point, all Catholics have been agreed. But a very celebrated dispute arose in the 17th c., on occasion of the *Augustinus* of Jansenius, as to the infallibility of the church in judging of books, out of which originated the well-known Jansenist distinction of *law* and of *fact*. See JANSENISM. On this subject, it will be enough to say, that all Catholics are now agreed in recognising as a necessary condition to the effective infallibility, that it should extend to the judgments upon books so far as to decide whether the doctrine contained therein may or may not be opposed to sound faith or morality.

The arguments in favour of the infallibility of the church, which Roman Catholics derive from texts of Scripture, are set aside by Protestants on the ground that these texts only teach the permanence of the church and the continuance of God's grace towards it (as Matt. xvi. 18; Matt. xxviii. 19, 20; &c.), and have no relation whatever to the special subject of infallibility.—It is common also for Protestants to urge, that on the supposition of infallibility and of the need of an infallible interpreter of Scripture, as commonly declared by Roman Catholics, there can be no value in any argument from Scripture; and that the Roman Catholic theologian, in attempting to prove the infallibility of the church by Scripture, and the authority of Scripture by the infallibility of the church, is involved in the sophism of reasoning in a circle.—It is sometimes added, that if God's word needs an interpreter to make it a safe rule of faith, man's word may well be supposed equally difficult to comprehend.—And the notion of infallibility, with the whole system of which it forms an essential part, is protested against as contrary to the rational nature of man, and to that personal relation and responsibility to God which are at the foundation of all true religion. Something is also made in argument of the difficulty which the advocates of the infallibility of the church have found in agreeing as to where it is lodged.

INFA'MED, or DEFAMED, in Heraldry, an epithet applied to a lion or other animal which has lost its tail, the loss being supposed to disgrace or defame it. *Defamed looking backwards* occurs in ancient blazon for counter-rampant regardant, the lion being supposed to be flying from an enemy.

I'NFAMOUS. Infamy was, in point of law, formerly a ground for rejecting a witness in a court of justice; but now, in the United Kingdom, the witness is allowed to give evidence subject to comment, and to state what he can say for what it is worth.

INFAMOUS BEHAVIOUR, DISCHARGE WITH INFAMY, terms in use in the military and naval codes to designate conduct (and its penalty) which is not only opposed to discipline, but is also disgraceful in a social sense. As infamous behaviour, have been always classed in all countries desertion of colours on the field of battle, failure to attempt to succour comrades in danger, cold-blooded cruelty, and other crimes which are greatly subversive of morality. If a man is found guilty of any of these crimes by a court-martial, and not sentenced to death, the sentence is ordinarily discharge—or dismissal—with ignominy or infamy. So severe an enactment adds to the force of the penalty, and stigmatises the offender for life as a disgrace to his country and his cloth.

INFANT, in English Law, means every male and female under the age of 21. As a general rule, an infant cannot enter into contracts; at all events, they are not binding except at his or her option. But a contract for necessaries is always binding, and an infant may be imprisoned for non-payment of these, like other persons. The father, or, after his death, the mother, of an infant can in general only be bound for an infant's debts where some express or implied contract to pay for these can be made out; and the mere fact of the infant living in the same house is not always sufficient to imply liability, though it is generally an element for the jury. If an infant enter into trade, he is nevertheless only bound by his contracts at his option. But in all cases, if the infant, on coming of age, ratify the contract, then it is binding on him.

An infant in England generally requires the consent of his parent or guardian to marry, though it is more correct to say, that if he misrepresent in the preliminary formalities that he is of age, he may be indicted for perjury, but nevertheless the marriage will be good, and cannot be annulled. An infant cannot make a will either of his real or personal estate. He can only sue in a court of law by a near friend or *prochein ami*, who is his father if alive, or any other friend.

In Scotland, the law differs in many respects from the law of England on this subject. The term infant is not used at all in a technical sense. All persons, if male, are in legal strictness called pupils till 14, and if female, till 12; and from 14 or 12 to 21, they are technically called *minors*. In general, the contracts of a pupil are absolutely void, and he is under the care of tutors, who are either his parents, or others appointed by the court. A minor, on the other hand, may enter into contracts, but if they are to his lesion or prejudice, he can reduce or set them aside any time within four years after majority. Moreover, if a minor go into trade, his contracts bind him, as they do other persons. Further, a minor can make a will or testament, operating on his movable estate, though he cannot alienate his heritable estate in like manner. The four years which are allowed to him after majority to consider whether he will set aside contracts are called *quadriennium utile;* and if he can prove lesion, he is in that period entitled to restitution. In Scotland, also, a minor may marry as freely as if he were a major, and, indeed, he is in general his own master, or *sui juris*, at the age of 14 (as a female is at the age of 12); whereas in England he would be liable to have a guardian appointed to control his person till he attained 21.

INFANT SCHOOLS. Oberlin (q. v.), the pastor of Waldbach, in France, may be regarded as the founder of infant schools. He appointed females in his own parish to assemble the little children between the ages of two and six, his object being to interest them by conversation, pictures, and maps, and to teach them to read and to sew. The first infant school attempted in this country was in connection with Robert Owen's socialistic establishment in Scotland; it was taught by James Buchanan. In 1819, through the efforts of Lord Brougham and Lord Lansdowne, an infant school was set on foot in London. One of the first teachers was Wilderspin, whose labours in connection with the extension of infant schools are well known. His methods, based on the Pestalozzian system, were further matured by the Home and Colonial Infant School Society, founded in 1836. This society, by training teachers and instituting model infant and juvenile schools, has done more than any other to propagate the infant school system.

Infant schools are not yet very numerous either north or south of the Tweed; but they have certainly been more extensively encouraged in the southern than in the northern half of the kingdom. Two causes have operated to prevent their more rapid increase—the want of means, it being necessary to devote to juvenile schools the money which can be collected for educational objects; and the defects which have hung about the system, and brought it into disrepute. Too much has frequently been attempted in the way of direct instruction. In Germany, under the names of *Kleinkinderschulen* and *Kindergärten*, infant schools are numerous. In

France, under the name of 'Asylums,' they are very widespread.

Infant schools, like other seminaries which are not purely *professional* in their aims, ought to keep in view the threefold nature of the child's mind, and appeal to its different faculties in turn. But while the intellect, the moral nature, and the imagination ought to receive their proper food, it has to be borne in mind that we contradict the laws of nature when we omit an element more powerful and exacting than any of these; we mean the physical, and that love of play, fun, and nonsense which is connected with it, and which is peculiar to infancy, and not unbecoming even the gravity of manhood. By marching, exercises, toys, and, above all, by the judicious use of a large open playground, full provision should be made for the muscular restlessness of children, and for their love of play. The room in which they are collected should be little more than a well-ordered, covered playground. In the playground, whether open or covered, order, obedience, kindness, consideration, civility, cleanliness, good-temper, are to be taught, and the *moral* objects of the infant school attained. Play, and the moral training which may be connected with it, should be the leading ideas of the place, and to these everything else should be subordinated. Next to this, the intellectual nature of the infant has to be considered, its future anticipated, and the elements of reading taught, but with the help of such methods and books as call for the minimum of mental exertion. An infant school which has cultivated the moral nature of its children through games and exercises, and has taught them to read easy monosyllabic sentences by the time they reach the age of six, has accomplished its work well. At the same time, other means of awakening interest and intelligence may be resorted to with advantage, but under this restriction, that, if they fail to call forth spontaneous and unconscious attention, either through the want of skill on the part of the mistress to present them in an attractive form, or through some defect in the apparatus at the command of the mistress, they should at once be given up. We refer to songs of a moral or narrative kind—rhymes and nursery jingles—descriptions of objects and pictures by the children under the teacher's guidance (object-lessons)—the concealed purpose being to cultivate the perceptive faculties of form, colour, number, size, &c.—and lessons in arithmetic on a ball-frame. Then, again, the teacher may collect the children around her and read to them fairy tales and simple stories of incident and the affections. All this may be, and actually is attained; but the qualifications in the teacher for the attainment of them are rarely to be met with. So far as these qualifications are of a moral or imaginative kind, they are natural endowments; but they may receive enlightenment and direction by a judicious system of training. In the first Report of the Home and Colonial School Society, it is truly said, 'that few situations in life require so much discretion, so much energy, so much tenderness, so much self-control and love, as that of a teacher of babes.' Without a consciousness that she possesses these qualifications, especially the last-named, no woman should for a moment contemplate the career of an infant-school mistress.

The question still remains to be considered—whether infant schools are desirable at all, and whether the family hearth, and the fields, or the streets, do not constitute the best, because nature's infant school. Were society in a normal and healthy condition, the answer to this question would be, that infant schools are hurtful even at the best, and that, when we bear in mind the chances of their being badly conducted, they may be generally denounced as a public nuisance. But we are *not* in a normal state; and while infant schools proper are, perhaps, superfluous in rural parishes, they are in populous places a boon and a blessing, if not a necessity.

INFA'NTÉ (from the Lat. *infans*, an infant), the title given in Spain and Portugal to the princes of the royal family, the corresponding title of INFANTA being given to the princesses. Since the 14th c., however, the heir-apparent to the throne in Spain has been styled the Prince of Asturias, and the heir-apparent in Portugal, until the separation of Brazil from the mother-country, bore the title of Prince of Brazil. The personal domain of an Infante or Infanta is called the *Infantado*, and this has come to be the name of a district which was made a dukedom in 1475.

INFA'NTICIDE, the act or practice of murdering infants, which is abhorrent to modern civilisation, was common in ancient times, and now prevails among many barbarous nations. It prevailed in Greece and Rome, and (such is the force of custom) found defenders in Plato and Aristotle! The latter, in his *Politics*, says the law should forbid the nurturing of the maimed, and where a check to population is required, abortion should be produced before the quickening of the infant. In Sparta, we are informed that the law directed, when a child was born, the father was to carry it to an appointed place, to be inspected by the elders of the community. If they perceived that its limbs were straight, and its look was wholesome, they returned it to its parents to be educated; otherwise, it was thrown into a deep cavern, at the foot of the mountain Taygetus; and it was said this law had a wholesome effect, for it made women with child very careful as to their eating, drinking, and exercise, and hence they proved excellent nurses. In the other Grecian republics, a similar disregard of the life of sickly infants was shewn. With regard to the practice among the Romans, little definite information exists, though learned authors discuss it at great length. It seems certain that it lay with the Roman father to say whether his child should be permitted to live or not. The exposition of infants, indeed, was the rule, rather than the exception, in most countries in old times. Among the Norse, the child's life always hung in the balance till the father handed it to the nurse to be reared; if, on account of its being weak, or a daughter, he disapproved of its living, it was exposed to die by wild beasts or the weather. In modern times, the practice is cruelly common among certain peoples. Child-murder prevails to a great extent throughout the whole of the South Sea Islands. Among the Fijians, it is a system. A recent authority says, that in Vanua Levu in some parts, 'the extent of infanticide reaches nearer two-thirds than a half.' Among the Hindus, the practice of destroying children, especially females, prevailed frightfully, till it was checked in the time of the Marquis of Wellesley's rule. The Rajpûts, it is said, destroy all female children but the first-born—a peculiar custom, due to its being a point of honour with a Rajpût to nearly ruin himself in the marriage feast and portion of his daughter, so that he could not afford to have more than one. The Mohammedans were inclined to the same practice, but effected their object chiefly by means of abortion. In New Holland, the native women think nothing of destroying, by compression, the infant in the womb, to avoid the trouble of rearing it alive. In China, infanticide is supposed to be common, the chief cause being said to be the right of periodically repudiating their wives, which is possessed by Chinamen. Some statistics, recently published in the *Esperance* of Nancy, indicate the fearful extent to which life is lost through this practice prevailing in so vast a population as that of China. In all the cases above cited, it may be assumed there was no feeling of infanticide being wrong or criminal. In some, it was owing to religious feeling of a perverted kind; in some, to the difficulty of living; but in many, as among the Fijians, it would appear that the mother killed her child often from whim, anger, or indolence.

Modern civilisation deals very differently with the subject of infanticide, for one of its maxims is that human life, from its first to its last hour, is sacred, and whoever wilfully puts an end to it is a murderer, or a criminal of the same category. Instead of encouraging the destruction of life, modern civilisation abounds in every kind of machinery for preserving it, however unsuccessful the attempt. The chief cause which now leads to infanticide is that of shame, which, however, operates only in the case of the child being illegitimate. The parents often incur the risk of committing the crime of murder, to avoid social disgrace. In order, therefore, to appreciate the force of the checks put by the law on the tendency to infanticide, the law of Bastardy (q. v.), the practice of instituting Foundling Hospitals (q. v.), and the kind and degree of the punishments attending any attempt more or less direct to destroy the child either before or after birth, require to be taken into account.

The criminal law deals with the cognate offences which make up infanticide in the following manner, whether the child is legitimate or illegitimate. As regards the procuring of abortion, every woman who takes poison or other noxious thing, or uses instruments or other means to procure her miscarriage, is guilty of felony, and liable to penal servitude for life, or not less than three years; and so is any person who administers poison or uses instruments upon the woman with such intent. Whoever supplies drugs, poison, or instruments for the same purpose, is guilty of a misdemeanour, and liable to penal servitude for three years. The concealment of birth is also made a criminal offence. Whoever, after a child is born, by any secret disposition of the body, endeavours to conceal its birth, is guilty of a misdemeanour, and liable to imprisonment for two years. This is the offence which, perhaps, is most frequently committed, or at least made the subject of prosecution in such cases, as the attempt to establish the larger crime of murder to the satisfaction of a jury, is frequently foiled by the secret sympathy shewn towards the mother, who is presumed to have been the victim of seduction, or otherwise wronged. The existence of this offence shews the necessity which every woman likely to become a mother labours under of making public her situation to some extent. As the destruction of children may be effected by the negative fact of not supplying food and clothing, as well as by the positive act of wounding or ill-treating, the refusal or neglect of a parent or other person who is bound by law to supply food and clothing to the child, and neglects to do so, thereby causing its death, amounts either to murder or manslaughter, according to the circumstances. Moreover, the unlawful abandoning or exposure of any child under the age of two years, whereby the life and health of the child are endangered, is a misdemeanour punishable with three years' penal servitude. Where a person is charged with the murder of a very young child, it is essential to prove that the child was in life. The test of this is not that it breathed, or had an independent circulation after it was separated from the mother, but it is enough that the child was fully born; hence, if a man strike a woman with child, so as to cause the death of the child, he is neither guilty of murder nor of manslaughter of the child. The judges of England, in 1848, had to deliberately consider whether though a child was still attached to the navel-string, the killing of it was murder, and they held that it was. In all cases of the murder of infants, the question whether the child was fully born, and so the subject of murder, is generally one of medical jurisprudence, upon which medical skill is needed to throw light, and medical men have certain well-known tests for ascertaining this important fact. The above offences in reference to infanticide are punished in a similar manner in Scotland.

One of the coroners in London recently stated that an inquest is held daily upon the bodies of children destroyed through the design, the neglect, the ignorance, or the mental infirmity of the mothers. Even when the act may fairly be regarded as a crime, its enormity is generally greatly lessened in the eye of the law by the consideration of the physical condition and moral disturbance of the parent. Where puerperal insanity supervenes, the infant is often sacrificed during the despair or violence of the mother.

A further protection was given to infant life by an act of 1872, which obliges those who undertake for hire to nurse infants under the age of one year, to have their house registered, and to keep records of the children they take charge of. They must also give notice to the coroner or procurator-fiscal of such infants' death; and the local authorities defray the expense of enforcing this act.

I'NFANTRY, the foot-soldiers of an army. Among semi-barbarous nations, fighting on foot has always been considered less advantageous than fighting on horseback or in chariots; but as war has become a science, the principal strength of armies is found to lie in their infantry. See ARMIES, TACTICS, WAR, &c.

INFE'CTION is distinguished from Contagion (q. v.) by some medical writers, who would restrict the latter word to the cases in which there must be *contact* of the healthy person with a patient, while they apply the term *infectious* to diseases which can be conveyed by the atmosphere. The distinction is unimportant.

INFE'CTIOUS DISORDERS in cattle have been made the subject of special enactment, in order to protect the public from the calamities arising from the spread of disease in so important an article of food. Though passed for a temporary period, the act 11 and 12 Vict. c. 107, has been continued from time to time, and will probably be ultimately declared permanent. The statute gives power to the police to seize any sheep or lambs exposed in any market which are infected or labouring under a disease called the sheep-pox, or *variola ovina*. The parties who so expose them are liable to penalties, and the cattle may be destroyed; so if any person depasture diseased sheep on commons, woods, forests, waste lands, open fields, or the roadside.

INFE'FTMENT, or SASINE, a Scotch law-term, used to denote the symbolical giving possession of land, which was the completion of the title, the mere conveyance not being enough. The instrument of sasine was the notarial instrument embodying the fact of infeftment. But now the necessity of a separate formality is unnecessary, it being sufficient to register a conveyance in the register of sasines in Scotland. In England, there is no similar register for deeds, and the title is complete when the conveyance is executed and delivered to the purchaser. In Scotland, an *infeftment in security* is a temporary infeftment to secure payment of some debt; and an *infeftment of relief* is a similar security to relieve a cautioner.

I'NFINITE. This word is the source of much controversy and difference of opinion. Some hold that there corresponds to Infinity a distinct notion, which we are entitled to entertain and reason about, with the same confidence that we discuss measured intervals, as a yard or mile; while others maintain that the word is a name for a mere negative. Sir W. Hamilton goes so far as to say that 'the Infinite and the Absolute are only the names for two counter-imbecilities of the human mind, transmuted into properties of the nature of things—of two subjective negatives converted into objective affirmatives' (*Discussions*, p. 21). And Mr J. S. Mill holds a similar view. It had also been maintained by Locke that we have no positive idea of the infinite, that it was only the negative of an end or termination (*Essay on the Understanding*, book ii. chap. 17).

The notion of the infinite has, indeed, been admitted into mathematical reasoning, a circumstance that would seem to imply that we could use it with exactness, and, consequently, it could not be altogether an incompetence or imbecility of the understanding. It appears, however, that mathematicians use the word under peculiar restrictions. They employ it in the two extremes of the infinitely great and the infinitely little. 'If we see a conclusion, which we can nearly attain by the use of a large magnitude, more nearly by the use of a larger, and so on without limit, that is to say, as nearly as we please, if we may use a magnitude as large as we please, but which is never absolutely attained by any magnitude however great, then such conclusion may be said, for abbreviation, to be absolutely true when the magnitude is infinite' (*Penny Cyc.*, art. 'Infinite'). The very same statement might be made regarding the infinitely small, which is represented in mathematics by the symbol for nothing, although it is not the same as nothing in the strictest sense, namely, the nothing caused by subtracting a quantity from itself, as two from two. It is nothing in this sense, that if added to a finite quantity, as 10, it produces no augmentation that can be made use of; the quantity for all purposes remains the same. The machinery of infinite quantities plays a large part in the operations of the higher mathematics, and is introduced in order to compare two things naturally incommensurate. Thus, in estimating the area of a curved surface, such as a circle, in straight-lined spaces, such as square inches, the difficulty was got over by a sort of fiction, namely, by supposing the circle to be inscribed by a right-lined figure or polygon, of such a very great number of sides that they coincide to all intents and purposes with the curved circumference. The coincidence can never be perfect; but by imagining the sides to be smaller and smaller, and, consequently, more and more numerous, the difference between the polygon and the circle may become less than any assignable quantity, or, as it may be said, infinitely little, in fact, as good as nothing, so that the estimate of the area of the one will stand for the estimate of the area of the other. This device for overcoming the natural incommensurability of straight and curved, and of number and motion, is the real occasion of the mathematical use of the term in question. Nor does it give any foundation for the view that would regard the infinite as a positive conception of the mind, which we may apply to objects with a conscious meaning.

This will be more apparent when we attend to the difference between two classes of negative notions. The first class includes those whose negative brings something positive; thus, not hot, brings before us a positive experience, namely, cold; not white, according to what is intended, turns up either black or all other colours, which are to us as much a positive, or real, conception as white. Unjust, or not just, is the name for a distinct class of really existing actions, in contrast to the class named just actions. All notions, such as these, which have for opposites really existing things, are real and genuine notions of the mind; they are conceivable by us to the full extent that we are capable of conceiving anything whatsoever. In fact, the highest test of genuineness, reality, and conceivability, is the existence of a negative, which is also real and positive. Body or matter is a real conception by being opposed to space; the one resists our movements, and the other permits them. Body and space together make the extended universe, the world of externality, or objective existence; which has a distinct meaning by contrast to the inextended mind, or the subject universe. But *existence*, as a whole, is not a real conception, because we have nothing to oppose it to; non-existence is not a real opposite, like space to body, or mind to extension; it is only a formal or verbal opposite, made up by using the word for negation to a case that does not admit of the operation. Non-existence is total annihilation, which, of course, we cannot conceive, as we do cold or black, in their opposition to hot and white. This being so, we have nothing to affirm respecting existence as expressing the absolute totality of things. See EXTENSION.

Now, to which class of notions does infinite belong? Is it a real opposite to the finite, like cold to heat, or a verbal and formal opposite, like non-existence? Finite means what has a boundary or termination, and applies strictly to body, which is always conceived by us as bounded and terminating in space. The bounded is, in fact, body (or some analogy of body, as when we fancy an enclosure which we do not actually construct); the absence of bounds is free space, which is a real conception. It means scope for movement, freedom from obstruction, and its opposite is some inert matter, standing in our way, to prevent further movement. The unbounded is thus another name for *space;* and when we arrive at a space with no further prospect of obstruction, we may call that a boundless space, but the only meaning we have thereby is a space which no longer contains material obstruction. And we can conceive of no other end of space. Our whole experience furnishes no other contrast except these two, space and body, and where the one ends, the mind must conceive the other. We may conceive the not-extended, it is true, by passing to the subject mind, with its feelings and volitions; but within the sphere of the extended, we have no choice but between space and body. We cannot conceive the end of space otherwise than by the beginning of resistance; anything else (not being the subject mind) would be non-existence, or annihilation.

The infinite may thus be the name for an abbreviation in mathematics, but as a real notion of the mind, it merely expresses our inability to pass beyond the region of our experience of matter and space.

INFINITE'SIMAL CALCULUS. See CALCULUS.

INFI'NITIVE. See VERB.

INFLAMMA'TION is the most important of all the morbid processes that fall under the notice of the physician or surgeon. The most obvious symptoms or phenomena of inflammation, when it attacks an external or visible part, are pain, redness, heat, and swelling, or, in the words of Celsus, 'rubor et tumor cum calore et dolore.' The general characters of the process will be best understood by an assumed case. If a healthy man gets a splinter of wood or any other foreign body imbedded in any fleshy part, he begins to experience pain at the part, and this is soon succeeded by redness of the skin, a firm and extremely tender swelling at and around the spot, and a sense of abnormal heat. These purely local symptoms are succeeded, if the inflammation reach a certain degree of intensity, by a general derangement of the vascular and nervous systems, to which various names, such as constitutional disturbance, symptomatic or inflammatory fever, pyrexia, &c., have been applied. If the foreign body is extracted, the probability is that all these symptoms will gradually abate until the part at length regains its natural appearance and sensations. In this case, the inflammation is said to terminate by *resolution*, and this is the most favourable mode of termination. If, however, the cause of irritation is not removed, or if the intensity of the morbid process exceed a certain point, the following phenomena occur: the swelling assumes a more projecting or pointed form, the part becomes softer, and the skin at its centre, which is usually the most projecting part, becomes whiter. There is a sensation of throbbing pain, and if the skin be not divided by the knife, it finally breaks, and a yellow, cream-like fluid, known as Pus (q. v.), escapes, after which the symptoms rapidly abate. This termination is known as *suppuration*.

If the original injury was very severe, and the inflammation intense, there may be actual death of the part affected. In that case, the red colour of the skin becomes purple or greenish black, the pain ceases, and the part becomes dead and putrid. This is *mortification*. Under favourable circumstances, this dead part, which is called a *slough*, spontaneously separates from the adjacent living parts by a vital process known as *Ulceration* (q. v.), and the cavity which is thus formed gradually fills up and heals.

The *pain* may vary from mere discomfort to intense agony. There is usually most pain in those parts in which the tension produced by the swelling is the greatest, as in bone, serous and fibrous membranes, &c. The pain occurring in inflammation is always aggravated by pressure, and by this means the physician can often distinguish between inflammatory and non-inflammatory disorders. The *heat* is seldom so much increased as the sensations of the patient would lead him to believe; it does not rise above the maximum heat of the blood in the interior of the body. This increase of heat depends upon the increased flow of arterial (or highly oxidised) blood to the part. The *redness* depends upon there being more blood than usual in those vessels in the affected part which usually carry red blood; upon the blood containing an increased number of red corpuscles; and upon red blood entering into vessels which, in the normal state, convey colourless fluids only, or which naturally admit so few red corpuscles that they cannot usually be observed. The *swelling* depends in part upon the distension of the blood-vessels, but mainly upon the effusion of various fluids, such as blood, serum, coagulable lymph (or fibrine), and pus into the tissue of the affected part. These fluids are termed the *products* of inflammation. This coagulable lymph frequently becomes organised, and many changes, some of a reparative nature (to which a reference will be presently made), and others of a morbid nature, depend upon its effusion.

Numerous observers have attempted to trace the exact phenomena of inflammation, by microscopic examination of the transparent parts of animals in which the process has been artificially excited. From observation made on the web of the frog's foot and other transparent parts of animals by Wharton Jones, Paget, and others, the following general conclusions may be drawn.

1. The primary effect of a slight stimulus applied to the blood-vessels is a slight and gradual contraction, with a retardation of the current through them.

2. During this contraction, the blood is impeded, or altogether stops. But the vessels soon dilate to a size larger than they originally possessed, and the blood now moves through them more rapidly than in the normal state. The slight stimulus that previously caused the vessels to contract, has now, if re-applied, little or no effect; but on applying a more powerful irritant, such as a minute drop of tincture of capsicum, the phenomena of active congestion or determination of blood become almost instantaneously developed. The vessels become lengthened, dilated, and tortuous, and are distended with blood which contains a great excess of red corpuscles, and is circulated with far more than the normal velocity.

3. But if the injury be still more severe—if, for example, a red-hot needle be inserted—then, in addition to the active congestion described in the preceding paragraph, there is a retardation, and finally a complete stagnation of the blood in the capillaries of the injured spot, while around it the blood moves rapidly through turgid but less full vessels.

The blood obtained by bleeding a patient suffering from inflammation of any important organ, usually presents a peculiar appearance after coagulation. In healthy blood, the clot consists of a uniform admixture of blood corpuscles and coagulated fibrine, and is of a deep red colour; but in inflammation, the upper part of the clot consists of a layer of a yellowish or whitish colour, to which the term *buffy coat* is applied. This buffy coat is often concave, or hollowed out into a cup-like form, in which case the blood is said to be both buffed and cupped. The cause of this buffy coat is still to some extent an open question; but the phenomenon is clearly due to a subsidence of the blood corpuscles, by which a layer of fibrine, forming the buffy coat, is left at the surface. Another and a more important change in the blood in inflammation is the augmentation of the fibrine, which often rises to two, three, or more times its normal quantity.

Reference has already been made to coagulable lymph or fibrine as one of the products of inflammation. This effusion of coagulable lymph is so important a process both for good and for evil, that a few lines must be devoted to its special consideration.

When coagulable lymph is effused between membranes that are normally in contact (or nearly so) with one another, it often causes them to cohere. In this way we often have adhesions of the adjacent surfaces of serous membranes, such as the pleuræ, the pericardium, and the peritoneum, which materially interfere with the natural free motion of the parts, and occasion various persistent morbid symptoms. In inflammation of the iris, the pupil may be rendered irregular or immovable, or may even be closed up by the effusion of coagulable lymph. In endocarditis, or inflammation of the lining membrane of the heart, coagulable lymph may be deposited in wart-like masses on the valves, and may thus occasion some of the worst forms of cardiac disease. On the other hand, in many cases, the effusion of coagulable lymph has a reparative and conservative influence. It is by the organisation of this fluid that the lips of recent wounds are glued together, and that parts recently severed from the body may be sometimes replaced and still live. The success of the Talicotian operation, by which a new nose is engrafted in the position of that which had been lost—of the operation of injecting a stimulating fluid into cystic tumours, &c., with the view of setting up adhesive inflammation—and of various other surgical operations, essentially depends upon the property of organisation possessed by this fluid. It is thus, too, that ulcers are gradually filled up till the breach of texture is repaired.

The inflammatory diseases of the most important organs are described under their specific names, and, as a general rule, the termination *-itis* is employed to indicate an inflammation. Thus, pleuritis signifies inflammation of the pleura; peritonitis, inflammation of the peritoneum; iritis, inflammation of the iris; &c. Inflammation of the lungs, however, is usually known as pneumonia instead of pneumonitis.

It is unnecessary to enter into the consideration of the treatment of inflammation further than to remark (1) that if possible we must remove its exciting cause, which can seldom be done except when the inflammation is external; and (2) that the patient should be placed on a strictly antiphlogistic regimen (which implies a total abstinence from solid animal food and stimulating drinks, due attention to ventilation, temperature, &c.). Of the direct remedies, the most important (except in persons of weak or broken-down constitutions) is blood-letting, although at present it is somewhat out of fashion. The medicines chiefly employed are purgatives, preparations of mercury, tartar emetic, and opium; while, as external applications, hot fomentations (occasionally cold lotions), and counter-irritation by means of blisters, sinapisms, setons, &c., are often of service.

INFLE'CTION is a general name used by grammarians for all those changes that words undergo when placed in relation to one another in a sentence. See DECLENSION, CONJUGATION, GENITIVE. Most of these changes occur in the end syllable or syllables of the word; and with regard to these at least, there is every reason to believe that they were originally separate words joined on to the root-words (see LANGUAGE), and that through the natural processes of phonetic change and decay, the compounds thus formed gradually assumed the forms now known in grammar as cases, numbers, persons, tenses, &c. In some instances, the original suffix can be readily recognised, and, by the help of Comparative Grammar, much has been done in recent times in tracing the more disguised inflections to their source; so that the greater part may be considered as satisfactorily established. Confining our remarks to the Indo-European languages, we may safely assert, that the syllables used in forming the cases of nouns and the terminations of verbs are of pronominal origin. Thus, *mi*, *si*, *ti*, as the endings of the three persons of the present singular of the verb, are evidently connected with the personal pronouns *ma*, *tva* (*sva*), *ta*; and the plurals *mas*, *tas*, *nti*, contain the same with an indication of the plural number. The nominative singular of masculines and feminines, ending in *s* (*equu-s*, *ἵππο-ς*, *fini-s*, *πίστι-ς*), contains the personal pronoun of the third person, *ta* (*το*, nom. *sa*, *ὁ*); the plural, *piscēs*, *κόρακες*, is probably only a corruption of the same pronoun put twice (*pisci-sa-sa*—i. e., fish that and that), the doubling of the pronominal element expressing symbolically a plurality of the same thing. In the oblique cases, we meet with other pronominal elements, which indicate that a certain thing is placed with regard to the predicate in the three fundamental directions of motion—those of *whither*, *where*, and *whence*. The accusative is the exponent of the direction of an action *towards* some object, and its termination *m*, in the plural *ns* (i. e., *m* with the plural termination *s*), is connected with the pronomen *ama*, yon. I (comp. Lat. *i-s*, *i-d*, *i-bi*) is the pronominal syllable employed for signifying that an action has arrived at a certain goal, and is continuing there, giving the dative and locative cases; while the starting from a certain point is indicated by the pronoun of the third person, *ta*, and its equivalent *sa* (that), corrupted to *t* and *s*, the termination of the ablative and genitive cases. The dative and genitive of the plural express the same relations as the singular, though they are less clear as to their origin. If, notwithstanding the identity of terminations, the aggregate of nouns must, by a manifest analogy, be classified into several distinct declensions, this, in most cases, is to be accounted for by the difference of the formation of stems or bases previous to their coming in contact with the affixes. It is natural that the so-called crude forms should undergo a different process of contraction according to the nature of their final vowel. The dative *lupô*, from the crude form *lupŏ*, is as much a contraction of *lupo-i*, as is the dative *fini* from *fini-i*. Consonantic bases, or of the vocalic, those which end in *u* (*v*), a vowel of a decided consonantic quality, are most apt to preserve the inflections in their unaltered form, being less liable to change on the conflict of congruous or incompatible elements. Accordingly, we find that the third Greek, and the third and fourth Latin declensions, present a much more normal aspect of the original inflections than the others. This does not preclude the possibility of a peculiar inflection being preserved in one or other declension; for nothing is more certain than that language, at a certain stage of its development, created and applied a great variety of means to the same purpose, and that these became limited only when the rising intellect of the human tribes, and their distribution into larger or smaller political bodies, taught and compelled them to economise their ways of expression.

In the formation of certain tenses of the verb, we find a process different from the combination of a nominal or verbal base with a pronominal syllable. The Latin subjunctive of the first conjugation, the future in *bo*, the Greek optative and future, the Latin imperfect, and the perfect ending in *avi*, *ui*, *ivi*, consist of the verbal root with an already inflected form of the verbs *i*, to go, *as* and *fu*, to be. However strange this may appear at first sight, it is nevertheless a fact that, e. g., *εἴην*, I would be (for *ἐσ-ίην*, Scr. *s-yâm*, Lat. *s-iem*), originally meant, I go (if I mistake not) in being, I am in doubt of the act of being; that *ποιή-σεις*, thou wilt do, is literally translated, 'thou mayst be doing.' The Latin *i-bat* for *i-fuat*, or *i-vit* for *i-fuit*, is still more clearly, 'he was in the act of going.' That auxiliary verbs sometimes assume the function of inflections, is proved by the French future, where forms like *trouverai*, *finirai*, are easily recognised as compositions of the infinitive with the verb *avoir* (*finir-ai*, I have to finish).

The inflections hitherto described affect the end of words, and possess the character of a composition of a significative word or root with a syllable of local import, or an inflected form of a verb. But language also employs other means of a symbolical nature, either in the middle or the beginning of verbs, with the object of representing the various aspects in which an action can appear. We find that the present tenses generally have longer forms than those of the past. The additions commonly used are long vowels or diphthongs, inserted nasals and semi-vowels, or, lastly, reduplication. It seems that the weight given to the verbal root by these appliances is intended to exhibit the continuance of an action in the present tenses, in contrast with the fleeting or momentary operation of the past. In a similar manner, the long vowels peculiar to the subjunctive in Greek (*τύπτετον-τύπτητον, τύπτομεν-τύπτωμεν*) convey the idea of doubt or uncertainty, by means of the longer interval required for the pronunciation of the intermediate long vowel, thus expressing the hesitation of the speaker with regard to the reality of his judgment. The reduplication in the perfect, being originally a repetition of the root (*tu-tudi*), is not so much the sign of a past time, as the symbol for an action having passed from the stage of incipience into that of completion.

The wear and tear of time exercises its influence as well on the radical part of words as on their inflections. Grammatical terminations of a totally different formation by corruption become obscured, and identical in shape with others of heterogeneous purport. The Latin *Romae* takes on itself the functions of *Româ-i-s* (gen.), of *Româ-î* (dat.), *Româ-i* (locat.), and *Româ-i-es* (nom. pl.); or *populo* those of *populô-î* (dat.), *populo-d* (abl.), and at a very early age that of *populo-m*. The absence of written standard works of such a national importance as to penetrate into the masses of a people, and to check their inclination towards misapplying or neglecting inflections which in progress of time have lost their inherent meaning, and therefore appear cumbersome, accelerate the change of the inflective system into the analytical. The demand for a precise and, so to speak, material expression of those manifold relations appropriated to inflections in ancient languages, is felt more keenly with the waning distinctness of the latter; and sudden political revolutions, such as the invasion of Italy by Teutonic tribes, or the conquest of England by the Normans, interrupting the influence of the privileged classes of a nation, bring the struggle to an issue, and give the ascendency to the popular movement. Articles, prepositions, pronouns, auxiliary verbs, take in modern languages the place of inflections; and notwithstanding that these are not entirely destroyed, they have a precarious existence, and are in danger of being finally supplanted by the tendency to represent every distinct relation of words to each other by a distinct expression. The application of the *s* as a mark of the possessive case becomes more and more limited in modern English, and the mistaken effort to supersede this relic of Saxon inflection by the substitution of the pronoun *his*, has only been defeated because it proceeded from learned pedants, and not from the people. The termination *nt* as a sign of the plural in French verbs (*aiment, aimaient*), may be called almost a dead letter, only traditionally preserved in spelling. The loss of inflections has deprived modern languages of the wonderful simplicity and power of the ancient tongues, and the periphrastic mode of expression they have adopted prevents them from arranging all the parts of a sentence with the same degree of liberty. On the other hand, they have gained in perspicuity. After all, they have only reversed the process of the combination of pronominal and auxiliary words with others; but by placing them in front, the attention of the hearer or reader is called at once to the particular modification of every possible shade of a given thought.

INFLECTION, in Optics, see DIFFRACTION.

INFLORE'SCENCE (Lat. *in*, and *floresco*, to begin to flower), in Botany, a term employed to designate the flowers of a plant considered collectively and with reference to the manner in which they are arranged and the succession in which they are developed. The flower-bud being a modified leaf-bud, and the parts of the flower modified leaves, it might be expected that the inflorescence should exhibit a close correspondence with the ramification of the plant, but the modification in the parts immediately concerned in the production of flowers is so great, that this is far from being the case. The most important classification of kinds of inflorescence is into CENTRIFUGAL and CENTRIPETAL (q. v.). When the flowering axis produces only a single terminal flower, the inflorescence must be regarded as of the centrifugal kind. The terms used to designate more specifically the different kinds of inflorescence are numerous. The principal of them are explained under separate heads, as CATKIN, CONE, CORYMB, CYME, PANICLE, RACEME, SPIKE, UMBEL, &c. But it is to be regretted that such terms are still used somewhat vaguely or carelessly, even by very eminent botanists, or in such various senses, that the inflorescence of the same plant is often described by one term in one botanical work, and by another term in another. And hence arise confusion and difficulty, not entirely to be ascribed to the endless variety which is exhibited in nature.

INFLUE'NZA, one of the class of diseases to which the term *Zymotic* (q. v.) is now applied, has been long recognised by medical writers, although the name, borrowed from the Italian, is comparatively modern in this country. Cullen called it *catarrhus a contagio*, but although, in most cases, it closely resembles ordinary catarrh, it presents certain points of difference from that disease. In addition to the ordinary symptoms of catarrh, there is a sudden, early, and very striking debility and depression of spirits. This early debility is one of the most marked and characteristic signs of influenza. The mucous membranes (especially the pulmonary membrane) are much affected. The tongue is white and creamy, the sense of taste is lost, there is no appetite, the pulse is soft and weak, the skin, although at first hot and dry, soon becomes moist, and the patient complains of pains and soreness in various parts of the body.

In simple, uncomplicated cases, convalescence supervenes in the course of a week or sooner, but influenza is very frequently conjoined with bronchitis or pneumonia, in which case it is much more persistent and dangerous.

Influenza affords an excellent example of an epidemic disease, a whole community being often attacked in the course of a few hours. From this it may be inferred that the occurrence of this disease is connected with some particular condition of the atmosphere, but what that condition is, is not known. Not unfrequently, influenza follows close upon a sudden thaw; sometimes it is preceded by thick, ill-smelling fogs. One hypothesis refers the complaint to some change in the electrical state of the air; and one of the latest and most probable conjectures regarding its exciting cause is that of Schönbein, who refers it to the presence of an excess of Ozone (q. v.) in the atmosphere. Like cholera, influenza generally follows a westerly direction, or one from the south-east towards the north-west, and its course seems to be altogether independent of currents of air, as it frequently travels against the prevailing wind.

The most important point in the treatment of influenza is *not* to bleed the patient, or in any way to depress his vital powers. He should be kept in bed; his bowels should be gently opened; his skin slightly acted upon, if dry; and, if the cough be troublesome, a mustard-poultice should be applied to the chest, and an expectorant mixture prescribed. In persons of weak or broken-down constitutions, ammonia, beef-tea, and wine and water, must be given from the outset. The debility that often remains for a considerable period after the establishment of convalescence, is best met by the preparations of iron and quinine.

Few diseases increase the death-rate to such an extent as influenza, more, however, in consequence of the great number of persons who are attacked in a severe epidemic, than in consequence of its danger in individual cases.

IN FO'RMA PAU'PERIS, a term used when a person is allowed to sue as a pauper—i. e., by getting leave to dispense with paying the fees of court and other costs.

INFORMA'TION, in English law, is used in several senses. In criminal law, an information filed by the attorney-general or master of the crown office is a substitute for an ordinary indictment, and is resorted to only in cases of such misdemeanours as tend to disturb the peace or the government—for example, as libels on judges, magistrates, or public officers, bribery at elections, &c. This information is usually called a criminal or an *ex officio* information, and the defendant is put on his trial in the same way as under an indictment. There are other informations, such as those called *quo warranto*, to test the validity of an election or appointment to a public office, &c. An information by the attorney-general in Chancery is a suit on behalf of the crown or government as to any misapplication of a public charity, or on behalf of an idiot's or lunatic's property. The term is also commonly used to denote the written statement often but not invariably made on oath before a justice of the peace, previous to the issuing of a summons or complaint against a person charged either with a crime or an offence punishable summarily. There are also informations in the Court of Exchequer to recover penalties for breach of the revenue laws. The term is not now used technically in Scotland, except in cases of difficulty, when the Court of Justiciary orders informations—i. e., written arguments—on both sides.

INFO'RMER, in English law, the person who sues for a penalty under some statute. In many statutes which define offences—not criminal but savouring of criminality—encouragement is often given to strangers to come forward and prosecute the offence, by giving them power to sue for the penalty for their own benefit in whole or in part. This practice has been much resorted to in modern statutes on most subjects. In England, when the informer sues in such an action, it is called a penal or *qui tam* action; but, in general, the penalty is now recoverable before justices of the peace in a summary way. In suits in Chancery, which require to proceed in the name of the attorney-general, the informer is called a relator. In Scotland, an informer is the party who sets the Lord Advocate in motion in criminal prosecutions, and the Lord Advocate is bound to give up the name of the informer, who is liable in case of malicious prosecutions. See QUEEN'S EVIDENCE.

INFU'SIONS, or INFU'SA. These terms are applied in pharmacy to aqueous solutions of vegetable substances obtained without the aid of boiling. They are usually prepared by digesting in soft water (which may be either hot or cold, according to circumstances) the sliced or powdered substance in an earthenware vessel fitted with a cover. Cold water is preferable when the active principle is very volatile, or when it is expedient to avoid the solution of some ingredient in the vegetable which is soluble in hot, but not in cold water. For example, in preparing the infusion of calumba, cold water is preferable, because it takes up the bitter principle (which is the essential ingredient), and leaves the starch-matter undissolved. In most cases, however, boiling water is employed. Infusions are preferred to decoctions when the active principle volatilises at a boiling heat, as in the case of essential oils; or when ebullition readily induces some chemical change, as in the case of Senna (q. v.).

Infusions may also be prepared by Percolation (q. v.), a process which is extensively employed in the preparation of tinctures. When thus prepared, they are less liable to decay than when prepared on the old system.

INFUSO'RIA, a class of the sub-kingdom of animals called PROTOZOA (q. v.). The term originally almost synonymous with Animalcules (q. v.), but now very much restricted in its signification. It was first used by Otto Friederich Müller, and was adopted by Cuvier, who made the I. the last class of *Radiata* (q. v.). But their radiated structure is by no means established. No distinct trace of nervous matter has been found.—After Müller (1773—1786), the next to devote himself to the special study of the I. was Ehrenberg, the publication of whose work on them (1837) was the commencement of a new era in the history of this branch of zoology, which has since been prosecuted with great industry by Dujardin, Stein, Lachmann and Claparède, Cohn, Lieberkühn, Rymer Jones, and others. Many of the organisms included by Ehrenberg, as by previous naturalists, among I., are now generally regarded as vegetable (see DESMIDEÆ and DIATOMACEÆ); whilst others, as the *Cercariæ* (q. v.), have been discovered to be immature states of Entozoa. The *Rotifera* (q. v.) are now also, by very general consent, widely separated from the *Polygastrica* of Ehrenberg, for which alone the term I., although not unobjectionable (see ANIMALCULE), is retained; the term *Polygastrica* (Gr. many-stomached) being rejected, because it expresses a view of the structure of these creatures which is generally deemed erroneous. Agassiz has gone the length of proclaiming an opinion, not received by other naturalists, that the I. are all immature or larval worms. But of the forms at present known, it is at all events probable that many are those of immature creatures; it is certain that some species assume very different forms at different stages of their existence; and the whole life-history of no one species is fully known.

Some of the I. are large enough to be individually visible to the naked eye, but most of them are altogether microscopic. Their bodies are composed of *sarcode*, a glutinous diaphanous substance, of which the outer layer sometimes forms a more or less resisting integument. The body has some well-defined form, of which the varieties are very great in different species. Many are furnished with *cilia*, the motion of which carries them with great rapidity through the fluid in which they live, and by means of which also currents are created in the fluid to bring food to the mouth. The mouth is very generally surrounded or largely provided with cilia. Whether these organs are under the control of will, or maintain their motion without will or even consciousness on the part of the creature, like the cilia of the epithelium in higher animals, is not determined. There is an analogy in favour of the latter opinion, and many appearances—which, however, the phenomena of zoospores, &c., teach us to regard as possibly deceptive—in favour of the latter. Some I., instead of cilia, have a few slender filaments, which they agitate with an undulatory movement; others move by contractions and extensions of their bodies. Some have stiff bristle-like organs, which they use as feet for crawling on the surfaces of other bodies; and some have hooks, by which they attach themselves to foreign bodies.

All I. have a distinct mouth, and many have also an anal opening, sometimes near the mouth, sometimes at the opposite extremity of the body. Between these, Ehrenberg imagined that he could trace an intestine, straight in some, variously bent in others, with which along its course many small stomachs are connected; whilst in the I., having only one aperture, he supposed all the stomachs to open immediately from it. But other observers have failed to find the canal and stomachs, although Ehrenberg's experiments, by means of fluids coloured with indigo and carmine, have been often repeated. And it seems probable that the food taken into the mouth is simply conveyed into the midst of the soft gelatinous substance of the body, being formed into pellets as it passes from the mouth through a kind of gullet in the firmer integument. The food of I. consists of organic particles of various kinds, and different species have been remarked to shew a preference, like those of higher animals, for particular kinds of food. Many of them feed on microscopic plants and on other infusoria. Their great use in the economy of nature is probably to consume organic particles, the decomposition of which would otherwise be baneful to all life, and the return of which by decomposition to their primitive elements would diminish the fertility and wealth of the world. The numbers of the I. are prodigious. They are found in all parts of the world, and both in fresh and salt water, in stagnant ponds and ditches, in mineral and hot springs, and in moist situations. Any infusion or other liquid containing vegetable or animal matter, if left exposed to the atmosphere, is sure to be full of them. Their multitudes are so great that leagues of the ocean are sometimes tinged by them. Some, which, instead of swimming freely, like most of their class, become surrounded with a gelatineus substance, are found adhering together in masses sometimes four or five inches in diameter, although the individual animals are so small that a cubic inch of the mass may contain 8,000,000 of them. The I. contained in a single cup of putrid water may exceed in number the whole human population of the globe!

The organisation of the I. is still very imperfectly known. There appears in many of them a cavity not far from the mouth, the *contractile space*—variously regarded as a cavity without proper walls, or as a vesicle—from which branches sometimes radiate through the substance of the body, and which, being capable of contraction and expansion, is regarded by some as the centre of a kind of vascular system. It is with considerable probability regarded as furnished with proper walls. There is also, probably in all the I., another organ, evidently of great importance, although its use is still uncertain, called the *nucleus*, which is usually roundish or a little elongated, sometimes much elongated and band-like. It is enveloped in a membrane, and is more compact than the surrounding substance. In the multiplication of these animals by spontaneous division, a fission of the nucleus always takes place. Each of the halves becomes furnished with a complete mouth, set of cilia, and other organs. The division, in the same species, is sometimes longitudinal, sometimes transverse, perhaps alternately longitudinal and transverse. The multiplication of the I. in this way is extremely rapid. A *Paramecium*, well supplied with food, has been observed to undergo division every 24 hours, from which would result 16,384 individuals in a fortnight, or 268,435,456 in four weeks. Reproduction also takes place by gemmation; buds or gemmules forming on the outer surface of the body, and gradually assuming the shape of the parent animal, although they do not attain to their full size till after separation. More extraordinary is another mode of reproduction by *encysting* or *encapsulation*. The animal contracts, closes its mouth, becomes surrounded by a viscid secretion, and finally by a membrane, becomes attenuated, and dissolves, all but the nucleus, into a mere liquid containing granules, which afterwards form within the cyst a new infusorium, different in form and appearance from that by which the cyst was produced. The metamorphoses of the I. have been traced to a certain extent in some kinds, but not fully in any. Whether any truly sexual propagation takes place, has not been perfectly ascertained, although the observations of Balbiani have made it extremely probable as to some of them. A reproduction, different from all that has yet been mentioned, has been observed to take place in some, by the formation of internal germs, to which this character has been ascribed, but the subject is still involved in doubt; nor is it improbable that there may be amongst these minute creatures a production of real eggs, which has hitherto eluded observation.

In the integument of some I., very minute fusiform bodies are thickly imbedded, called *trichocysts*, which are capable of throwing out long filaments. Their use is unknown, although they are supposed to be urticating organs. The filaments are thrown out when the animal is subjected to annoyance by the drying up of the liquid in which it lives, or by the application of some irritating liquid.

INFUSORIA, Fossil. See Diatomáceæ.

INGEMANN, Bernhard Severin, one of the most distinguished poets and novelists of Denmark, was born May 28, 1789, in the island of Falster. His literary career may be divided into three distinct periods. The first of these, extending from 1811 to 1814, embraces his best lyrical productions, viz., the collection of poems entitled *Procne* (1812), and the allegorical epic of *De Sorte Riddere* (1814); while the second, or dramatic, ending in 1822, was marked by the appearance of numerous tragedies which have maintained their place on the national stage, and among which the best are his *Masaniello*, *Blanca*, *Rösten i Oerken* (1815); *Hyrden af Tolosa*, *Reinald*, *Underbarnet*, *Loveridderen* (1816); and *Tasso's Befriede* (1819). After this period, I.'s writings are characterised either by leaning to historical disquisition, or a strongly religious bias. His admirable epic poem of *Valdemar den Store og Hans Mänd* (1824) was the prelude to the various historical novels, in which, taking Walter Scott for his model, he endeavoured to portray the social life and habits of his own country in the middle ages. *Valdemar Seier*, the first of the series (1826), and *Erik Menved's Barndom* (1828), which are generally regarded as the best of these productions, may compete favourably with some of the most successful efforts of his great model; while even the less popular of his historical novels, *Kong Erik og de Fredløse* (1833), and *Prinds Otto og Hans Samtid* (1835), may justly entitle him to rank among the first novelists of his time. The poems of *Dronning Margrete* (1836) and *Holger Danske* (1837), which are based, like his novels, on incidents of Danish national history and tradition, rank among I.'s most successful efforts. The religious element in this writer's mind has found expression in various productions of considerable merit—as, for instance, in his collection of anthems and psalms, *Hoejmessepsalmer* (1825), in his rendering of some of the symbolical or traditionary legends of the church in his *Blade af Jerusalem's Skomager's Lommebog* (1833); *Salomon's Ring* (1839); and in his allegorical poem, *Guldæblet* (1856). I. held the chair of Æsthetics and Danish Literature at the Royal Academy of Soröe, near Copenhagen. His collective works have been published in 38 vols., 1857, Copenhagen, and the greater number of his prose works and many of his poems have been translated into various languages. He died 1862.

INGERSOLL, Charles J., an American statesman, was born in Philadelphia, October 3, 1782. His father, Jared Ingersoll, was an active partisan in the American revolution, and a member of the convention which adopted the Federal constitution. Charles J. I. received a liberal education, which was completed by European travel. In 1801, he produced the tragedy of *Edwy and Elgiva*, and in 1808, a strong political pamphlet in defence of the democratic policy of Mr Jefferson, and a satirical review of American politics, entitled *Inchiquin's Letters* (1810). He was elected to Congress in 1812; and in 1814, he advocated the principle that 'free ships make free goods,' in a powerful speech. He was for fourteen years United States' district attorney for Pennsylvania, and in Congress from 1839 to 1849. He published two series of *Historical Sketches of the War of* 1812, in 1845 and 1852. A speech in opposition to the Lincoln administration caused his arrest in 1862; but his popularity made it advisable to release him, after a brief detention. He died in May 1862.

I'NGOLSTADT, or **INGOLDESTADT** (anciently *Aureatum*, and by the Latin writers of the 16th c. called *Auripolis* and *Chrysopolis*—i. e., 'the golden city'), a town and fortress of Upper Bavaria, is situated in a fertile district, on the left bank of the Danube, which is here crossed by a stone bridge, 46 miles N.N.W. of Munich. It contains three parish churches (two Catholic and one Protestant), a hospital, and a castle. Cloth, playing-cards, and leather are manufactured; and breweries and a trade in corn are carried on. Pop. (1871) 13,164.

I. is an ancient, melancholy-looking town, too large for the number of its inhabitants. A university was founded here in 1472, which reckoned Reuchlin, Aventin, and other eminent scholars among its professors; it was removed, however, to Landshut in 1800, and to Munich about six years after. At this university, in the 16th c., Urb. Rhegius the poet, known by the name of Dr Faustus, studied. I. was the first German town at which the Jesuits were permitted to establish themselves, and to teach publicly from the university chairs. Loyola gave it the fond title of 'his little Benjamin.' After the suppression of the order in 1773, Adam Weisshaupt established here the order of the Illuminati (q. v.). In 1827, the fortifications of I., which had been destroyed by the French in 1800, were restored upon a large scale, the two forts on the left bank of the river being especially distinguished for their elegance and strength.

INGRAI'LED. See Engrailed.

INGRES, Jean Dominique Auguste, an eminent French painter, was born at Montauban, 15th September 1781, studied under David (q. v.), and subsequently went to Rome. Here he resided for fifteen years, after which he spent four years in Florence, by which time his fame was so well established, that he was called to the School of Fine Arts in Paris as the successor of Denon. In 1829, he succeeded Horace Vernet as Director of the Academy at Rome; and in 1845, he was made Commander of the Legion of Honour. As to his merits as a painter, unanimity of opinion is yet far from having been attained. I. occupies a sort of middle place between the classic and romantic schools, but rather inclines to the former. Among his numerous pieces may be mentioned 'Raphael et la Fornarina,' 'Romulus, Vainqueur d'Acron,' 'Virgile lisant son *Enéide* à Auguste et à Octavie,' 'La Mort de Léonard de Vinci,' 'Le Vœu de Louis XIII.,' 'L'Apothéose d'Homère,' 'Stratonice,' 'Jésus au Milieu des Docteurs,' 'Molière dans son Cabinet,' and 'L'Apothéose de Napoléon I.,' with a motto flattering the late Emperor of the French, *In nepote redivivus*. At the Paris Exhibition of 1855, I. had a whole salon to himself. In 1862, he was raised to the dignity of senator, and made a member of the Imperial Council of Public Instruction. He died in 1867.

INGRIA. See St Petersburg, Government of.

INGRO'SSING, or **ENGROSSING**, a deed means, in Law, the writing it out in full and regular form on parchment or paper for signature. The person who engrosses is usually a law-stationer or clerk. In Scotland, the corresponding term is 'extending a deed,' and the name of the person who does so must be named in the testing clause, which is not necessary in England.

INGULPH, Abbot of Croyland, long considered the author of the *Historia Monasterii Croylandensis* (History of the Monastery of Croyland or Crowland, in Lincolnshire), is supposed to have been born in London about 1030 A. D. According to the account of his life in his History, he studied oratory and philosophy at Oxford; became a favourite of Edgitha, the wife of Edward the Confessor; visited Duke William of Normandy at his own court in 1051; and, after a disastrous pilgrimage to the Holy Land, entered a Norman monastery. Here he remained till 1076, when he was invited to England by the Conqueror, and made Abbot of Croyland, where he died December 17, 1109. The *Historia Monasterii Croylandensis* was printed by Savile at London in 1596, and in a more complete edition by Gale at Oxford in 1684. It has been translated into English for Bohn's Antiquarian Library by Riley. Some writers even of the last century questioned the entire genuineness of the book; but their scepticism did not proceed further than the hypothesis of interpolations by a later writer; but in 1826, the late Sir Francis Palgrave, in an article in the *Quarterly Review*, endeavoured to prove that the whole so-called History was little better than a novel, and was probably the composition of a monk in the 13th or 14th century. His conclusions have been, on the whole, almost universally adopted.

INHE'RITANCE. See Heirs, Intestacy, Will, Succession.

INHIBI'TION, in Scotch Law, is a writ which is issued in order to prohibit a person from alienating his heritable estate until the debt of the creditor is paid.

I'NIA (*Inia Boliviensis*), a cetaceous animal, of the family *Delphinidæ*, in form resembling a dolphin, with a long and slender snout. It is the only known species of its genus, and is one of the few cetacea which inhabit fresh water. It is found in some of the upper tributaries of the Amazons, and in the lakes near the Cordilleras. It is from seven to twelve or fourteen feet long. The I. feeds chiefly on fish. It is pursued for the sake of the oil which it yields. It is generally found in little troops of three or four. The females shew great affection for their young.

Inia (*Boliviensis*).

INITIALS. Though in general it is usual and regular in all legal deeds and writings for a party to write his full Christian name and surname, yet in many cases, especially in documents of a mercantile nature, signature by initials will bind equally with the full signature.

INJECTIONS. This term is applied in medicine to fluids thrown into the passages or cavities of the body by means of a syringe or elastic bag. The fluids thus injected into the *rectum* or lower bowel are termed Clysters (q. v.). The injection of a dilute solution of salt into the veins has been found to be of great service in even advanced cases of Asiatic cholera. The injection of blood into the veins is described in the article TRANSFUSION OF BLOOD.

INJUNCTION, a writ in English law, by which the Court of Chancery stops or prevents some inequitable or illegal act being done. The writ is peculiar, in general, to the Court of Chancery, though to a limited extent it is now introduced into common law. If the party disobeys the injunction, he may be attached for contempt of court, and imprisoned till he obeys. If he obeys it, he may apply to have the injunction dissolved. In Scotland, a remedy of a similar kind is called an Interdict (q. v.).

INK. The most important kinds of ink may be included in the two following heads—*Writing Ink* and *Printing Ink*.

1. *Writing Ink.*—The composition of the ink used by the ancients is not well understood; it is, however, certain that their ink exceeded ours in blackness and durability. Mr Underwood (who read a paper upon the subject of ink before the Society of Arts in 1857) thinks that some old ink was merely a carbon pigment, like the Indian ink of the present day, while other kinds were veritable dyes of iron and acids (true chemical compounds), with the addition of a good deal of carbon.

The essential constituents of ordinary black ink are galls, sulphate of iron (popularly known as green vitriol or green copperas), and gum; and the most important point is the regulation of the proportion of the sulphate of iron to the galls. If the former is in excess, the ink, although black at first, soon becomes brown and yellow. The gum is added to retain the colouring matter in suspension, and to prevent the mixture from being too fluid. The following prescription by Professor Brande yields a very good ink: 'Boil six ounces of finely bruised Aleppo galls in six pints of water, then add four ounces of clean and well crystallised sulphate of iron, and four ounces of gum-arabic. Keep the whole in a wooden or glass vessel, occasionally shaken. In two months, strain, and pour off the ink into glass bottles.' The addition of a little creasote is useful as a check to the formation mould. Stephens's ink—a blue liquid, which a few hours after its deposition on paper becomes of an intense black—is one of the most popular our writing fluids. It consists essentially of gal-tannate of iron, *dissolved* in sulphate of indigo, while in ordinary ink the colouring matter is merely *suspended* by means of the gum. Runge, a German chemist, has discovered a simple and cheap blue writing fluid, prepared from chromate of potash and a solution of logwood, which possesses the property of forming no deposit, of adhering strongly to the paper, of being unaffected by exposure to water acids, and of neither acting on, nor being acted by steel pens.

Various receipts for *indelible inks* have at different times been published. Dr Normandy asserts that the ink obtained by the following combination cannot be obliterated or defaced by any known chemical agent: Twenty-four pounds of Frankfort black (which is supposed to be a charcoal obtained from grape and vine lees, peach kernels, and bone-shavings) must be ground with mucilage, formed by adding twenty pounds of gum-arabic to sixty gallons of water, and the mixture strained through a coarse flannel; four pounds of oxalic acid are then added together with as much decoction of cochineal or sulphate of indigo as will give the required shade.

Red Inks are of two kinds, one variety consisting essentially of the tinctorial matter of Brazil-wood and the other being prepared from cochineal or carmine. Stephens's red ink, which is one of the best of these preparations, is obtained as follows: 'Add to a quantity of common carbonate of potash, soda, or ammonia, twice its weight of crude argol in powder. When the effervescence has ceased, decant or filter the solution from the insoluble matter. To this fluid add by measure *half* its quantity of oxalate of alumina, prepared by dissolving damp, newly precipitated alumina in as small a quantity as possible of a concentrated *solution* of oxalic acid. The mixture thus prepared is next coloured, when cold, with bruised or powdered cochineal, and after standing for forty-eight hours is strained, when it is fit for use.' (Muspratt's *Chemistry*, vol. ii. p. 378.)

Blue Inks are now chiefly made either directly or indirectly from Prussian blue. Stephens's unchangeable blue ink is formed by dissolving this salt (which should be first well washed in a dilute *mineral* acid in an aqueous solution of oxalic acid. Ink of which Prussian blue is the basis, is unaffected by any of the numerous physical causes which operate *injuri*ously on black ink, unless it be exposed to a strong light, when the iron (which exists as a sesquioxide in Prussian blue) becomes deoxidised, and causes the colour of this ink to fade; but on removing the writing from the influence of light, the colour is restored.

Purple, green, and yellow inks have been formed by various chemists, but they are not of sufficient importance to claim a notice in this article.

Sympathetic Inks leave no trace of colour upon the paper, but when exposed to heat or chemical action of some kind, become more or less distinctly apparent. The following are a few of the principal kinds of this class of compounds. On writing with a solution of sugar (acetate) of lead or of ternitrate of bismuth, and washing the paper with a solution of hydrosulphuric acid (sulphuretted hydrogen), the letters come out *black*. On writing with a solution of nitrate of cobalt, and washing the paper with a solution of oxalic acid, the letters come out *blue*. On writing with a solution of subacetate of lead, and washing the paper with a solution of iodide of potassium, the letters come out *yellow;* or on writing with a dilute solution of chloride of copper, and gently heating the paper, the letters which were previously invisible assume a beautiful *yellow* tint, which disappears on cooling. On writing with a solution of arsenite of potash, and washing the paper with a solution of nitrate of copper, the letters come out *green*.

2. *Printing Ink* is a soft glossy compound, altogether different in its composition from the inks which have been already described. The following are, according to Mr Underwood (in the paper already referred to), the necessary conditions of a good printing ink: 1. It must distribute freely; 2. It must have much greater affinity for the paper than for the type; 3. It must dry almost immediately on the paper, but not dry at all on the type or rollers; this is a great desideratum, especially for newspapers; 4. It should be literally proof against the effects of time and chemical reagents, and should never change colour. It is prepared by boiling the best linseed oil in an iron pot, kindling and allowing it to burn for a short time; by this operation the oil acquires the necessary drying quality. After being again boiled, resin is dissolved in it, in order to communicate body to the fluid, which now somewhat resembles Canadian balsam. The colouring matter—which is lampblack for black ink; carmine, lake, vermilion, &c., for red ink; indigo or Prussian blue for blue ink; lemon and orange chrome (chromate and bichromate of lead), or gamboge, for yellow ink, &c.—is then added to the hot mixture, and the whole is drawn off, and finally ground into a smooth uniform paste.

In Lithography, a *writing* and a *printing ink* are employed, both of which differ altogether from the compounds already described. The writing ink is composed, according to Muspratt, of the following materials: shell-lac, soap, white wax, and tallow in certain proportions, to which is added a strong solution of gum-sandarach, and it is coloured with lampblack; while the printing ink, which is employed to take impressions on paper from engraved plates, with a view to their transference to the stone, is composed of tallow, wax, soap, shell-lac, gum-mastic, black pitch, and lampblack.

INKERMANN, a small Tartar village in the Crimea, is situated near the eastern extremity of the harbour of Sevastopol. It is memorable for the battle which took place there, during the Russian war, between an army of Russians 60,000 strong, and detachments of allied forces, consisting of about 14,000 troops actually engaged. At about six o'clock on the morning of the 5th November 1854, the Russians, who had marched westward from Sevastopol, along the southern shore of the harbour, and whose movements were concealed by the darkness and a thick, drizzling rain, appeared crowding up the slopes of the plateau to the south, on which the allies were posted. Here a handful of men, about 1400 strong, a portion of the 'Household Guards,' made a most heroic stand for six consecutive hours against a body of Russians that was probably ten times as numerous. Reinforcements, both English and French, coming up to the rescue, the Russians were finally driven from the field.

INLAND BILL of Exchange means a bill of exchange drawn by and upon persons living in the same country. The rules applicable to foreign bills differ in some respects from those applicable to inland bills. By a recent statute, all bills drawn by persons in England on persons in Scotland or Ireland, and *vice versâ*, are to be treated as inland bills.

INLAYING is the art of decorating flat surfaces by the insertion of similar or different materials; thus, wood of one colour is decorated by inlaying with others of different colours: to this kind of inlaying the French term *marqueterie* is now generally applied. Metal of one kind is inlaid with other kinds, and often very beautiful effects are produced. When steel is inlaid with gold or brass, it is usually called Damascene work. One variety produced in India is called Kuft-gori—in this, the inlaid metal, usually gold, occupies more of the surface than the metal forming the ground. Another beautiful variety of Indian inlaying is called Tutenague or Bedery-work, which consists in making the article to be inlaid, most frequently a hookah bowl, of an alloy consisting of copper one part to pewter four parts. This is hard, but is easily cut; the pattern is then engraved, and little pieces of thin silver cut to the desired forms are dexterously hammered into the spaces thus cut out to receive them. Ivory, pearl, shell, bone, tortoise-shell, are favourite substances for inlaying wood; and stone or marble is inlaid with an immense variety of coloured stones. In the art of stone-inlaying, the Florentines have long held the palm; their favourite work is black marble, with inlaid figures of brilliant-coloured stones; this work is called *pietra dura*, or Florentine work. Very beautiful work of this kind, excelling the Florentine, is now made in the Imperial works at St Petersburg, where the art has of late been sedulously cultivated by the Russian government. This art was always a favourite one in Delhi and Agra, where some of the most exquisite work is still produced. Usually, in the Indian work, white marble forms the groundwork, and the figures are formed of carnelian, jasper, agate, jade, lapis-lazuli, and other costly hard stones. No stone-inlaying has ever rivalled the inlaid marble walls of the celebrated Taj Mahal, the tomb of the sultana of Shah Jehan, at Agra. The designs are very artistic, the execution almost marvellous, and the harmony of colour produced by the different stones employed is most beautiful. Many other materials than those mentioned are used for inlaying; and there is a style of inlaid-work in which small squares of coloured stone, glass, or pottery are made to form pictorial and artistic decorations; this is called Mosaic-work (q. v.).

INLET, an arm of the sea open only on one side, and stretching into the land, is distinguished from a Bay (q. v.) only by its smaller size, as a haven is, again, by still smaller dimensions, distinguished from an inlet. Examples of inlets are seen in the indentations of the west coast of Norway; as of bays in the deeper and wider indentations of the coast of Italy.

INN (ancient *Œnus*), a river of Germany, the most important Alpine affluent of the Danube, rises in the south of the Swiss canton of Grisons, at a height of 4293 feet above sea-level, and flowing north-east through that canton forms the valley of the Engadine. It maintains generally a north-east course to its junction with the Danube. Leaving Switzerland, it enters the Austrian dominions at the village of Finstermünz, flows through the crown-land of Tyrol, and crosses the south-east angle of Bavaria, after which, forming the boundary between Bavaria and Upper Austria, it enters the Danube at Passau, after a course of 285 miles. Its principal affluent is the Salza from the south. It is regularly navigable from the town of Hall, eight miles below Innsbruck. At its junction with the Danube, the Inn is broader than the Danube itself.

INN AND INNKEEPER (see HOTEL). In point of law, an inn is merely a house of entertainment for travellers, which any person may set up without licence like any other trade. It is when excisable liquors are sold that a licence is required. Public-houses and ale-houses are, however, synonymous terms with inns, for the innkeeper almost invariably finds it expedient to obtain the necessary licence to sell spirits and beer. As to these licences, see BEER ACTS and PUBLIC-HOUSES. The rights and duties of innkeepers irrespective of the licence will here be noticed. It may be observed, in the first place, that though public-houses are always inns, yet beer-houses are not so, the latter being merely shops for selling beer and a few other liquors, the distinguishing characteristic of the public-house being, that refreshment as well as lodging may be had on the premises by all comers. Taverns are chiefly places for the sale of wines and liquors; victualling-houses, for the sale of victuals; coffee-houses and hotels are also varieties, all of which may or may not be inns, according as they do or do not hold themselves out to give meat, drink, and lodgings to all travellers; and it is not at all necessary that any sign-board be put up to distinguish the inn.

One of the incidents of an innkeeper is, that he is bound to open his house to all travellers without distinction, and has no option to refuse such refreshment, shelter, and accommodation as he possesses, provided the person who applies is of the description of a traveller, and able and ready to pay the customary hire, and is not drunk or disorderly, or tainted with infectious disease. He is, of course, bound only to give such accommodation as he has. If the traveller has a horse and luggage, the innkeeper is bound to receive these also, if he has accommodation, provided the traveller himself intends to lodge there as a guest. But the traveller is not entitled to select whatever room he pleases, and if he will not accept such reasonable accommodation as is offered, the innkeeper can order him to leave the house. As some compensation for this compulsory hospitality, the innkeeper is allowed certain privileges; thus, he has a lien on the horse and carriage or goods of the guest for that part of the bill or reckoning applicable to each respectively—i. e., he can keep these until he is paid for the keep, even though they are not the property of the guest. But he cannot detain the person of his guest until payment is made, for if so, a man might be imprisoned for life without any legal process or adjudication. While, however, an innkeeper has this remedy for his score, he is also liable to great responsibility for the safety of his guests and their goods. By the Roman law, under the edict *nautæ, caupones, stabularii*, he was bound to restore safely whatever goods of his guests were intrusted to him, unless some *damnum fatale*, or some act of God, prevented his doing so. This rule has been adopted by the law of England. Hence, if the guest be robbed of his goods at the inn, the innkeeper is liable, unless the robbery was caused by the guest's servant or companion, or by his own gross negligence, as, for example, by leaving a box containing money in the commercial-room, after exposing its contents to the bystanders. So the innkeeper will be excused if the guest took upon himself the charge of his own goods, yet the guest does not take that charge by merely accepting from the landlord the key of the room, though that may be an element in the question. A guest who takes all reasonable precaution—as, for example, locking his room-door—and is yet robbed, has therefore a good claim on the landlord for indemnity; and the landlord will not escape liability by putting up a notice in his rooms, that he will not be answerable for such losses, otherwise guests would have no protection, for they are very much at the mercy of the keepers of such houses. It has been attempted to extend the common law liability of innkeepers for the safety of the goods of their guests to ordinary lodging-house keepers, but the courts have held that an ordinary boarding-house keeper or lodging-house keeper is only responsible for ordinary care, i. e., such care as he takes of his own goods. He must, it is true, be careful in selecting his servants, but he is not bound absolutely to return the goods safe merely because they were in his house along with the lodger.

In Scotland, the Roman rule of law as to the responsibility of innkeepers for the safety of a guest's goods has been also adopted, and the other heads of law are substantially the same as in England, except that no indictment would lie in Scotland against an innkeeper for refusing a guest. But the substantial remedies are the same.

I'NNATE IDEAS. See COMMON SENSE.

INNER HOUSE, the name given in Scotland to the higher divisions of the Court of Session (q. v.).

INNER TEMPLE, one of the four Inns of Court in London having the exclusive privilege of calling persons to the English bar. See INNS OF COURT.

INNISCA'TTERY. See SCATTERY ISLAND.

INNISHE'RKIN, a small island on the south coast of Ireland, belonging to the county of Cork, from the shore of which it is separated by a channel a quarter of a mile in width, is about one mile north-east of Clear Island. It is well cultivated, and contains some good and extensively worked slate-quarries. Pop. upwards of 1000.

I'NNOCENT, the name of 13 popes, the most remarkable of whom are the following.—*INNOCENT* I., a native of Albano, was elected Bishop of Rome in 402. Next to the pontificate of Leo the Great, the of Innocent I. forms the most important *epoch* in the history of the relations of the see of Rome with the other churches, both of the East and of the West. Under him, according to Protestant *historians*, the system of naming legates to act in the name of the Roman bishop in different portions of the church originated; while Catholics at least *admit* that it received a fuller organisation and development. He was earnest and vigorous in enforcing the celibacy of the clergy. He maintained, with a firm *hand*, the right of the Bishop of Rome to receive and to judge appeals from other churches, and his letters abound with assertions of universal jurisdiction, *to which* Catholics appeal as evidence of the early exercise of the Roman primacy, and from which Dean Milman infers that there had already 'dawned upon his mind the conception of Rome's universal ecclesiastical supremacy, dim as yet and shadowy, yet full and comprehensive in its outline' (*Latin Christianity*, i. p. 87). Innocent I. died in 417.

INNOCENT III. (LOTHARIO CONTI), by far the greatest pope of this name, was born at Anagni in 1161. After a course of much distinction at Paris, Bologna, and Rome, he was made cardinal; and eventually, in 1198, was elected, at the unprecedentedly early age of 37, a successor of Pope Celestine III. His pontificate is justly regarded as the culminating point of the temporal, as well as the spiritual supremacy of the Roman see; and it is freely avowed by the learned historian of Latin Christianity, that if ever the great idea of a Christian republic, with a pope at its head, was to be realised, 'none could bring more lofty or more various qualifications for its accomplishment than Innocent III.' (iv. p. 9.) Accordingly, under the impulse of his ardent but disinterested zeal for the glory of the church, almost every state and kingdom was brought into subjection. In Italy, during the minority of Frederick II. (son of the Emperor Henry VI., king of Italy), who was a ward of I.'s, the authority of the pope within his own states was fully consolidated, and his influence among the other states of Italy was confirmed and extended. In Germany, he adjudicated with authority upon the rival claims of Otho and Philip; and a second time he interposed effectually in behalf of his ward, Frederick II. In France, espousing the cause of the injured Ingerburga, he compelled her unworthy husband, Philip Augustus, to dismiss Agnes de Meranie, whom he had unlawfully married, and to take back Ingerburga. In Spain, he exercised a similar authority over the king of Leon, who had married within the prohibited degrees. The history of his conflict with the weak and unprincipled John of England would carry us beyond the space at our disposal. If it exhibits I.'s character for consistent adherence to principle, and his lofty indifference to the suggestions of expediency, in a less favourable point of view than his other similar contests, it at the same time displays in a stronger light the extent of his pretensions and the completeness of his supremacy. In Norway, he exercised the same authority in reference to the usurper Swero. In Aragon, he received the fealty of the king Alfonso. Even the king of Armenia, Leo, received his legates, and accepted from them the investiture of his kingdom. And, as if in order that nothing might be wanting to the completeness of his authority throughout the then known world, the Latin conquest of Constantinople, and the establishment of the Latin kingdom of Jerusalem, put an end, at least during his pontificate, to the shadowy pretensions of the eastern rivals of his power, spiritual as well as temporal. Pursuing consistently the great idea which inspired his entire career, his views of the absoluteness of the authority of the church within her own dominion were no less unbending than his notion of the universality of its extent. To him, every offence against religion was a crime against society, and, in his ideal Christian republic, every heresy was a rebellion which it was the duty of the rulers to resist and repress. It was at his call, therefore, that the crusade against the Albigenses was organised and undertaken; and although he can hardly be held responsible for the fearful excesses into which it ran, and although at its close he used all his endeavours to procure the restitution of the lands of the young Count of Toulouse, yet it is clear from his letters that he regarded the undertaking itself not merely as lawful, but as a glorious enterprise of religion and piety. As an ecclesiastical administrator, I. holds a high place in his order. He was a vigorous guardian of public and private morality, a steady protector of the weak, zealous in the repression of simony and other abuses of the time. He prohibited the arbitrary multiplication of religious orders by private authority, but he lent all the force of his power and influence to the remarkable spiritual movement in which the two great orders, the Franciscan and the Dominican (q. v.), had their origin. It was under him that the celebrated fourth Lateran Council was held in 1215. In the following year, he was seized with his fatal illness, and died in July at Perugia, at the early age of 56. His works, consisting principally of letters and sermons, and of a remarkable treatise *On the Misery of the Condition of Man*, were published in two vols. folio (Paris, 1682). It is from these letters and decretals alone that the character of the age, and the true significance of the church-policy of this extraordinary man, can be fully understood; and it is only from a careful study of them, that the nature of his views and objects can be realised in their integrity. However earnestly men may dissent from these views, no student of medieval history will refuse to accept Dean Milman's verdict on the career of Innocent III., that 'his high and blameless, and, in some respects, wise and gentle character, seems to approach more nearly than any one of the whole succession of Roman bishops to the ideal light of a supreme pontiff;' and that 'in him, if ever, may seem to be realised the churchman's highest conception of a vicar of Christ' (*Latin Christianity*, iv. 277).

INNOCENT XI. (BENEDETTO ODESCALCHI), elected in 1676, was one of the most distinguished among the popes of the 17th century. He was a vigorous and judicious reformer, and his administration is entirely free from the stain of nepotism, which had sullied the fame of many of his predecessors. But his historical celebrity is mainly owing to his contest with Louis XIV., which illustrates as well the personal character of the pontiff, as the peculiar spirit of the age. The dispute began from an attempt on the part of the pope to put an end to the abuse of the king's keeping sees vacant, in virtue of what was called the *Droit de Regale*, and appropriating their revenues. The resistance to this attempt drew forth the celebrated declarations of the French clergy as to the Gallican Liberties. See GALLICAN CHURCH. But the actual conflict regarded the immunities enjoyed by the foreign ambassadors residing in Rome, and especially the right of asylum, which they claimed not only for their own residences, but also for a certain adjoining district of the city. These districts had gradually become so many foci of crime, and of frauds upon the revenue; and the pope, resolving to put an end to so flagrant an abuse, gave notice that, while he would respect the rights of the existing ambassadors, he would not thereafter receive the credentials of any new ambassador who should not renounce these abusive claims for himself and his successors. The great powers murmured at this threat, but it was with France that the crisis occurred, on the death of the Maréchal d'Estrées. The pope renewed his notice in May 1687. Louis XIV., on the other hand, instructed his new ambassador to maintain the dignity of France, and sent a large body of military and naval officers to support his pretensions. I. persisted in refusing to grant an audience to the ambassador. Louis, in reprisal, seized on the papal territory of Avignon, and threatened to send a fleet to the coast of the Papal States, but I. was immovable; and in the end, the ambassador was compelled to return with his credentials unopened, nor was the dispute adjusted till the following pontificate. I. died in 1689.

INNOCENTS, HOLY, FEAST OF, one of the Christmas festivals, held in the Western Church on December 28, and in the Eastern on the 29th, under a title similar to that of the Latin festival. It is intended to commemorate the massacre of the children 'from two years old and upward' at Bethlehem. See HEROD. These children are referred to as martyrs by St Cyprian, and still more explicitly by St Augustine; and it is to them that the exquisite hymn of Prudentius, *Salvete Flores Martyrum*, is addressed. The concurrence of the East and West in celebrating the festival is an evidence of its antiquity. In the modern church, this feast is celebrated as a special holiday by the young, and many curious customs connected with it prevail in Catholic countries. One of these is, that in private families the children are on this day privileged to wear the clothes of the elders, and in some sort to exercise authority over the household in their stead. So also, in communities of nuns, the youngest sister becomes for this day superioress of the house, and exercises a sort of sportive authority even over the real superiors.

INNO'MINATE ARTERY (*Arteria innominata*) is the first large branch given off from the arch of the aorta. It varies from an inch and a half to two inches in length, and divides into the right carotid and the right subclavian arteries. See CIRCULATION, ORGANS OF. This artery, through which all the blood to the right side of the head and neck, and to the right arm, flows, has been tied by several surgeons for aneurism of the right subclavian, but the operation has never been successful. An important fact has, however, been established, viz., that the circulation of the blood in the parts supplied by this large vessel, is re-established by Anastomosis (q. v.) after the operation.

INNOMINATE BONE. See PELVIS.

INNOVA'TION, or NOVATION, a name sometimes given in the law of Scotland to the exchange or substitution of one obligation for another. It is in effect taking a fresh security.

INNS OF COURT, the name given in England to certain voluntary societies which have the exclusive right of calling persons to the English bar. There are four such societies in London, viz., the Inner Temple, the Middle Temple, Lincoln's Inn, and Gray's Inn. Each of those inns possesses certain smaller inns, which are mere collections of houses or chambers, as Clifford's Inn, New Inn, Furnival's Inn, &c. The four inns are each governed by a committee or board, called the benchers, who are generally Queen's counsel or senior counsel, self-chosen, i. e., each new bencher is chosen by the existing benchers. Each inn has also a local habitation, consisting of a large tract of houses or chambers, which are in general occupied exclusively by barristers, and sometimes by attorneys, and are a source of great wealth. Each inn is self-governing, and quite distinct from the others, all, however, possessing equal privileges; but latterly, they have joined in imposing certain educational tests for the admission of students. It is entirely in the discretion of an inn of court to admit any particular person as a member, for no member of the public has an absolute right to be called to the bar, there being no mode of compelling the inn to state its reasons for refusal. But, practically, no objection is ever made to the admission of any person of good character. Each inn has also the power of disbarring its members, that is, of withdrawing from them the right of practising as counsel. This right has been rarely exercised, but of late years there have been examples of persons abusing their profession, and indulging in dishonest practices; in such cases, the inn has its own mode of inquiring into the facts affecting the character of a member, and is not bound to make the investigation public. By this high controlling power over its members, a higher character is supposed to be given to the bar as a body, than if each individual was left to his own devices, unchecked, except by the law. See BARRISTER.

I'NNSBRUCK, capital of the Tyrol, is charmingly situated on the Inn, at its junction with the Sill, at the height of 1900 feet above sea-level, in the midst of a valley, surrounded by mountains ranging from 6000 to 9200 feet high. It lies on the right bank of the Inn, and is connected with the suburb of St Nicolaus, on the left bank, by a wooden bridge, from which the name of the town (*Inn's Brücke*, Ger. the Inn's Bridge) is derived. The Inn is also crossed by a chain bridge a little below the town. The Franciscan church, or Hofkirche, architecturally uninteresting, is remarkable for its elaborate monument to the Emperor Maximilian I., which, though constructed at the request of Maximilian, and intended for his burial-place, does not contain his remains. The monument consists of a marble sarcophagus supporting the emperor's effigy in bronze, in a kneeling posture; while on both sides of the aisle are rows of monumental bronze figures, 28 in number, representing a variety of distinguished personages, male and female. In this church, on 3d November 1651, Christina (q. v.) of Sweden was solemnly received into the Roman Catholic Church. The other chief buildings are the Ferdinandeum, a museum containing a collection of the productions of the Tyrol in art, literature, and natural history; and the university (founded in 1672, and, after several vicissitudes, organised anew in 1825), with faculties of law and philosophy, and which, in 1866, had 450 students and 48 professors. I. carries on important manufactures of woollen cloth, silk, gloves, ribbons, and carved work, as well as a flourishing transit trade. It is connected with Munich by railway, and a railroad is also in progress across the Brenner Pass, to unite I. with Botzen and Verona. Pop. (1869) 16,810.

INNUE'NDO, a part of a pleading in cases of libel and slander, pointing out what and who was meant by the libellous matter or description.

INOCA'RPUS (*I. edulis*), the *Mape* or *Rata* of the South Sea Islands, is a tree important to their inhabitants for its fruit, a nut covered with a thin fibrous husk, which supplies a considerable part of their food, and is sometimes called the South Sea Island chesnut. The fruit is pulled in a green state, and roasted. The tree is a very beautiful one, of stately growth and fine foliage; the leaves oblong, six or eight inches long, evergreen, but of delicate texture. It is one of those which, as they advance in age, instead of increasing uniformly in thickness, throw out buttresses to support the trunk. Small projections first appear, extending in nearly straight lines from the root to the branches, which finally become like so many planks covered with bark. The central stem continues for many years perhaps only six or seven inches in diameter, whilst the buttresses, two or three inches thick, extend from it at the bottom two, three, or four feet. These natural planks are used for paddles of canoes and other purposes.

INOCULA'TION. If the matter of a variolous (or small-pox) pustule, taken after the commencement of the eighth day, be inserted in or beneath the skin of a person who has not previously suffered from small-pox, the following phenomena are induced: 1. Local inflammation is set up; 2. At the end of six days there is fever similar to that of small-pox; and 3. After the lapse of three more days, there is a more or less abundant eruption of pustules. This process is termed inoculation, and the disease thus produced is denominated inoculated small-pox. The disease produced in this artificial manner is much simpler and less dangerous than ordinary small-pox; and as it was an almost certain means of preventing a subsequent attack of the ordinary disease, inoculation was much practised till the discovery (about 1796*) of the antivariolous power of vaccination.

The importance of inoculation was recognised in the East at a very early period. According to Dr Collinson (*Small-pox and Vaccination Historically and Medically Considered*, p. 14), the Chinese had practised this process from the 6th c., and the Brahmans from a very remote antiquity. In

---

* This was the year in which Jenner inoculated his first case (the boy Phipps) with matter taken from the hand of a girl who had been directly infected by the cow. He was aware of the protective efficiency of cow-pox as early as 1770, and mentioned the circumstance in that year to his master, John Hunter.

Persia, Armenia, and Georgia it was in use, and it is even said to have been employed in Scotland and Wales. It was not, however, till Lady Mary Wortley Montagu wrote her celebrated letter from Adrianople in 1717, that the operation became generally known in this country. In that letter she writes: 'The small-pox, so fatal and so general amongst us, is here entirely harmless, by the invention of *engrafting*, which is the term they give it. Every year, thousands undergo the operation. There is no example of any one who has died of it, and you may believe that I am well satisfied of the safety of this experiment, since I intend to try it on my dear little son.' Four years afterwards, she had her daughter publicly inoculated in this country; the experiment was then performed successfully on six condemned criminals at Newgate, and on the strength of these successful cases, 'the critical course was taken of inoculating two children of Caroline, Princess of Wales, which gave a sanction to the practice.'—Collinson, *op. cit.* p. 15.

Inoculation was not, however, thoroughly established for more than a quarter of a century after its introduction. It met with virulent opposition both from the medical profession and the clergy. A sermon is extant which was preached in 1722, by the Rev. Edward Massey, in which it is asserted that 'Job's distemper was confluent small-pox, and that he had been inoculated by the devil.' The great drawback to inoculation turned out, however, to be this: while it was invaluable to him who underwent the operation, and completely guarded him from the natural disease in its severe form, its effect upon the community at large was extremely pernicious, in keeping alive the natural disease, and increasing its spread amongst those who were not protected by inoculation. While one in five or six of those who took the natural disease died, the average number of deaths at the Inoculation Hospital was only 3 in 1000; and yet, according to the authority of Heberden, in every thousand deaths within the bills of mortality in the first 30 years of the 18th c. (before inoculation was at all general), only 74 were due to small-pox. The deaths from this disease amounted to 95 in 1000 during the last 30 years of the century; so that, notwithstanding the preservative effects of inoculation on almost all who were operated on, the total number of deaths from this disease increased in 100 years in the ratio of about 5 to 4. Moore (*The History of Small-pox*, 1815) states that, at the beginning of the 18th c., about one-fourteenth of the population died of small-pox; whereas, at the latter end of the same century, the number (notwithstanding, or perhaps rather in consequence of inoculation) had increased to one-tenth; and this immense consumption of human lives was not the total evil, for many survivors were left with the partial or entire loss of sight and with destroyed constitutions. From these remarks, it will be seen that the benefits which were expected from inoculation were far from being realised, and small-pox would doubtless have gone on increasing in its destructive power, if it had not been checked by Jenner's invaluable discovery of VACCINATION (q. v.).

INOFFI'CIOUS TESTAMENT, a will made whereby near relatives have not been provided for by the testator.

INOWRA'CLAW (called also JUNG BRESLAU, 'Young Breslau'), a small town of Prussia, in the government of Posen, is situated on an eminence, in a fruitful plain, 26 miles south-south-east of Bromberg. It is an ill-built town; contains many religious edifices; carries on a considerable trade, especially in brewing, distilling, and the manufacture of saltpetre; and has a population of (1871) 7429.

IN PA'RTIBUS INFIDE'LIUM (Lat., 'in the regions of the unbelievers'). Titular bishops in the Church of Rome have been styled bishops *in partibus infidelium* since the 13th century. They are actual bishops, who have no diocese, and take their titles from places where there is now no bishop's see, but where there once was. This practice originated after the Greek schism, and became general in the time of the Crusades. The places conquered by the crusaders in the East were furnished with Roman Catholic bishops; but when these conquests were again lost, the popes continued to appoint and consecrate the bishops, as a continual protest against the power which had prevailed over their alleged right, and to signify their hope of restitution. The same policy has been pursued with regard to Protestant countries. But in Britain, the assumption of territorial titles being illegal and dangerous, the Roman Catholic bishops actually resident have usually borne titles derived from distant places. Thus, the present bishop in Edinburgh is styled bishop of Abila. The Roman Catholic bishops in England were similarly designated from places abroad until 1850, when their assumption of titles from their actual sees gave prodigious offence to the Church of England, and led to the passing of the *Ecclesiastical Titles Bill*, which, however, has been permitted to remain a dead letter.

I'NQUEST. See CORONER.

INQUISI'TION, in English Law, is the return or report made by a sheriff or coroner as to the finding of a jury on matters inquired into.

INQUISITION, THE, called also the **HOLY OFFICE**, a tribunal in the Roman Catholic Church for the discovery, repression, and punishment of heresy, unbelief, and other offences against religion. From the very first establishment of Christianity as the religion of the Roman Empire, laws, more or less severe, existed as in most of the ancient religions, for the repression and punishment of dissent from the national creed; and the emperors Theodosius and Justinian appointed officials called 'inquisitors,' whose special duty it was to discover and to prosecute before the civil tribunals offences of this class. The ecclesiastical cognizance of heresy, and its punishment by spiritual censures, belonged to the bishop or the episcopal synod; but no special machinery for the purpose was devised until the spread, in the 11th and 12th centuries, of certain sects reputed dangerous alike to the state and to the church—the Cathari, Waldenses, and Albigenses—excited the alarm of the civil as well as of the ecclesiastical authorities. In the then condition of the public mind, however differently it is now constituted, heresy was regarded as a crime against the state, no less than against the church. An extraordinary commission was sent by Pope Innocent III. into the south of France, to aid the local authorities in checking the spread of the Albigensian heresy. The fourth Lateran Council (1215) earnestly impressed, both on bishops and magistrates, the necessity of increased vigilance against heresy; and a council held at Toulouse directed that in each parish the priest, and two or three laymen of good repute, should be appointed to examine and report to the bishop all such offences discovered within the district.

So far, however, there was no *permanent* court distinct from those of the bishops; but under Innocent IV., in 1248, a special tribunal for the purpose was instituted, the chief direction of which was vested in the then recently established Dominican Order. The inquisition thus constituted became a general, instead of, as previously, a local tribunal; and it was introduced in succession into

Italy, Spain, Germany, and the southern provinces of France. So long, moreover, as this constitution remained, it must be regarded as a strictly papal tribunal. Accordingly, over the French and German inquisition of the following century the popes exercised full authority, receiving appeals against the rigour of local tribunals (Fleury, v. 266), and censuring, 'or even depriving,' the inquisitor for undue severity (*ibid.* 303). In France, the inquisition was discontinued under Philip the Handsome; and though an attempt was made under Henry II. to revive it against the Huguenots, the effort was unsuccessful. In Germany, on the appearance of the Beghards (see BEGUINES), in the beginning of the 14th c., the inquisition came into active operation, and inquisitors for Germany were named at intervals by various popes, as Urban V., Gregory XI., Boniface IX., Innocent VIII., down to the Reformation, when it fell into disuse. In England, it was never received, all the proceedings against heresy being reserved to the ordinary tribunals. In Poland, though established in 1327, it had but a brief existence. The history of the times of its introduction and of its discontinuance in the various states of Italy, would carry us beyond the limits at our command.

It is the history of the inquisition as it existed in Spain, Portugal, and their dependencies, that has absorbed almost entirely the real interest of this painful subject. As an ordinary tribunal similar to those of other countries, it had existed in Spain from an early period. Its functions, however, in these times were little more than nominal; but early in the reign of Ferdinand and Isabella, in consequence of the alarms created by the alleged discovery of a plot among the Jews and the Jewish converts—who had been required either to emigrate or to conform to Christianity—to overthrow the government, an application was made to the pope, Sixtus IV., to permit its reorganisation (1478); but in reviving the tribunal, the crown assumed to itself the right of appointing the inquisitors, and, in truth, of controlling the entire action of the tribunal. From this date forwards, Catholic writers regard the Spanish inquisition as a state tribunal, a character which is recognised by Ranke, Guizot, Leo, and even the great anti-papal authority, Llorente; and in dissociating the church generally, and the Roman see itself, from that state tribunal, Catholics refer to the bulls of the pope, Sixtus IV., protesting against it. Notwithstanding this protest, however, the Spanish crown maintained its assumption. Inquisitors were appointed, and in 1483, the tribunal commenced its terrible career, under Thomas de Torquemada. The popes, feeling their protest unsuccessful, were compelled, from considerations of prudence, to tolerate what they were powerless to suppress; but several papal enactments are enumerated by Catholics, the object of which was to control the arbitrary action of the tribunal, and to mitigate the rigour and injustice of its proceedings. Unhappily, these measures were ineffective to control the fanatical activity of the local judges. The number of victims, as stated by Llorente, the popular historian of the inquisition, is positively appalling. He affirms that during the sixteen years of Torquemada's tenure of office, nearly 9000 were condemned to the flames. The second head of the inquisition, Diego Deza, in eight years, according to the same writer, put above 1600 to a similar death; and so for the other successive inquisitors-general. But Catholics loudly protest against the credibility of these fearful allegations. It is impossible not to see that Llorente was a violent partisan; and it is alleged that in his work on the Basque Provinces, he had already proved himself a venal and unscrupulous fabricator. Although, therefore, he has made it impossible to disprove his accuracy by appealing to the original papers, which he himself destroyed, yet his Catholic critics—as Hefele in his *Life of Cardinal Ximenes*—have produced from his own work many examples of contradictory and exaggerated statements; Prescott, in his *Ferdinand and Isabella* (iii. 467—470), has pointed out many similar instances; Ranke does not hesitate (*Fürsten und Völker der Süd. Europas*, i. 242) to impeach his honesty; and Prescott pronounces his 'computations greatly exaggerated,' and his 'estimates most improbable' (iii. 468). Still, with all the deductions which it is possible to make, the working of the inquisition in Spain and in its dependencies even in the New World, involves an amount of cruelty which it is impossible to contemplate without horror. When it was attempted to introduce it into Naples, Pope Paul III., in 1546, exhorted the Neapolitans to resist its introduction, 'because it was excessively severe, and refused to moderate its rigour by the example of the Roman tribunal' (Llorente, ii. 147). Pius IV., in 1563, addressed a similar exhortation on the same ground to the Milanese (*ibid.* ii. 287); and even the most bigoted Catholics unanimously confess and repudiate the barbarities which dishonoured religion by assuming its semblance and its name.

The procedure of the inquisition deserves a brief notice. The party, if suspected of heresy, or denounced as guilty, was liable to be arrested and detained in prison, only to be brought to trial when it might seem fit to his judges. The proceedings were conducted secretly. He was not confronted with his accusers, nor were their names even then made known to him. The evidence of an accomplice was admissible, and the accused himself was liable to be put to the torture, in order to extort a confession of his guilt. The punishments to which, if found guilty, he was liable, were death by fire, as exemplified in the terrible Auto da Fé (q. v.), or on the scaffold, imprisonment in the galleys for life or for a limited period, forfeiture of property, civil infamy, and in minor cases, retractation and public penance. This form of procedure is strangely at variance with modern ideas; but it is fair to recollect that some of the usages were but the ordinary procedures in all the courts of the age, whether civil or ecclesiastical.

The rigour of the Spanish inquisition abated in the latter part of the 17th century. In the reign of Charles III., it was forbidden to punish capitally without the royal warrant; and in 1770, the royal authority was required as a condition even for an arrest. From 1808, under King Joseph Bonaparte, the inquisition was suppressed until the Restoration: it was again suppressed on the establishment of the constitution in 1820; but it was partially restored in 1825; nor was it till 1834 and 1835 that it was finally abolished in Spain, its property being applied to the liquidation of the national debt.

The inquisition was established in Portugal in 1557, and its jurisdiction was extended to the Portuguese colonies in India. The rigour of its processes, however, was much mitigated in the 18th c., and under John VI. it fell altogether into disuse.

The inquisition in Rome and the Papal States never ceased, from the time of its establishment, to exercise a severe and watchful control over heresy, or the suspicion of heresy, which offence was punished by imprisonment and civil disabilities; but of capital sentences for heresy, the history of the Roman inquisition presents few instances, and, according to Balmez (*On Civilisation*, p. 156), that tribunal 'has never been known to order the execution of a capital sentence' for the crime of heresy. The tribunal still exists under the direction of a congregation, but its action is confined to the examination of books and the trial of ecclesiastical offences, and questions of church law, as in the recent case of the boy Mortara; and its most remarkable prisoner in recent times was an Oriental impostor, who, by means of forged credentials, succeeded in obtaining his ordination as a bishop.—See Llorente's *Istoria Critica de la Inquisicion*; Prescott's *Ferdinand and Isabella*; Hefele's *Der Cardinal Ximenes; eine Biographie*; Balmez, *Catholicism and Protestantism compared in Relation to Civilisation*.

INSA'NITY means all unhealthiness of mind. This consists, according to one opinion, in such disorganisation or degeneration of the nervous structure as to render the exercise of reason impossible; according to another, it consists in disorder of the reason itself; and according to a third, in perversion or destruction of the soul, or the moral part of our nature. The prevailing view of physiologists is, that insanity is a symptom or expression, manifested through the functions of the nervous system, of physical disease. The legal term, lunacy, represents only those deviations from that standard of mental soundness which is universally recognised, although difficult of definition, in which the person, the property, or the civil rights may be interfered with. These deviations are, briefly, where the incapacity, or violence, or irregularities of the individual are such as to threaten danger to himself or others, and to unfit him for his ordinary business and duties. Insanity is more comprehensive, and includes all states of the feelings and passions, as well as of the understanding, which are inconsistent with the original and ordinary character and habits of the individual, and with his relations to the family or community of which he is a member. It has been stated broadly, that if a man be deprived of the enjoyment of his religious rights by exclusion from membership of the church to which he belongs; of his civil rights in giving evidence in a court of justice or on oath; and of his personal rights in the management of his property and affairs, he may be regarded as insane; but more correct views of the human mind have led to the belief, that many degrees of feebleness of the faculties, many forms of eccentricity and extravagance, and many defects in the will and moral sentiments, which were formerly regarded as crime and wickedness, but which do not involve such deprivation, may be classed under the same designation. Very recently, the interpretation of insanity has been greatly widened, and now includes various degrees of moral perversion, morbid habits, and sudden impulses, such as dipsomania and homicidal mania. The great divisions of this class of diseases into mania, melancholia, and imbecility, remain popularly very much the same as they were 2000 years ago. While this fact may indicate that such a classification has a foundation in nature, it has, unfortunately, tended to render the treatment, or rather the maltreatment, of the insane as stationary as the view of the diseases under which they labour. The following arrangement may serve to explain what insanity is, as well as what it appears to be.

AFFECTIONS OF THE INTELLECTUAL POWERS.—*Idiocy*, the non-development of one or more faculties. *Imbecility*, the imperfect development of one or more faculties. *Fatuity*, or *Dementia*, the deprivation by disease, or age, or otherwise, of powers which have been developed. *Mania*, with delusion, excitement, and irregular action of all, but especially of the intellectual powers; accompanied also by errors connected with the special senses.

AFFECTIONS OF THE SENTIMENTS.—*Melancholia*, exaltation of grief, penitence, and anxiety. *Monomania of Fear*, exaltation of cautiousness. *Monomania of Pride*, exaltation of self-esteem. *Monomania of Superstition*, exaltation of the sense of devotion and the marvellous. *Monomania of Suspicion*, exaltation of jealousy, envy, want of confidence. *Monomania of Vanity*, exaltation of craving for applause, grandeur, of feeling of ambition.

AFFECTIONS OF PROPENSITIES.—*Dipsomania*, incontrollable craving for stimulants. *Homicidal Mania*, impulsive desire to destroy life. *Kleptomania*, incontrollable desire to acquire.

This catalogue is not intended to be exhaustive. The departures from health will correspond not merely with the primitive mental powers and instincts, but with every possible combination of these, and with such complications as may result from hereditary predispositions, innate peculiarities, education, and habit.—Dr Combe *On Derangement*, Copland's *Dictionary*, art. 'Insanity.'

For the disposal and treatment of the insane, see LUNATIC ASYLUM.

INSCRI'PTIONS, a term applied to all writings engraved or written on objects or monuments not of the class of books, principally on hard materials, such as metals, stones, and other substances. They are a class of documents of the highest interest and importance to history and philology, and a consideration of them embraces the whole scope of history, language, and art. The oldest (excepting those of China) are probably the Egyptian inscriptions found in the Pyramids (see PYRAMIDS), of about 2000 B. C.; to which succeed those of Assyria and Babylonia, reaching nearly as high an antiquity (see CUNEIFORM CHARACTERS); which are succeeded by the Persian and Median, 525 B. C., and along with which prevailed the Phœnician, probably about 700 B. C. (see PHŒNICIA); which were in their turn succeeded by the Greek, between 500 and 600 B. C., or even earlier; which were succeeded by the Etruscan and Roman, in 400—300 B. C., and continued through the middle ages in Europe to the present day. See PALÆOGRAPHY. In the East, the oldest inscriptions are those of China, which ascend to 2278 B. C.; those of India not being older than 315 B. C., or the age of Sandracottus; while the antiquity of the hieroglyphical inscriptions of Central America cannot be determined. Of many ancient nations, the history and language are found in inscriptions only, as in the case of Lycia and Etruria, and all official inscriptions have a certain authority, from their contemporaneous nature, and the care with which they were executed.

Before the invention of paper or other light substances for the record of events, public acts, devotions, and other documents were inscribed on *bronze*, as the early treaties and dedications of the Greeks, or even lead, as certain small rolls of imprecation and others found in Greece; gold plates were inscribed and placed in foundations under the temples, as that of Canopus shew; the *exequaturs* of consuls among the Greeks, and the discharges of the Roman soldiery, were inscribed on bronze tables; while charms, amulets, and other formulæ were occasionally inscribed on metals. The numerous inscriptions known, probably amounting to half a million, have been classed under public or official acts, tables of magistrates, military titles, lists of magistrates, those relating to the gymnasia or games, honours rendered to emperors or men, donations, rites, private and sepulchral, comprising epitaphs, some in elegiac and heroic verse, and numerous minor inscriptions on gems, vases, and other objects of ancient art, on wax tablets or *pugillaria*, and the scrawls discovered on the walls of public and private edifices, as at Pompeii and elsewhere. The study of the letters and their form will be seen under ALPHABET; that of the different languages and the mode of deciphering, under their respective heads. Those found upon coins will be mentioned in NUMISMATICS. The most remarkable inscriptions are the trilingual inscription of Rosetta, that of Shalmanazer on the obelisk of Nimrud, and the cylinder of Sennacherib; the trilingual inscription of Darius I. on the rock at Behistun; the Greek inscription of the soldiers of Psammetichus at Ibsamboul, and of the bronze helmet dedicated by Hiero I. to the Olympian Jupiter; the inscription on the coffin of the Cyprian king Asmumazer; the Etruscan inscription called the Eugubine Tables; that of Mummius, the conqueror of Corinth, at Rome, and the will of Augustus at Ancyra; the inscription of the Ethiopian monarch Silco; the old monument of Yu, and the inscription of Se-gan-fu, recording the arrival of Christianity in China (631 A. D.); the inscriptions of Chandra-gupta and Asoka in India. The study of inscriptions is so difficult, that it has formed a special branch of scholarship, such as decipherment for those of which the language has been lost, or epigraphy for the dead languages. Special collections of the inscriptions of different localities, and general ones, have been made of those in the same languages as Assyrian, Greek, Etruscan, Oscan, and Latin, by Gruter, Muratori, Böckh, Franz, Orellius, Mommsen, Letronne, Lebas, and others. Inscriptions have also engaged the scholarship and attention of the most accomplished philologists with various success, from the end of the 17th century. They have been forged by Fourmont and others.—Gruter, *Thesaurus Inscr.* (fo. 1603—1663); Muratori, *Novus Thesaurus* (4to, 1739); Kellerman, *Spec. Epigraph.* (1841); Mommsen, *Inscript. Neapol.* (fo. 1852); Böckh and Franz, *Corpus Inscript. Græc.* (fo. 1828—1851); Osann, *Sylloge* (1822); Lepsius, *Inscr. Umbr. et Osc.* (1841); Gesenius, *Script. Ling. Phœn.* (1837); Garucci, *Graffiti* (1856).

INSECTI'VORA (Lat. insect-eating), in Cuvier's system of zoology, one of the divisions of the mammalian order *Carnaria* (q. v.). None of the I. are of large size; most of them are small timid creatures, generally nocturnal in their habits, and useful in the economy of nature chiefly in preventing the undue increase of worm and insect tribes. Although many of them are not exclusively insectivorous, all of them have the summits of the molar teeth beset with small conical tubercles, as for the purpose of breaking up the hard coverings of insect prey. Their dentition is otherwise very different in the different families. Their legs are short. They all place the whole sole of the foot on the ground. The snout is generally elongated. The families of *Talpidæ* (Moles, &c.), *Soricidæ* (Shrews, &c.), *Erinaceadæ* (Hedgehogs, &c.), and *Tupaidæ* (Banxrings) are referred to insectivora. The I., although in some respects very different from the *Cheiroptera*, exhibit an affinity to them in others.

INSECTS (*Insecta*), one of the classes of *Articulata* (q. v.), or Articulated Animals, of the division having articulated members. All the Articulata having articulated members were included by Linnæus in the class of I.; but the *Crustacea* and *Arachnida* were soon separated from it, and afterwards the *Myriapoda*. See these heads. This restricted application of the term I. corresponds more nearly with its popular use, and so well accords with its derivation, that it may be regarded as one of the most appropriate names employed in natural history. It is from a Latin word, signifying cut *into;* a derivation exactly answering to that of the Greek *entoma*, from which the science having insects for its subject receives the name of Entomology. Insects, a natural and extremely well defined class of organised beings, are remarkable, in their mature or *perfect* state, for the division of their bodies into three very distinct portions—the *head*, *thorax*, and *abdomen;* the divisions being often so deep, that the slenderness to which the body is there reduced cannot be contemplated without admiration.

The body of an insect, as of all the other Articulata, is composed of a certain number of rings. One of these forms the head; or, if the head ought to be regarded as really composed of several rings, modified and condensed together, as the skull of vertebrate animals is formed of modified vertebræ, yet no distinction of rings appears. The eyes, the antennæ, and the organs of the mouth are the most conspicuous organs connected with the head.

The thorax is formed of three rings, closely combined, but easily distinguishable. The first is the *prothorax;* the second, the *mesothorax;* the third, the *metathorax* (Gr. *pro*, before; *mesos*, middle; and *meta*, after). Of these rings, one or another is often remarkably developed. The legs and wings are attached to the thorax. Insects have six legs, and generally four or two wings, never any other number; but some are wingless, and this is the case not only in all the insects of certain groups, but also in particular species of groups ordinarily winged, and is sometimes even a distinction of sex, as in the glowworm. The first pair of legs are attached to the prothorax; the second, to the mesothorax; and the third, to the metathorax. The first pair of wings are attached to the mesothorax; the second, to the metathorax. In dipterous (two-winged) insects, the place of the second pair of wings is occupied by two small organs—little threads, terminated by a knob—called balancers (*halteres*), the use of which is not well known.

The abdomen consists of nine rings, or of fewer; as some are often obliterated, or modified, to form various appendages. It contains the principal viscera. In it, the sexual organs are situated. The rings of the abdomen are much more separate and movable than those of the thorax. The terminal rings of the females of some groups form an oviduct or ovipositor, which is sometimes capable of being employed as a borer, to make a place for the eggs in the animal or vegetable organism destined to receive them, and which in wasps and bees is replaced by a sting.

The nervous system of I., in all their stages of existence, exhibits the general characters noticed as belonging to the *Articulata* (q. v.). There is a *brain*, or ganglion of the head, from which arise the nerves of the eyes, antennæ, and mouth.

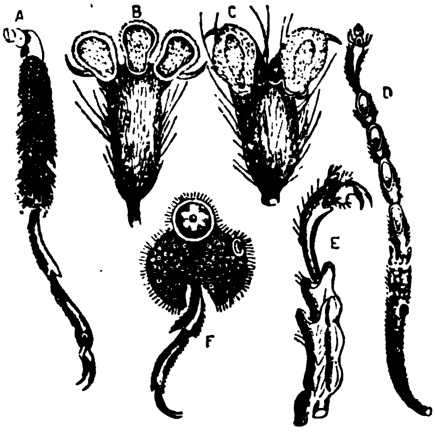
The rings of which the body of an insect is composed appear most distinctly in the external covering. This is in most parts hard, but more or less flexible, of a horn-like substance, chiefly composed of *Chitin* (q. v.). The external covering of insects is the principal framework of their bodies, and to it the muscles are attached. The external covering of each ring is more or less distinctly divided into two parts—a dorsal and a ventral—the connection at the sides being effected by a softer and more flexible membrane, a still softer membrane connecting the rings of the abdomen, so as to allow considerable freedom of motion; whilst between the rings are minute pores called *stigmata* or *spiracles*, by which air is admitted to the *tracheæ* or air-tubes (q. v.), the organs of respiration.

Insects respire neither by means of lungs nor of gills, and the blood is not brought to a particular part of the body for aëration, as by circulation in vertebrate and many invertebrate animals, but the air which enters by the breathing-pores is conveyed by tubes to all parts of the body, and even through the delicate structure of the wings, so that the whole frame is rendered more light by the very means employed to maintain and increase muscular energy. Respiration is extremely active in insects; they consume a great quantity of oxygen in proportion to their size, and they display, in general, an extraordinary degree of activity and muscular energy. The flight of very many kinds is far more rapid in proportion to their size than that of birds; others display a similar superiority of powers in running, swimming, or digging and burrowing; whilst the leaping of many, as fleas and grasshoppers, and the springing of others, as cheese-hoppers, prodigiously exceeds anything of which any vertebrate animal is capable. The respiration of aquatic insects takes place in the same manner as that of other insects, and they come to the surface of the water for fresh supplies of air.

The blood of I. is thin and colourless. It is not everywhere enclosed in vessels, but is freely diffused in interstices between the muscles and other organs, and in the visceral cavity. It contains globules or corpuscles of determinate shape. How far the *dorsal vessel* (see **ARTICULATA**) should be regarded as a *heart*, is not fully determined; but by its contractions and dilatations, a constant motion of the blood is maintained.

The members of I. have generally a structure analogous to that of the trunk, in being composed of articulations, the hard and solid part of which is the external covering. This appears very perfectly in the legs, the antennæ, and the palpi, but not in the wings.

The legs of I. consist of two principal parts, the thigh (*femur*) and shank (*tibia*), with two smaller articulations, the *coxa* and *trochanter*, interposed between the body and the thigh, and at the extremity of the shank, a set of three, four, or five small articulations, called the *tarsus*. The last segment of the tarsus in terrestrial insects is generally terminated by a pair of hooks or little claws; and many dipterous insects, as the House-fly (q. v.), have discs and suckers for taking hold of smooth surfaces.



Various Forms of Insects' Feet, shewing the adhesive Discs or Suckers (highly magnified).

(Copied from Rymer Jones's *Animal Kingdom*.)

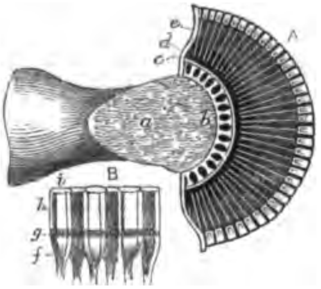
A, one of the middle pair of legs of Water-beetle; B, foot of *Bibio febrilis*; C, foot of House-fly; D, leg and foot of *Cymbex lutea*; E, tarsus of Abyssinian Grasshopper, shewing hooks or leaping appendages; F, one of the anterior legs of Water-beetle.

The wings of I. are often very large in proportion to the size of the body, and the rings of the thorax are soldered together, and supported by supplementary pieces, to give firm support to them, and to the powerful muscles necessary for their action. The hard covering of the body of an insect consists, like the skin of vertebrate animals, of three layers, and the membranes of the wings are filmy expansions of the outermost of these, the epidermis. The ribs or nervures in the wings of I. are tubes, of which one of the uses is the conveying of air even to the extremities of the wings. The forms of the wings are very various; some of the more important diversities being characteristic of different orders. The bodies of I. are often very much covered with hairs, which are often very long and thick in proportion to the size of the animal, and on the wings of butterflies and other *Lepidoptera* are flattened and expanded so as to form scales (see **BUTTERFLY**), often richly coloured, and also, by reason of very fine parallel striæ, with which they are marked, displaying an admirable iridescence or reflection of evanescent prismatic colours in changing light. The first pair of wings in coleopterous I. or beetles is represented by a pair of hard chitinous *elytra* (Gr. coverings), or wing-covers. *Orthopterous* I. have softer leathery or parchment-like elytra.

Insects feed on very different kinds of food; some prey on other I., some devour animal, and some vegetable substances, some suck the juices of animals, some the juices of plants or the honey of their flowers. The structure of the mouth varies accordingly, and the digestive organs also vary. The mouth is either adapted for gnawing, cutting, and tearing, or merely for sucking, or it is adapted partially for both of these purposes. The parts of a mandibulate mouth are figured in the article **COLEOPTERA**, and are an upper lip (*labrum*) and an under lip (*labium*), moving vertically; and an upper pair of jaws or mandibles (*mandibulæ*) and a lower pair of jaws (*maxillæ*), moving horizontally. The upper and under lip meet when the mouth is shut. Both are as hard as the jaws. The lower lip is sometimes regarded as consisting of two parts, called the chin (*mentum*), and the tongue (*lingua*), which is more membranous and fleshy, and reposes on the inside of the chin. The upper jaws or mandibles are usually powerful, and often strongly toothed and hooked, sometimes furnished with cutting edges like sharp scissors, and sometimes adapted for bruising and grinding. They are also the instruments which bees and other I. use for their wonderful operations of cutting, tearing, building, plastering, &c. The lower jaws or maxillæ are generally less powerful. In some I., in which the mandibles are enlarged into great organs of prehension, the maxillæ alone serve for the ordinary use of jaws in eating. To the maxillæ and the lower lip are attached organs called *palpi* or feelers, consisting of a number of minute articulations, supposed to be delicate organs of touch connected with the purposes of the mouth, and distinguished as *maxillary palpi* and *labial palpi*.

The mouths of mandibulate I. are sometimes called *perfect*, and those which exhibit a different character, *imperfect*. The terms, however, are improper—each kind is perfect, according to the purposes for which it is to be used. Yet a correspondence of structure may be traced, so that the parts of the mandibulate mouth may be recognised under various and very remarkable modifications in the mouths of I. which live by suction. Thus the filaments which form the proboscis of butterflies are the maxillæ excessively lengthened, and the cutting parts of the mouth of the flea are the mandibles and maxillæ. The proboscis of flies represents the lower lip.

The alimentary canal of I. is usually more or less convoluted. Between the mouth and the proper digestive stomach, it sometimes exhibits a *crop* (honey-bag of bees) in I. which live by suction, and this is either a dilatation of the lower part of the gullet or a lateral vesicle; sometimes a *gizzard*, with muscular walls, often armed with horny pieces, for trituration of food. The stomach is of a very elongated form. The liver is represented by long slender bile-tubes, four or more in number, which wind around the intestine, and pour their secretion into it, where it originates from the stomach. The salivary glands are generally similar tubes.

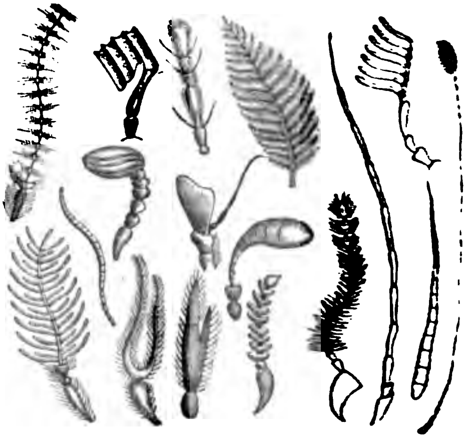


Section of the Eye of a Cockchafer (highly magnified):

A, section: *a*, optic ganglion, into which the optic nerve swells; *b*, nerves arising from its surface, and proceeding to the general retina; *c*, general retina; *d*, layer of pigment, in front of the general retina; *e*, optic nerves of the individual eyes which form the compound eye. B, a group of these, much magnified: *f*, bulb of optic nerve; *g*, layer of pigment; *h*, vitreous humour; *i*, cornea.

The eyes of I. are of two kinds—*simple* or *stemmatic*, and *compound* or *composite*. See EYE. Some I. have only simple eyes (*ocelli*), some have only compound eyes; but the greater number have two large compound eyes on the sides of the head, and three small simple eyes between them. Compound eyes occur in I. only in their mature or perfect state; the eyes of larvæ are simple.

The Antennæ (q. v.) are generally regarded as organs of touch. They are attached to the head, in front of the eyes, and are always present, and always two in number. They exhibit a vast variety of different forms, some of which are figured in the following cut. I. make much use of their antennæ to investigate surrounding objects by contact, although, if this is their sole use, it is not very easy to assign any probable reason for some of their forms; but there is not much plausibility in the conjectures which assign to them a part in the exercise of the senses of hearing and smell, although these senses and taste are evidently enjoyed by I., or at least by many I. in great perfection, and their particular seat and organs are not well ascertained. The sense of smell appears to be of great importance to I. in guiding them to their food. The sexes are distinct in all I., and very remarkable differences are often exhibited by the males and females of the same species, in size, colour, and the form and structure of parts that have no immediate connection with the reproductive system. What are called *neuters* in some tribes are imperfectly developed females. The connection of the sexes takes place only once in the lives of I., and a remarkable provision is made in the female: the consequent fertilisation of eggs, that in s



Various Forms of Antennæ.
(Copied from Roget's *Animal Physiology*.)

as bees, continue for a long time afterwards to be successively developed.

Insects are generally oviparous; a few are viviparous. The *Aphides* afford an instance of what has been called the Alternation of Generation. The greater number of I. take no care of their eggs after depositing them, and many themselves pass out of existence before the eggs are hatched; the chief part of the lives of I. being generally spent in their immature states, and their brief existence in the perfect state serving mainly for the propagation of their species. Thus many insect tribes disappear entirely on the approach of winter, their eggs awaiting the warmth of spring or summer to be hatched. The case is very different, however, with bees, ants, earwigs, and some others, which carefully tend and rear their young.—The number of eggs laid by I. is very various, but often very great. The flea, indeed, only lays about twelve, and many dipterous and coleopterous insects about fifty; but the silkworm produces from 500 to 2000; a single queen bee is supposed to lay 40,000 or 50,000 in a season; and the female termite or white ant, laying about sixty eggs in a minute, and for a period of very considerable though unknown duration, exceeds as to the number of her eggs any other known animal in the world.

The eggs of I. are generally white, yellow, or green; they are of very various shapes—round, cylindrical, conical, lenticular, &c.; they are sometimes smooth, sometimes beautifully sculptured.

The stage of development at which I. come forth from the egg is very different in different tribes: in some, they appear as footless worms; in others, they have rudimentary feet, but still with very little power of locomotion; in others, besides little claws representing the six feet of the perfect insect, there are on the abdominal segments of the worm-like body fleshy tubercles serving as feet; in others still, the legs are well developed, and the insect, on issuing from the egg, differs little from the perfect insect, except in the want of wings; whilst, finally, in a comparatively small number (lice, &c.), there is no obvious difference except in size. Similar differences of the degree of development appear in the mouth, eyes, and other organs. Hence the subsequent changes by which the mature state is reached are very different in degree; and I. being primarily divided into those which undergo and those which do not undergo metamorphosis, some of the former are commonly spoken of as undergoing *complete*, and others *incomplete* metamorphosis. In the first state of insect life, the insect is called a *Larva* (q. v.). Grubs, caterpillars, and maggots are the larvæ of different orders of insects. From this state it passes into that of a *Pupa* (q. v.), or nymph—a *chrysalis* or *aurelia* is the *pupa* of a lepidopterous insect—and finally it becomes an *imago*, or perfect insect.

The metamorphoses or transformations of I. have always been regarded with great admiration. A worm, inhabiting a muddy pool, becomes a winged creature that sports in the air. A crawling caterpillar, that ravenously devours some kind of herbage with its horny jaws, eating vastly more in proportion to its size than an ox, is converted into a splendid butterfly, flitting from flower to flower, and feeding only on nectareous juices. The intermediate or pupa state only adds to the wonder. The caterpillar, after several *moultings*, or changes of skin, and when it has attained its utmost size, ceases from eating, perhaps fixes itself under a leaf, becomes incased in a horny covering, as in a second egg, and from this it finally breaks forth a moth or a butterfly. Many larvæ, also, when about to change into the pupa state, spin Cocoons (q. v.), in which they envelop themselves, by means of *spinnerets* on the under lip, through which a viscid secretion passes in fine threads which harden into silk. But whilst the pupæ of many I. are motionless, or nearly so, and eat no food whatever, the pupæ of other I., as dragon-flies, are active and voracious. The intermediate or pupa state often differs little from the larva state, except in the possession of wings, or from the perfect state, except in the wings being merely rudimentary and still unfit for flight.

An opinion at one time prevailed, that the successive envelopes of the larva were all contained from the beginning within the first, within them the covering of the pupa, and within it the perfect insect. This extraordinary fancy has given place to the belief, established on sufficient observation, that the envelopes which the growing larva successively casts off, are merely a hard, thick, extravascular and unextensile epidermis; that the jaws, claws, &c., of the larva, with which it parts when it becomes a pupa, in the case of I. undergoing complete metamorphosis, are connected with the epidermis; and that the covering of the pupa is a new secretion. Discoveries, however, do not render less marvellous, but only more admirable, the changes which take place. Of these, some of the most important are in the organs of the mouth, the digestive organs, and the nervous system.

It is not certain that any insect has a voice or cry, although the origin of the sounds produced by some of them, as the plaintive, squeaking note of the death's-head moth, is not known. The sounds of which we do know the origin are not produced by the mouth or throat. See GRASSHOPPER, DEATH-WATCH, and CICADA.—The *humming* or *buzzing* of I. during flight has been commonly ascribed to the extremely rapid vibrations of their wings. Burmeister, however, supposes it to be produced by vibratory laminæ in the respiratory spiracles of the thorax, acted upon by the forcible emission of air during the violent muscular action necessary for flight.

Insects are all animals of small size, and many of them are minute. The largest species are tropical, and I. of all sizes abound in warm far more than in cold climates. The I. of the polar regions are comparatively few, and are to be seen only during summer; those of them whose whole existence is not comprised within a single year spending the winter, as very many I. of temperate climates also do, in a state of torpidity. All I. are very fond of heat, and many which do not become completely torpid in cold weather, become partially so. It is only in warm weather that I. display their greatest activity. As to their geographical distribution, I. are found in all countries, to the utmost alpine and polar limits of vegetable life. Many kinds are peculiar to particular climates and countries. The I. of the Malayan Archipelago and of Australia, like their other natural productions, are generally very different from those of other parts of the world. The I. of elevated mountainous regions within the tropics generally resemble those of the temperate and frigid zones, but are seldom the same. The multitude of species of I. is very great. The species of coleopterous I. alone, or beetles, are more numerous than all those of vertebrated animals together.

A few I. are important for their usefulness to man, and a greater number for the injuries which they inflict. Of the former, bees and silkworms deserve to be first named; and after them the cochineal insect and cantharides or blistering-flies. There are a few others to which we are indebted for substances useful in medicine and the arts, as kermes, lac, galls, &c. Of the injuries inflicted by I., the most serious are those caused by the destruction of herbage and crops, as by the ravages of locusts, of some kinds of caterpillars, and of numerous tribes of coleopterous and dipterous insects. See CORN-FLY, TURNIP-FLY, &c.

The primary division of I. into those which do not and those which do undergo metamorphosis (*Ametabolia* and *Metabolia* of Leach), has been already noticed. The former are divided into the orders *Thysanura* (q. v.) and *Parasita* (q. v.) or *Anoplura*, and are all included in the order *Aptera* (see APTEROUS I.) or wingless I. of Linnæus. The insects undergoing metamorphosis, which are far more numerous, are divided into two great groups, *Mandibulata* and *Haustellata*, the former having the mouth fitted for mastication, the latter for suction. The *Mandibulata* form the universally recognised orders *Coleoptera*, *Orthoptera*, including *Dermoptera* of some entomologists, *Neuroptera*, and *Hymenoptera;* the *Haustellata* form the orders *Hemiptera*, including *Homoptera* of some, *Lepidoptera*, *Strepsiptera*, *Diptera*, and *Suctoria* (*Aphaniptera* of some). See these heads.

Fossil Insects.—Several causes conspire to make the remains of I. in the stratified rocks comparatively rare, such as their possession of the power of flight, their soft and speedily decomposing bodies, and the extent to which they are preyed upon by other animals. That they were abundant during some periods is, however, very evident. In the Lower Lias, several bands of limestone occur, which, from the abundance of insect remains contained in them, have been called 'insect limestone.' They are crowded with the wing-cases of several genera of Coleoptera, and I., almost entire, are frequently found. The strongly nerved wings of some Neuroptera are beautifully perfect. In the Eocene strata, at Auvergne, a considerable thickness of limestone is formed entirely of the indusia or cases of the aquatic larva of a neuropterous insect. Amber from Tertiary strata often abounds in I., captured and enclosed while this petrified gum was in its primitive fluid condition, and now made permanent in the transparent stone, with every minute detail of structure beautifully preserved.

The oldest strata in which insect remains have been observed belong to the Carboniferous period.

The remains consist of fragments of Neuroptera, Orthoptera, and Coleoptera.

The Lower Lias I. belong to various orders; they are generally of a small size, apparently indicating a temperate climate. In the Upper Lias, they are not infrequent; a few specimens have been found in the Oolite proper; and in the Wealden, both land and water forms occur. None have been noticed as yet in the deep sea rocks of the Cretaceous period, but in the newer Tertiary strata they are common, especially in the amber from the lignite beds of Germany, and in the cavern deposits. It is worthy of remark that no new forms have been observed; all are either referred to living genera, or placed in new yet nearly allied genera.

INSESSO'RES (Lat. perchers), or **PERCHING BIRDS**, an order of Birds called *Passerine* (sparrow-like) *Birds* by Cuvier. In respect of the number of species which it contains, it is by far the largest order of the whole class of Birds. Cuvier says: 'Its character seems at first sight purely negative, for it embraces all those birds which are neither swimmers, waders, climbers, rapacious, nor gallinaceous. Nevertheless, by comparing them, a very great mutual resemblance of structure becomes perceptible.' A principal characteristic is found in the structure of the feet, which are particularly adapted for perching on the branches of trees, and have three toes before and one behind, the hind toe on the same level with the others. The legs are neither very long nor very strong; nor are the claws in general very long or very sharp. The wings are often long, and the power of flight very considerable, but this is not always the case. The neck is not long. The bill exhibits many varieties in length, thickness, &c., being very short and thick in some, very slender in others, but never exhibits the characteristic peculiarities of the accipitrine beak, although there is an approach to them in the shrikes, which are a connecting link between the two orders. The I. with short strong beaks are principally granivorous, those with slender beaks insectivorous; but very many adapt themselves almost indifferently to both kinds of food. Some feed on pulpy fruits; some on vegetable juices; some chiefly on carrion. The stomach is a muscular gizzard. To the order I. belong the singing-birds, and throughout the whole order a variously complicated structure of the lower larynx prevails. The I. pair, but the attachment of the sexes in most of them seems to endure only for a single season. They generally build interwoven nests, and lay numerous eggs. The young are always naked and blind on coming forth from the egg.—The I. are divided into four great tribes or sections, *Dentirostres*, *Conirostres*, *Tenuirostres*, and *Fissirostres*. See these heads.

INSO'LVENCY, or **BANKRUPTCY**, is the state of a person declared to be unable to pay his debts. Insolvency is a term which in England had long been confined to the case of a non-trader who was unable to pay his debts. All who were *traders* (a term which was not always easily defined) were said, in the same circumstances, to be, not insolvent, but bankrupt. Different courts, called the Bankrupt and Insolvent Courts, were applicable respectively to these two great divisions of mankind, traders and non-traders, and the chief points of difference in the procedure were these. In the case of traders, the Court of Bankruptcy was the court to which they or their creditors applied for its summary intervention. That court, whenever a man who was a trader was unable to pay his debts—certain tests of which inability, called acts of bankruptcy, were assumed as infallible symptoms—on the application of a creditor, took forcible possession of his property or his assets of every kind and denomination, converted these into money, and distributed the produce impartially among the creditors, according to certain rules, at the joint expense of the creditors. In the course of doing this, the court required the bankrupt to state all the property he had, where it was, and to give explanations as to what had been lately lost; and it was a crime for him to conceal or make away with any part of his property to the prejudice of this impartial distribution. The creditors also came in and proved their debts against his estate, thereby shewing their title to share in it. In this way the debtor was entirely stripped of everything (with a few trifling exceptions) which he had, and which was saleable; and on the other hand, he received a certificate which entirely cleared him of the incumbrance of his past debts for ever—freed him not only from imprisonment, but even from the liability to pay more in future, should he afterwards become rich; and he could thus begin the world anew.

On the other hand, the non-traders, who consisted of country gentlemen, professional men, gentlemen at large, and nondescripts of every degree who were not traders, fell under the care of the Insolvent Court. These non-traders petitioned the court voluntarily, instead of their creditors doing so, as was the case in the Bankrupt Court, and they of course put off this application till the last, when they were in prison, though they might also petition before any creditor put them in prison. The sole condition on which the Insolvent Court granted them its protection, and discharged them from prison, was, that they should not only give up all their property, but state fully all the debts and *liabilities* they had incurred. If they did this satisfactorily, the court relieved them from imprisonment, which was the most obnoxious of their terrors, *but did not* entirely free them from the debt they had incurred. On the contrary, they were still liable for their debts; and if ever they should in future *become rich* enough to pay twenty shillings in the pound, they were still held liable to make up that amount. This contingency, however, seldom happened, and, moreover, when it did happen, considerable leniency was shewn to the debtor, so that practically, both in bankruptcy and insolvency, the debtor was more or less whitewashed, and was at least saved from imprisonment.

Important changes were made in the practice of bankruptcy by the act of 1869, 33 and 34 Vict. c. 71, which repealed the prior enactments and rendered the law more uniform. Under that act non-traders as well as traders may be made bankrupts; and even peers of the realm not only may be made bankrupt, but, on being declared so, are at once disqualified from sitting and voting in the House of Lords till they have received their discharge. The act 34 and 35 Vict. c. 50, provided that the moment a peer is adjudged a bankrupt his disqualification begins, and he commits a breach of privilege if he sits or votes, or attempts to do so, while thus disqualified. And if he is a representative peer, a new election must take place when he becomes bankrupt.

The bankruptcy laws date from the time of Henry VIII., and the insolvency laws from the time of Elizabeth, the distinction as above explained having always been kept up between them till the old statute, 24 and 25 Vict. c. 134, passed in 1861. By that statute, the Insolvent Court was abolished. The court now administering this branch of the law is called the Court of Bankruptcy, which, as far as the London district is concerned, sits in Basinghall Street, City. The London district includes all the area of the ten metropolitan county courts. The rest of England is divided into separate jurisdictions, and the judge of each county court is the ordinary judge. In London, the chief judge in bankruptcy, who is also one of the judges of the Chancery Division of the High Court, sits, and has several registrars under him, to whom he has power to delegate his jurisdiction. Each judge of county courts has also all the jurisdiction of a judge in Chancery; and each county court is a branch of the Bankruptcy Court. There is an appeal from a local court to the chief judge, and then to the High Court of Appeal. The office of official assignees is abolished, and the creditors choose a trustee to represent their interests and administer the estate, and collect and distribute the effects. The registrar of each county court is an official trustee, but he merely acts till the creditor's trustee is appointed. The comptroller, whose office is in London, keeps a register of all bankruptcies, shewing the state and progress of each; and the High Bailiff serves all summonses, and inserts advertisements in the *Gazette*.

The tests of bankruptcy, or rather the acts done by a trader which make him liable to be proceeded against as a bankrupt, are technically called acts of bankruptcy. These are: departing the realm—remaining abroad—absenting himself from his dwelling-house—keeping (himself prisoner in his) house—suffering himself to be outlawed and sued by creditors for debt—or allowing his goods to be taken in execution for debt—executing a fraudulent grant, gift, or conveyance of his lands or goods. If a trader execute a conveyance of his whole property to a trustee for the benefit of his creditors, this will be treated as an act of bankruptcy, if any creditor petition within six months thereafter to make him a bankrupt. And, after a petition has been presented, the paying or giving security to any one creditor, so that he shall receive more than the other creditors, is void and null. If any creditor make an affidavit of debt, and give notice to the trader requiring immediate payment, the Court of Bankruptcy may order this to be filed, and call on the trader, if he do not *bonâ fide* dispute the debt, to enter into a bond with sureties to pay it in a given time, and refusal or neglect to attend or to pay this is an act of bankruptcy. With regard to a non-trader, the acts of bankruptcy were these: if, with intent to defeat or delay his creditors, he depart the realm, or remain abroad, or make a fraudulent gift, conveyance, or transfer of his real or personal estate; but in these cases the court did not declare him bankrupt until it was shewn he had, whether abroad or not, been personally served with notice of the intended application, or at least that every reasonable effort had been made to effect such personal service; that is to say, to put into his hands written notice and full information of what is intended against him. Other acts of bankruptcy, which were applicable to both trader and non-trader alike, were the lying in prison for debt—suffering his goods to be taken for debt—filing a declaration in the Court of Bankruptcy that he is unable to meet his engagements, provided a petition for adjudication of bankruptcy be filed against him within two months thereafter. The acts of bankruptcy, in all cases, are now the same, and are as first stated, one being also the filing of a declaration of inability to pay his debts.

The mode in which an adjudication in bankruptcy is conducted in England is as follows: The act of bankruptcy, as already explained, must have occurred within six months before the proceeding is commenced. The first step is a petition to the court. This may be presented either by one or several creditors. If, as is most usual, it is presented by a creditor, then such creditor must have a claim of debt amounting to not less than £50; or if the debt of two creditors amount to £50, they may jointly petition; or if the debt of three creditors amount to £50, they may jointly petition. Such debts may be due under mortgages, securities, or liens, and the costs and interest previously due in respect of such debts count as part of the whole debt. If a person in prison for debt is too poor to pay the fees, he formerly could be allowed to present the petition against himself *in formâ pauperis;* and as a monthly return of all debtors must be forwarded to the Bankruptcy Court, if prisoners stayed beyond a limited time—viz., if traders beyond a fortnight, and if non-traders beyond two months—without voluntarily petitioning, the court would at once make them bankrupts. But, imprisonment being abolished, creditors now begin the process. On the petition for adjudication of bankruptcy being presented, together with an affidavit of the debt, it is filed in court, and on proof of the particular act of bankruptcy, the court adjudicates the debtor a bankrupt. The court then appoints the official registrar to take possession of the property and premises. Before the adjudication is advertised in the *Gazette*, the debtor is to have notice personally, or by service, at his premises, and a certain number of days, from seven to fourteen, are allowed to him to shew cause why the adjudication should not be deemed valid. The bankrupt is then to deliver up all his books and papers on oath to the official registrar. He is bound to give information to the official registrar and the court, and to attend from time to time for that purpose, and he is allowed remuneration for that purpose. A small sum is also allowed for his and his family's maintenance during the proceedings. In general, the bankrupt from this time to the end of the proceedings is free from being arrested by individual creditors, and receives a protection from the court. The petitioning creditor, at his own costs, prosecutes the petition up to the stage when the creditors choose their trustee, when these costs are repaid to him. Soon after adjudication of bankruptcy, a ten days' notice is given in the *Gazette* to the creditors to meet and appoint a trustee. On this occasion, the creditors must first prove their debts, which they do by their affidavit or oath, together with production of any security or document verifying the debt. All creditors having thus proved their respective debts, have power to choose one or more persons as creditors' trustees; but the court has power to reject for want of security. The creditors may be represented on such occasion by an agent or deputy, whose authority needs no stamp. Creditors may determine whether such trustees shall give security. The court declares the appointment final. From the moment of their appointment, the whole of the bankrupt's real and personal property of every kind vests in them. They can sell it, and in general do everything which the bankrupt himself could have done. They are accountable to the creditors, and must render frequent accounts, and give explanations, which accounts must be printed and sent to every creditor. They manage and realise the estate and collect the debts, and can compromise claims and sue if needful. The court can summon the bankrupt, his wife, and all persons for examination. A sitting is appointed for every examination of the bankrupt which the court or the trustees may deem necessary. Meanwhile all creditors who have debts must complete the proof. Every creditor may prove his debt by delivering, or sending through the general post, to the official registrar—or, if the creditors' trustee has been appointed, then to the latter—a statement of such debt, and of the account of any, and a declaration signed by such creditor appended thereto that such statement is a full, true, and complete statement of account, and that the debt is justly due. If the debt is undefined, and consists of unliquidated damages, then the court orders a jury to be empannelled, either before itself or a court of law, to fix the sum. Debts which have been incurred, but are payable at a future time, may also be proved, and so may contingent debts and liabilities. When wages are due to clerks and servants at the time of the bankruptcy, the court may order a sum not exceeding four months' wages, and not exceeding £30, to be paid in cash; and for any surplus that may be due, the clerk or servant must prove and share with the other creditors. If the other creditors oppose a particular debt, and shew it is unfounded, the court will expunge it. When all the examinations necessary of the bankrupt have been gone through, a day is appointed for considering his discharge. A discharge shall not be granted unless it is proved to the court that a dividend of ten shillings in the pound has been paid, or might have been paid, except through the negligence or fraud of the trustee; or that a special resolution of creditors has been passed to the effect that the failure to pay ten shillings in the pound has arisen from circumstances for which he was not responsible, and that they desire that an order of discharge shall be granted to him. And the court may suspend for a time, or withhold altogether, the order of discharge, if the creditors, by special resolution, have decided that the bankrupt has made default in giving up to his creditors all the property required by the act to be given up, or that a prosecution has been commenced against him for some fraudulent offence declared by the Debtors Act of 1869, 32 and 33 Vict. c. 62. The effect of the discharge is to free the bankrupt entirely from all debts capable of being proved under the bankruptcy. The creditors have it in their power to determine whether any and what allowance should be made to the bankrupt up to and upon his discharge.

A debtor who is unable to meet the demands of his creditors may, instead of leaving them to commence proceedings in bankruptcy, call them all together, and lay a statement of his affairs before them, when those present are to decide whether the estate shall be wound up by arrangement. Due notice of this must, however, have been given to all creditors whose debts exceed £10. The debtor must also attend and answer all questions. If the majority of creditors agree, they may thus liquidate the estate by arrangement, and they proceed somewhat in the manner usual in bankruptcy by appointing a trustee; and there is power, in case of any legal or other difficulties, to call on the court to adjudicate the debtor a bankrupt in the usual way; and in all cases the proceedings are under the surveillance of the Bankruptcy Court.

The criminal offences committed by a bankrupt are such as not surrendering himself to the jurisdiction of the court at the time appointed; not making a full discovery of all his property and his dealings with it; concealing or embezzling part of his property above £10; not informing his trustee of any false debt proved under his bankruptcy; falsifying his books; fraudulently accounting for his property by fictitious losses; pawning or *mala fide* disposing of property within three months before the bankruptcy.

In Ireland, bankruptcy is substantially the same process in all its features as in England.

Scotch Bankruptcy, or Sequestration, is substantially the same process as that which prevails in England and Ireland; but there are some differences of no small importance, besides the different names given to the steps of the process. Certain acts and conduct of the bankrupt are held to be symptoms of notour bankruptcy, corresponding to what are called in England acts of bankruptcy. The first step is a petition for sequestration, which may be presented by creditors whose debt must be of the same amount as in England. There is no separate court of bankruptcy, but the sheriff of the county, or the Court of Session, has jurisdiction to award sequestration, and the court then appoints a judicial factor, if necessary, until the creditors elect a trustee, in whom the property vests. The creditors also appoint commissioners to advise with the trustee as to the management of the estate. The duties of the trustee and commissioners are nearly identical with those of the trustees in England. The creditors prove their debts in a similar way. There are also powers of winding up the estate under a deed of arrangement. The whole procedure in the sequestration has been very much imitated in the latest statutes passed in England. The commissioners of the creditors fix the trustee's remuneration. The trustee examines the grounds of claim of creditors, there being an appeal to the Lord Ordinary or sheriff, and he examines the bankrupt on oath, if necessary. On a report from the trustee as to the conduct of the bankrupt, which is not demandable by the bankrupt till five months after the sequestration, the bankrupt petitions for his discharge, and if the creditors all concur, he is entitled to his discharge at once; at later dates, if he has the concurrence of a certain number of his creditors, he is also entitled to a discharge; but if the creditors oppose, the court has a discretionary power to grant or suspend the discharge with or without conditions. In Scotland, there is no distinction, as there was once for many purposes in England, between traders and non-traders. Another peculiarity of a Scotch sequestration is, that the process is applicable not only in the case of debtors who are alive, but in cases of persons who have died in insolvent circumstances; whereas in England, the only remedy is an administration suit in the Court of Chancery. In Scotland, there is a process called *cessio bonorum*, which resembles the process called insolvency in England, the principle of which is, that the debtor is only relieved from imprisonment, but not from the debt; and where the debtor has trifling assets, it is in the power of the creditors to resolve that their debtor shall not have a discharge under the sequestration, but only a decree in a *Cessio Bonorum* (q. v.).

With regard to the effect of a discharge under a bankruptcy in either of the three kingdoms, the rule is, that whether the bankruptcy is awarded in England, Ireland, or Scotland, all the property of the bankrupt vests in the assignee or trustee, wherever it is situated; and when the bankrupt is discharged, the discharge is thereafter complete and given effect to in all parts of the United Kingdom. Of late years, owing to the belief that it was much easier to be made a bankrupt, and obtain a discharge from debt, in Scotland than in England, various English debtors resorted to Scotland for forty days, in order that they might be made bankrupt, no doubt thinking that creditors would be less likely to oppose their discharge at that distance; and after their discharge, they returned to England, and pleaded this Scotch bankruptcy. But a recent statute has given power to the Scotch courts to refuse the remedy of sequestration to debtors whose debts were chiefly contracted in England, and to remit them to their own country.

INSPE'CTOR, INSPECTOR-GENERAL, terms in military affairs, having a somewhat vague signification. There are inspectors-general of cavalry, be satisfactorily explained away (and their number has been for some time on the increase), argue in the following way : It is plain, first of all, and especially, that the question is not one to be settled according to any preconception, but according to the evidence of the facts given us in Scripture. The only right idea of inspiration is, as one has said, 'that which we form from our knowledge of the Bible itself. It is a question to be solved not by speculating what the Bible ought to be, but by examining what it actually is.' All *à priori* arguments are evidently at once inapplicable and dangerous on such a subject. The partisans of plenary inspiration maintain that it is necessary to the preservation of faith to hold, that God has not only revealed the truth to man, but that He has deposited that truth in an infallible record. Not only so; but the infallibility of the canon is no less indispensable; for all would be lost if any doubt was allowed to rest upon any portion of the Word of God. But if an infallible text and an infallible canon be necessary, why not also an infallible interpretation? Without the latter, the two former may be of no use. All may be lost by a false or defective commentary of the sacred text. It is plain that the idea of verbal inspiration cannot stop short of the conclusion of an infallible interpretation; and even such a conclusion, which upsets Protestantism, by denying the right of free inquiry, would not save it; for an infallible commentary would not necessarily insure infallible instruction —all might still be lost by the weakness, ignorance, or defect of the recipient mind. No infallibility of text, of canon, or even of interpretation, could insure the infallible reception of the truth, thus trebly guarded. If we would not be caught, then, in this absurd chain of assumption, we must break its first link, and ask, not what the Bible must be or should be, but what it is. This view is strongly argued in a recent treatise on inspiration by M. de Pressense, one of the most distinguished of the French Protestant divines belonging to the evangelical school of theology. According to this writer, who may be taken as the representative of a large class of theological thinkers, the Bible is a mass of documents of varying age and varying authenticity; its text has undergone the usual changes attending the transmission of historical documents; it is marked by the usual inequalities and varieties of style that we meet with in any other collection of ancient literature; it presents in many cases peculiar difficulties, differences and even contradictions of detail, scientific and historical errors. All who have studied the Gospels minutely, and especially the quotations in the Gospels and the Epistles of St Paul from the Old Testament, know that there are various inaccuracies and misapplications of facts throughout them. The same microscope of criticism that reveals to us the depths of the inner meaning of the divine message in all its manifold fulness, reveals to us also the imperfections, and even the contradictions, of the human messenger. The following are only a few of the instances in which such 'imperfections and contradictions' shew themselves.

1. The recital of the temptation in St Matthew and St Luke. In the former (Matt. iv. 6—8), the vision from the pinnacle of the temple is placed first; in the latter (Luke, iv. 1—10), that from a lofty mountain takes precedence.

2. In Matt. x. 10, Jesus commands his apostles to take for their missionary journey neither 'scrip, neither two coats, neither shoes, *nor yet staves.*' In Mark, vi. 8, he commands them to 'take nothing for their journey, save a staff only.'

3. In the narrative of the Passion, as in that of the Resurrection, there are numerous contradictions of detail resting on a fundamental and striking unity. According to Mark, xiv. 72, the cock is represented as crowing on each of the first and second occasions on which Peter denies his Lord. In the accounts given by the other evangelists, the cock only crows upon the third denial (Matt. xxvi. 74; Luke, xxii. 60). The statement of the death of Judas differs materially in Matthew and in the Acts of the Apostles. According to the former, Judas casts down the pieces of silver, and departs and hangs himself; and the chief priests *afterwards* purchase with the price of his guilt the potter's field for the burial of strangers, hence called the field of blood. According to the Acts of the Apostles, i. 18, Judas himself is represented as having purchased the field 'with the reward of iniquity;' then as having in some way (not explicitly stated in the narrative) met there a bloody death, from which circumstance the field took its name. In the narratives of the Resurrection, it is well known there are numerous variations; and numerous palpable errors of memory as to historical facts occur, such as may be seen by comparing Mark, ii. 26 with 1 Sam. xxi. 2—6, and 1 Cor. x. 8 with Numb. xxv. 9.

4. As to the citations of the Old Testament in the New, they are almost entirely taken from the Septuagint, and evidently in many cases quoted from memory, with little regard to their exact sense in the original. Thus, St Matthew (ii. 6), in applying to the Messiah the prophecy of Micah (v. 2), says of Bethlehem precisely the reverse of the Septuagint. 'Thou art too little to be reckoned among the thousands of Juda,' he translates : 'Thou art not the least among the princes of Juda.' In many cases, the New Testament writers, while repeating the inaccuracies of the Septuagint translation, turn them to admirable account; this is especially remarkable in the gospel of St Matthew and the Epistles of St Paul. Thus (iii. 3), St Matthew translates with the Septuagint: 'The voice of one crying in the wilderness;' while the Hebrew is: 'A voice cries, Make plain in the wilderness the ways of the Lord' (Isaiah, xl. 3). Compare also Matt. xii. 21 and Isaiah, xlii. 4, also Matt. xv. 8 and Isaiah, xxix. 13,

None of these errors, it is maintained, are of any material consequence so far as the substantial veracity of Scripture is concerned. The very fact that a microscopic criticism can detect no more serious inconsistencies in the Scriptural writers, is rightly held to be one of the most striking testimonies that could be given to their truthfulness. Such slight inaccuracies are the mere freedoms which writers, thoroughly honest, and animated with a high interest which overlooks trifles, permit themselves. But however unimportant in themselves, they are considered by many theologians to be altogether inconsistent with a theory of verbal inspiration. However minute, they are recognised as real *discrepancies*—human imperfections in the sacred record—and as consequently proving that the mere text or letter of Scripture is not infallible, that it cannot be regarded as a 'direct utterance of the Most High.'

Inspiration, therefore, according to these theologians, does not imply the infallibility of the Scriptural text; it is something consistent with scientific, historical, exegetical, and even argumentative errors (witness, to quote no other example, St Paul's allegorical argument about the sons of Abraham, Gal. iv. 22, 25). There is nothing valid, no divine authoritative element, it may be said, that can survive such deductions. If there are such errors in Scripture, why may it not all be imperfect or erroneous? The sufficient answer is, that it is not so—that, judged by the very same critical tests which detect such errors, the Bible remains an entirely *unique* book. Every Christian mind recognises in it a higher divine knowledge and authority than in aught else. The divine spirit in Scripture makes itself felt, shines forth in every page of it; and this is inspiration in the highest sense, the mind of God meeting our minds in Scripture, enlightening, guiding, elevating, purifying them. There is nothing more in reality to be got from any theory than this. An inspired letter, or *word*, or message is nothing to any one *in itself;* the meaning is everything. We must understand the word or message. There is no degree of objective authority that can supersede this subjective process of apprehension on our part. There cannot, therefore, be immunity from error, let the symbol or the text be as perfect as possible. It is only to us what *we* see it to mean; and this meaning, in the case of Scripture, shines with a divine power and lustre such as invest no other book. It bears its own divine witness. In such an idea of inspiration, criticism finds nothing inconsistent, nothing impossible, and no higher idea can be well formed of it.

INSTALLA'TION, in Church Law, means the ceremonial act or process by which a person presented and legally confirmed in a benefice is formally put into possession of his office, and by which he is fully empowered not alone to exercise its functions, but to enjoy its honours and emoluments. The ceremonial form, as well as the name, differs according to the office which is conferred, as 'enthronisation' for a bishop, 'induction' for a rector, &c. 'Installation' properly regards the office of a canon or prebendary. The word is also used generally for a formal introduction to any office.

I'NSTERBURG, a town of Prussia, in the province of East Prussia, is pleasantly situated on the left bank of the Angerap, 15 miles west-north-west of Gumbinnen. It contains a castle, and several educational institutions. Cloth-weaving, tanning, brewing, and distilling, with a trade in corn and linseed, are carried on. Pop. (1871) 7185. I. had its origin in a castle of the Teutonic Order of Knights, built here at an early period. At the close of the 16th c., it had attained the rank of a town, which increased considerably after the 17th c., about which time a number of Scottish families settled at I. on account of its trade.

I'NSTINCT. It has been common to describe the actions of the lower animals as guided by principles different from what obtains in the human constitution. The power of self-preservation is considered as reason in man, and as instinct in the brutes; but this contrast does not contain a real opposition. There is much that is common in the impulses of men and animals. When an animal, having found a morsel agreeable to its taste, masticates and swallows it, and takes up another of the same, the mental operation is not essentially different from what a human being would go through in the like circumstances. In both instances, we have an example of the exercise of Will, or volition, which operates to promote the pleasures and ward off the pains of the sentient being.

The most important meaning connected with the term Instinct is what contrasts with experience, education, and acquired knowledge. The original or innate tendencies and powers of the mind are to be distinguished from the powers that grow up in the course of the animal's experience of the world, and its companionship with other living creatures. There has been a disposition to under-rate the acquired aptitudes of the inferior animals, and to refer their capability of self-preservation purely to their natural or primitive endowments. But in point of fact, men and animals alike possess both instincts and acquisitions; for although in man the preponderance is greatly in favour of the acquired, he, too, must start from something primordial, the basis of the other.

In the first place, there are certain actions of importance to the safety and well-being of the individual that are termed Reflex, or Automatic. They seem to be almost out of the sphere of mind proper, as they are performed even unconsciously. Among these are the propulsion of the food along the alimentary canal, sneezing, respiration, &c. In all these, we have important activities, which are inherent in the constitution, and are performed as effectually at the beginning of life as at the full maturity of the being.

In the second place, there is a certain original provision for Rhythmical and Combined Movements among the active organs, more especially those concerned in Locomotion. Thus, there is a natural tendency to alternate the limbs, although the human infant cannot turn this to account at once for the ends of walking, as some of the quadrupeds can. From this alternation, the two eyes and the two sides of the face are specially exempted, and brought under another arrangement equally primitive—namely, concurrence. But all these cases alike illustrate the presence of an original mechanism of the frame, by which the movements are grouped up to a certain point.

In the third place, it may be safely maintained that there is an inborn tendency in all animals to *act somehow*, or to put forth the energies that they possess, without waiting for the stimulus of their sensations. This Spontaneous Activity is shewn more or less in every creature after rest and nutrition (see SPONTANEITY). Destitute of any special direction at the outset, it yet prompts to a great many experiments or trials upon things, in the course of which the animal discriminates the suitable from the unsuitable by means of its sensations, and thereby learns to follow up the one and eschew the other.

Fourthly, in connection with our Emotions, there are certain primitive links of mental state with bodily manifestation, which constitute a natural language of the feelings understood by the whole human race. The meaning of the smile, the frown, the sob, the contortion of pain, is uniform, and therefore instinctive. See EMOTION.

Fifthly, the power of will or volition, although it can be shewn to be a *growth*, must have some primitive and instinctive elements in the constitution to start from. See WILL.

Sixthly, there must be certain primordial powers of the human Intellect. What these are, has been much disputed. Every one must concede the existence of some intellectual forces or faculties, as, for example, Discrimination, the basis of all knowledge; Retentiveness, the faculty of acquiring everything that is acquired; and agreement, or Similarity (see INTELLECT); but it is contended by one school that we possess not merely powers of receiving knowledge by our contact with the world, and our consciousness of our minds, but *actual notions or ideas* that cannot be traced to our experience of the material or mental phenomena that we encounter. This is the doctrine of innate ideas, intuitive conceptions, *à priori* cognitions and judgments, first truths, &c. See COMMON SENSE.

Animals possess, as a rule, the instincts of human beings, with some that are special to themselves. They have the Reflex Actions above enumerated;

they have, even in a more decisive form, the primitive combined movements for locomotion and other purposes; they have the spontaneous activities that come under control in their voluntary acts; they have emotional manifestations that are emittant, although their organs of expression are fewer; they have certain rudimentary powers, which are developed by experience into the activity of the will.

There are certain intellectual judgments that in man are mainly, if not wholly, the result of experience, but in animals are instinctive. The chief of these is the appreciation of distance and direction; which is shewn in the ability to take an aim, as in birds pecking their food soon after they are born. The higher quadrupeds learn to feed themselves in a space of time too short for acquisition. It would seem also that animals have instinctive notions of things, as in the case of the aquatic animals knowing water at first sight, a fact generally affirmed, and not easy to contradict. In the same way, they may know their food at first sight before tasting it.

It is in connection with Sociability, that we have the largest compass of undoubted instincts. Animals seem to know their own species by intuitive perception. Predatory animals certainly recognise their prey by instinctive perception; the young kitten is aroused by the sight of a mouse; the dog pursues a cat with a decision and vehemence that could not be given by education. So animals that are preyed upon intuitively dread their captors.

While Pleasure and Pain must be regarded as fundamental attributes of the mind, inseparable from its working, the more special modes of feeling called Emotions, as Love, Anger, Fear, are states superinduced upon the primary modes of feeling, and as they appear from the earliest moments of life, they are properly termed instincts, being common to man and to animals.

Among the most notable instincts are the constructions of forethought—as the nests of birds, the cells of bees and wasps, the ant-hillocks, the beaver's dwellings, the spider's web; also the precautionary movements of animals, as in the migrations of birds and fishes, according to season. The striking and extraordinary anecdotes given of the sagacity of some animals, as the dog, the horse, the cat, the elephant, do not, properly speaking, exemplify instinct; they involve experience, memory, and reason, which animals are capable of in a greater or less degree, and with great individual differences, even in the same species. Respecting these various instinctive aptitudes, the account given until lately was that each distinct animal species was originally created so; and that the powers belonging to each were handed down without change from parents to offspring. A new rendering of the phenomena has been given, in the doctrine of *Evolution*. According to this doctrine, as applied to mind, instincts are experiences and acquisitions that have become hereditary.

'Though reflex and instinctive sequences are not determined by the experience of the *individual* organism manifesting them, yet the experiences of the *race* of organisms forming its ancestry may have determined them. Hereditary transmission applies to mental peculiarities as well as to physical peculiarities. While the modified bodily structure produced by new habits of life is bequeathed to future generations, the modified nervous structure produced by such new habits of life are also bequeathed; and if the new habits become permanent, the tendencies become permanent. Let us glance at the facts: Among the families of a civilised society, the changes of occupation and habit from generation to generation, and the intermarriage of families having different occupations and habits, greatly confuse the evidence of mental heredity. But it needs only to contrast national characters to see that mental peculiarities caused by habit become hereditary. We know that there are warlike, peaceful, nomadic, maritime, hunting, commercial races—races that are independent or slavish, active or slothful; we know that many of these, if not all, have a common origin; and hence it is inferable that these varieties of disposition, which have evident relations to modes of life, have been gradually produced in the course of generations. In domesticated animals, parallel facts are familiar. Not only the forms and constitutions, but the dispositions and instincts of horses, oxen, sheep, pigs, fowls, have become different from those of their wild kindred. The various breeds of dogs exhibit numerous varieties of mental character and faculty permanently established by mode of life; and their several tendencies are spontaneously manifested. A young pointer will point out a covey the first time he is taken afield' (Spencer's *Psychology*, vol. i., p. 422).

The strongest evidence, however, for the evolution theory is the remarkable similarity between instincts and acquisitions. Our instincts are just the powers that we need for our support and preservation, and that we should acquire by trying what actions are best suited for this purpose. An animal coming into the world unable to adjust the movements of its limbs, head, and mouth, to pick up the food that lies before it, would have to learn these movements as quickly as possible. Once acquired, they persist, and if very strongly embodied in the nervous system, they may be transmitted in a more or less perfect form to the next generation. Even granting that the transmission is not full and complete, a sufficient trace may be left to render the acquisition comparatively short. There are a great many instincts that need a certain amount of practice to make them operative; the first attempts at locomotion in most animals are feeble and awkward.

INSTITUTE, a term used in Scotch Entail Law to denote the person who is first mentioned or described as entitled to take the entailed estate. All those who come after him are called substitutes. When the institute dies before the entailer, the next person mentioned takes as institute. There are certain rules of construction which favour the institute, but these are entirely technical.

INSTITUTE, The, in English Law, is the mode of citation or reference to Chief-justice Coke's great work, in four volumes, on English law. Another name for the first part of it is *Coke upon Littleton*, owing to its being a commentary by Coke upon a work of Littleton. The second book is a comment on acts of parliament, the third is a treatise on the pleas of the crown, and the fourth on the different kinds of courts.

INSTITUTE OF FRANCE. On the revival of letters, associations for mutual intercourse and co-operation, called Academies (q. v.), were formed in Italy and France, one of which, composed of poets of no great note, was converted by Richelieu into a national institution, under the name of *Académie Française*, and met for the first time 10th July 1637. The chief object of this institution was the cultivation of the French language; but this was indifferently accomplished, owing to the intermeddling of the court, which arrogated to itself the right of directing the public taste. Many of the judgments of this Academy were strangely erroneous—e. g., its rejection of the *Cid* of Corneille, and its refusal to admit Molière, Boileau, and La Bruyère as members. The Academy was intrusted with the preparation of a Dictionary of the French language; but the merits of this work have been much disputed, and the plan of it generally condemned.—The taste for devices, inscriptions, and medals, which prevailed in the 17th c., suggested to Louis XIV. the foundation of the *Académie des Inscriptions* in 1663, for the immediate object of examining his collection of medals and other antiquities; but the Abbé Bignon, superintendent of the Royal Library, secured its perpetuation, with an extension of its field of labour, as the *Académie Royale des Inscriptions et Belles-lettres*, under which designation it met for the first time 16th July 1701. —The third Academy in order, and at present the most distinguished scientific association in the world, the *Académie Royale des Sciences*, was founded by Colbert in 1666, remodelled by Bignon in 1699, and further enlarged in 1785.—The painter Le Brun founded in 1648 an *Académie de Peinture*, for which he obtained a charter in 1655; and in 1664, Colbert remodelled and established it as the *Académie Royale de Peinture et Sculpture*. —An *Académie Royale d'Architecture* was also founded.

All these Academies were suppressed by an edict of the Convention, 8th August 1793; but on 25th October 1795, the Directory established a great national association, for the promotion of the arts and sciences, called the *Institut National*. It was at first divided into three classes—viz., Sciences Physiques et Mathématiques; Sciences Morales et Politiques; Sciences de Littérature et Beaux-Arts; but on the suppression of the second class by the First Consul in 1803, the remaining classes were re-arranged as follow: Sciences Physiques et Mathématiques; Langue et Littérature Française; Histoire et Littérature Ancienne; Beaux-Arts; and this arrangement continued during the Empire. On 21st March 1816, a royal ordinance commanded that the four classes should be replaced by four Academies, but the general title, 'Institute of France,' was retained, being modified by the epithet 'Royal,' 'Imperial,' or 'National,' in harmony with the political changes in France. Since 1870, it is, of course, the *Institut National*. The four Academies are—1. *L'Académie Française*; 2. *L'Académie des Inscriptions et Belles-lettres*; 3. *L'Académie des Sciences*; 4. *L'Académie des Beaux-Arts*; and an ordinance, bearing date 26th October 1832, re-established the old second class as a fifth Academy, *L'Académie des Sciences Morales et Politiques*, and this organisation still subsists.

Each Academy has its own independent government, and the free disposition of the funds allotted to it, an agency and secretaries; the library and the valuable collections of the Institute are common to the five; the common fund is managed by a committee of ten members (two from each Academy), under the presidency of the Minister of Public Instruction. Members are elected by ballot, the election requiring to be confirmed by government, and members of one Academy may be elected as members of any or all of the other four. Each member has an annual salary of 1500 francs, and the secretaries have 6000. Each member also receives a napoleon for each meeting of the Academy at which he is present, but is liable to a fine if absent for a whole year, or to expulsion for a prolonged absence without sufficient cause shewn. Each Academy meets once a week for two hours; each has also one public annual sitting; and on 15th August, there is a general public meeting of the whole five. All the Academies, with the exception of the first, have a certain number of *académiciens libres*, *associés étrangers*, and *correspondants*; the 'académiciens libres' have only the right of attending the meetings of the Academy; the 'associés étrangers' are foreign members. The following table gives the full complement of members and correspondents for each Academy:

	Members.	Académiciens Libres.	Associés Etrangers.	Correspondants.
1. Académie Française, . .	40			
2. „ des Inscriptions et Belles-lettres, .	40	10	8	50
3. „ des Sciences, . .	65	10	8	100
4. „ des Beaux-Arts, .	41	10	10	40
5. „ des Sciences Morales et Politiques, .	40	6	6	46
	226	36	33	236

Among the *associés étrangers* in 1874, there were in the 2d Academy, Professor Max Müller; in the 3d, Professors Owen, Airy, and Wheatstone; and in the 5th, the Right Hon. W. E. Gladstone, and the Hon. Mr Stanhope. Of correspondents, Mr Thomas Wright belonged to the 2d, as did also Sir H. Rawlinson, Mr Layard, and Dr John Muir of Edinburgh. Late correspondents with the various academies were Professor Faraday, Sir D. Brewster, Sir J. W. Herschel, Lord Brougham, Mr M'Culloch, Mr Grote, and Drs Whewell and Whately. The *Académie Française* occupies itself with debates on grammar, rhetoric, poetry, and French literature in general, and its great work is the preparation and continual improvement of a dictionary of the French language. It has the disposal of two prizes of 10,000 francs each, one of 2000 francs, and every alternate year, a sum of 1500 francs to be bestowed on meritorious authors in poor circumstances. The *Académie des Inscriptions et Belles-lettres* has for its subject history in its most comprehensive sense, including chronology, geography, numismatology, and the study of monuments of every kind, and of the languages of all nations at all times. It has in its gift a prize of 2000 francs, and another for numismatology. The *Académie des Sciences* has for its subject statistics, pure and mixed mathematics, medical science, &c.; and has the gift of eleven prizes, several of which are of 10,000 francs; all are annual, with the exception of one, which is decennial. The *Académie des Beaux-Arts* occupies itself with painting, sculpture, architecture, engraving, and music; and with the preparation of a dictionary of the fine-arts, and, alternately with the first Academy, distributes the sum of 1500 francs among poor meritorious authors. The *Académie des Sciences Morales et Politiques* discusses mental philosophy, law and jurisprudence, political economy and statistics, general and philosophical history, and politics, administration, and finance; and has the gift of two prizes—one decennial, the other quinquennial. There is also a Bordin prize in the gift of each Academy; and two general prizes—one annual, the other triennial—in the gift of the Institute.

Each year a sum is voted by the French government for the general fund of the Institute, and from this fund are paid the allowances of members, salaries of the secretaries and other officials, and several prizes; also experiments, printing, &c.

INSTITUTES is the name given to the elementary treatise on the Roman or civil law. See LAW, ROMAN, CIVIL.

INSTITUTION, in Church Law, means the final and authoritative appointment to a church benefice—more especially a bishopric—by the person with whom such right of appointment ultimately rests. Thus, in the Roman Catholic Church—even after the 'election' of a bishop by the chapter, or his 'nomination' by the crown, when that right belongs to the crown—it is only the pope who confers 'institution.' In English usage, Institution is a conveyance of the cure of souls by the bishop, who, or whose deputy, reads the words of the institution, while the clerk kneels. The institution vests the benefice in the clerk, for the purpose of spiritual duty, who thereupon becomes entitled to the profits thereof. But the title is not complete till Induction (q. v.).

I'NSTRUMENT, in point of law, is scarcely a technical term, though it is frequently used in England as descriptive of a will or testamentary writing—and often any document not under seal. In Scotland, on the other hand, it is usually descriptive only of a notarial instrument.

INSTRUMENTA'TION is the arranging of music for a combined number of instruments. The nature and character of the musical ideas must alone determine whether the instrumentation shall be simple or artistic, and perhaps complex; the latter being the case when some of the instruments take a more prominent part than others. For both purposes, a thorough knowledge of every instrument in the orchestra is absolutely necessary, as without this, instrumentation becomes only a deafening mass of sounds. The stringed instruments, from their nature, in most cases, form the principal parts of a score, around which the other instruments move, without depriving them of their importance. The wind instruments represent, more or less, as it were, a subordinate chorus, which may again be divided into two kinds, viz., the wood instruments and the brass, which, with the stringed instruments, give three essentially different choral effects, that may be mixed up together in endless variety. A knowledge of the art of instrumentation is only to be acquired by great experience; at the same time, much may be learned by consulting the following works: *Die Instrumentirung für das Orchestra*, von A. Sundelin, published in Berlin by Wagenführ; and Dr Joseph Fröhlich's *Systematischer Unterricht in den vorzüglichsten Orchesterinstrumenten.*

INSTRUMENTS, MUSICAL, may be divided into three classes—stringed, wind, and percussion. Stringed instruments are of three kinds: those whose sounds are produced by friction, as the violin, viola, violoncello, &c.; by twitching with the finger or otherwise, as the harp, guitar, mandoline, &c.; by striking, as the pianoforte and dulcimer. Wind instruments are of two kinds, viz., the reed species—as the hautboy, clarionet, &c.—and the flute species, as the flute, flageolet, &c. The trumpet, horn, trombone, and all similar wind instruments, are generally classed among the reed instruments; but whether the sound is produced by the lips of the blower acting as a reed, or by the compressed stream of air, as in flute instruments, is not yet determined. Percussion instruments are those which on being struck produce only one fixed sound, as the drum, triangle, cymbals, tambourine, &c. Whatever material may be used to form a musical instrument, there are only two means of producing musical sounds, and these are by the vibrations of a fixed elastic body, such as the string of the violin or pianoforte, the reed of the hautboy, bassoon, &c.; or by the vibrations of a confined column of air put into motion by a stream of compressed air, as in the flute, flageolet, and all the ordinary flute species of organ-pipes.

I'NSUCKEN MU'LTURES, in Scotch Law, mean the payments made to the miller by persons who are bound to grind their corn at a particular mill, under a servitude called Thirlage (q. v.). Outsucken multures mean the payment for the mere grinding, which strangers pay; and the insucken multures include that *plus* a small premium, which goes to the proprietor of the mill.

INSU'RANCE, a contract of indemnity, whereby one party, in consideration of a specified payment, called a 'premium,' undertakes to guarantee another against risk of loss. The first principles of insurance would appear to have been acted on at a very early period, since, without attaching undue importance to the opinions of writers who contend, on the authority of Livy, that they were known during the second Punic war, or that the Emperor Claudius can be considered an insurer, because, in order to encourage the importation of corn, he took all the loss or damage it might sustain upon himself—there are yet extant rules of sundry 'guilds,' or social corporations of the Anglo-Saxons, whereby, in return for certain fixed contributions, the members guarantee each other against loss from 'fire, water, robbery, or other calamity.' It was, however, to cover maritime casualties that insurance, viewed in its commercial aspect, seems to have been first undertaken. So early as 1435, the magistrates of Barcelona issued an ordinance relating to this class of business, and we find in the speech of the Lord Keeper Bacon, on opening Queen Elizabeth's first parliament, the allusion, 'doth not the wise merchant, in every adventure of danger, give part to have the rest assured.' The merit of being the first to apply mathematical calculations to the valuation of human life belongs to the famous John de Witt, pensionary counsellor of Holland, whose Report to the States-general, on the valuation of life annuities, has been lately brought to light by Mr Hendriks. The first insurance company established in Britain appears to have been the 'Amicable,' founded in 1696; not the office known by that name now, but the one that still exists as the 'Hand in Hand.' Omitting the gambling and other objectionable projects for which the science of insurance has been held responsible, it would exceed the limits of the present article to give any detailed account of even the more legitimate applications of it which are current at the present day: the traveller can be protected from the pecuniary loss entailed from damage by rail or flood; the gardener from the devastation of the hailstorm; the farmer from the inroads of disease among his cattle; and employer and employed alike reap the benefit of a guarantee on fidelity. 126 established life offices within the United Kingdom appeared in an accredited list published in 1874, and although there were, besides, 66 winding up in Chancery, there is an amount of confidence to be placed in the stability and integrity of the greater number existing, that cannot be exceeded in any other commercial interest. We propose confining our remaining remarks to the divisions of fire, life, and marine insurance.

1. *Fire Insurance.*—Although the business of fire insurance is not founded upon such exact data as can be made available in the practice of life insurance, yet considerable progress has been made by the offices towards a correct classification of the risks they run, and the rates of premium range by slight gradations from a minimum of 1*s.* 6*d.* per cent., which covers an ordinary private dwelling-house, to £3, 3*s.* per cent. and upwards, charged for insuring cotton-mills, sugar-refineries, theatres, and like specially hazardous risks. The average rate of premium received for risks in the United Kingdom may be estimated at 4*s.* per cent. A duty of 3*s.* per cent. per annum used to be levied by government upon all fire insurances, except farming-stock and public hospitals, and the parliamentary returns

made of it afforded valuable statistical information of the total amount insured. The duty paid in the year 1860 amounted to £1,558,608, representing a gross amount insured over the year of £1,039,072,140; and farming-stock, £73,309,898. Since the repeal, in 1869, of the act which levied a duty upon fire insurances, no data remain for estimating the total value of those now effected in this country. The 'Life Assurance Company's Act, 1870,' provided only for the publication of the accounts of such fire offices as do life business also. The local returns made to the Board of Works, upon which to estimate the contributions of the companies for the maintenance of the fire brigade, afford incidentally an interesting proof of the wealth of the metropolis, and of the magnitude of its business operations. Over the area mentioned, which excludes the important warehouses of the Victoria Docks, the returns exhibited by the resident companies of insurances for 1873 shewed a total value of property covered of upwards of £488,500,000. Fire insurance policies are of too familiar use to require explanation here, but one point in connection with them may be noticed: unlike a marine policy, they guarantee the insured to the extent of the whole amount specified in them, without regard to the excess of value of the entire property before the fire, unless an exceptional 'average clause' is attached to the policy.

2. *Life Assurance*, in its widest sense, is a contract entered into by the assurer to pay a certain benefit contingent upon the duration of one or more lives. The 'present value' or single premium corresponding to an assurance of £1, payable at the end of the year of death of an individual, is deduced from the value of an annuity on the same life (see ANNUITY), and is expressed by the formula $v - (1 - v) A_x$, where v is the sum which will amount to £1 in one year (therefore equal to $\frac{1}{1 + r}$, r being the interest of £1 for a year), and A_x is the value of an annuity of £1 per annum on the life aged x.

The more common form in which a life assurance is carried out is, however, by the payment of an annual premium to the company assuring, and this is determined (using the same symbols as above) by the formula $\frac{1}{1 + A_x} - (1 - v)$. The truth of which is thus demonstrated in a popular form by Mr Gray. The present value of an 'immediate' annuity on a life aged x—i. e., of an annuity of which the first payment falls to be made at the commencement of the transaction—being $1 + A_x$, it is easily deduced by proportion that £1 will purchase an immediate annuity of $\frac{1}{1 + A_x}$, the reciprocal of the first value; and this would be the proper premium for the benefit if the latter were paid to the assured at the beginning of the first, and not at the end of the last year of the duration of the policy; but inasmuch as the benefit is not paid until the close of the stipulated period, the difference between its immediate value and its value if due a year hence $(1 - v)$ has to be deducted from each year's premium, and the formula is the result.

The three important elements that have to be taken into account in the calculation of office-premiums are—the rate of interest which is to accrue from their investment, the mortality returns with which the future experience of the insured is expected to agree, and the proportion or 'loading' to be added to the *net* rates to meet expenses of management, and afford a profit to the insurer. The rate of 3 per cent. has, with a very few exceptions, been adopted as a basis for such calculations, as the nearest to what can be expected to be realised on good security for transactions extending over many years. The mortality table most generally in use is that originally published by Mr Milne, derived from the observations of Dr Heysham on the rate of mortality in Carlisle during the nine years 1779 to 1787 inclusive, and hence known as the Carlisle Table. This, however, is now being superseded by the mortality experience of life assurance companies, collected by the Institute of Actuaries, and published in May 1869, exhibiting certainly the most correct standard of assured life in this country, and possessing, by reason of the great skill with which it has been graduated, a complete adaptation for all practical purposes.

The following are examples of *net* premiums calculated on the Institute data:

SINGLE AND ANNUAL PREMIUMS FOR ASSURANCE OF £100, FOR WHOLE OF LIFE—INSTITUTE TABLE H^m, 3 PER CENT.

Age.	Single Premium.			Annual Premium.		
	£	s.	d.	£	s.	d.
20	32	17	9	1	8	7
25	35	16	3	1	12	6
30	39	4	5	1	17	7
35	42	19	0	2	3	10
40	47	1	2	2	11	9
45	51	13	5	3	2	3
50	56	12	3	3	16	0
55	61	17	3	4	14	6
60	67	5	6	5	19	9

For comparison, we append the corresponding premiums, calculated on the Carlisle data:

SINGLE AND ANNUAL PREMIUMS FOR ASSURANCE OF £100, FOR WHOLE OF LIFE—CARLISLE, 3 PER CENT.

Age.	Single Premium.			Annual Premium.		
	£	s.	d.	£	s.	d.
20	33	17	11¼	1	9	10½
25	36	17	10¾	1	14	0¾
30	40	2	6	1	19	0¼
35	43	7	11¼	2	4	8
40	47	3	2	2	11	11¾
45	50	17	8¼	3	0	4¼
50	55	8	7¾	3	12	5¼
55	60	18	11	4	10	10¾
60	66	10	7¼	5	15	9½

The question of the addition to be made to such (net) premiums is influenced by different considerations having regard to the practice of the office using the table.

Assurance companies are divided into three classes: 1. *Proprietary Companies*, being those offices possessing a capital the property of the partners, and which, in addition to the accumulated premiums, is pledged to the policy-holders as a guarantee for the fulfilment of their claims. As the liability in such companies is limited to the net sums assured, the addition made to the premiums requires to be only such a proportion as will cover the actual outlay for management, and remunerate the shareholders for the risk of loss which they run by fluctuation in the mortality, or from bad investments. A comparison of the above premiums with the 'non-participation' rates usually advertised, will shew that the prevailing competition has induced the construction of tables very favourable to the public. 2. *Mutual Offices*, where the members themselves constitute the company, being liable to each other for all claims. Here, in the absence of a capital, it is usual to adopt a scale of premiums known to be in excess of what is required to meet the sums insured. The profit arising therefrom is periodically ascertained, and allotted to the assured, most frequently in the form of 'bonuses' or additions to the claims payable under the policies. Some companies doing a large business are of this class, and in point of stability and irreproachable management bear the highest character. 3. *Mixed Companies* are proprietary companies charging such increased rates as will yield a bonus, but which, in return for the expenses of management and guarantee of their capital, reserve for their proprietors a stipulated proportion of the profits.

It would be beyond our province to deal with the comparative merits of these systems; undoubtedly, offices in which the assured participate in a part or the whole of the profits, have for some years back enjoyed the largest share of public support. Life-assurance, in the abstract, is certainly one of the greatest blessings of modern times. The extent to which it has been made available may be judged from the fact, that the total sum, including vested bonuses, for which the existing offices are liable is above £343,000,000 sterling; the annual premiums payable, therefore, being above ten millions—a sum equal to ⅐th of the net public revenue of the United Kingdom, or nearly half of the entire Customs duties.

A greatly increased facility for making the necessary calculations in connection with life-assurance has been developed within the last few years by the use of 'Commutation Tables,' the invention of Mr George Barrett, and of which a large collection, calculated by Mr D. Jones, is published by the Society for the Diffusion of Useful Knowledge. For the best information on their construction, and other formulæ, the reader is referred to the standard works of De Morgan, Gray, Milne, and the transactions of the Institute of Actuaries, published quarterly. See POST-OFFICE INSURANCE in SUPP.

3. *Marine Insurance.*—Although this branch of the subject does not possess such a general interest as the preceding, it is one that requires quite as great an amount of study and experience to insure its successful prosecution. In estimating the rate of premium, the insurer has to take into account not only the quality of the vessel covered, but the season in which she sails, the known character of her captain, the nature of the commodity carried, and (the contract being an indemnification both against the elements and the enemy) the state of our political relations. Nevertheless, losses at sea, like other incidents, are observed to follow certain laws, and if the average from which the value of the risk is deduced is of sufficiently broad basis, the result over equal intervals of time can be predicted with reasonable certainty. Until 1824, the only *companies* that could grant marine insurances were the 'Royal Exchange' and 'London Assurance;' and although the monopoly of these offices then ceased, and many other companies have since been established, a large portion of the business is, however, still transacted by individual insurers designated 'underwriters.' The underwriters of London form an influential society known as 'Lloyd's' (q. v.), from having originally met in a coffee-house kept by a person of that name in Abchurch Lane; and their extensive business, numerous agents for procuring information, and general influence in the mercantile community, have long gained for them a world-wide reputation. As a small number of risks, viewed in connection with the great hazard to which property at sea is exposed, would not secure a safe average to the individual insurer, he finds it prudent to take but a fractional part of the entire risk on himself, and this is done by subscribing or 'underwriting' the stipulated proportion on a policy drawn out for the whole amount to be covered. The necessity for circulating the policy for this purpose, and otherwise negotiating the insurance, has given rise to another business, that of the 'insurance broker,' with which, however, that of the underwriter is often combined. A system of mutual insurance is frequently carried out by associations of ship-owners forming 'clubs,' by which ship-owners arrange for the mutual insurance of their vessels, or shares of vessels—the various claims arising from loss or accident being met by *pro rata* contributions from the members in proportion to the sums respectively insured by them. Under this system the commission of the ship-broker, although included in the premiums, is saved by the owner.

Marine insurance differs from an ordinary fire insurance, in respect that in case of partial loss the underwriter pays only such a proportion of the sum insured as the damage sustained bears to its whole value at the time of insurance. See AVERAGE. In adjusting a partial loss, it is usual to deduct one-third of the nominal value, for new materials furnished to replace the older destroyed, and labour. Policies are of two kinds, 'valued'—where the insurance is based on a specific bill of lading—and 'open,' where, in case of loss, the value of a ship with her stores is estimated as at the date of sailing, her freight at the amount she would have earned had the voyage terminated favourably, and her cargo at its invoice price, adding premium and all charges. The insurance is binding although the ship may have been lost when the policy was executed, but any warranty, if not true, is held to vitiate the insurance, even although the misstatement is not material to the risk. A stamp-duty, now reduced to a nominal rate, is levied upon all marine insurance policies. In fixing its amount, the choice lies with the insured of doing so with reference to the term of insurance (not exceeding one year), or per single voyage, as follows: By time—for any term not exceeding six months, 3*d*. per £100; exceeding six months, 6*d*. per £100. By voyage, 3*d*. per £100. The rates of premiums for marine insurance have been much increased within the last few years, as a consequence of the number of shipwrecks experienced. For the five years 1851 to 1855 inclusive, the annual average of those reported was 1068; from 1856 to 1860, 1252; from 1861 to 1865, 1538; from 1866 to 1870, 1862—a very great increase.

INSURANCE, IN LAW.—The law on the subject of insurance is substantially the same throughout the United Kingdom.

Fire Insurance.—The contract is generally preceded by proposals, in which case the proposals and policy of insurance must be read together, if the policy refers to these proposals. In order to insure property, the insurer must have some interest in the property insured, for otherwise there would be an inducement to commit arson. But he need not be owner; it is enough that he be accountable for the goods, or hold a lien on them, as a carrier, wharfinger, or bailee. Thus, many carriers keep up a floating policy to cover all goods which may happen to be on their premises within a given period. In all these cases, the words of the policy are the important points; and good faith is required in giving a correct description of the goods or premises, for every statement or representation as to anything that is essential is taken to be a warranty. The premises must not be materially altered during the risk, otherwise the policy will be void; but often the policy stipulates that alterations may be made on giving notice. A person in lodgings may insure his goods, and may safely call the house his 'dwelling-house' for that purpose. But, as a general rule, great care must be taken by the insured not to misrepresent anything material, and not to conceal any extraordinary risk which the insurer ought to know. If a fire happens, either on the premises, or in neighbouring premises, the insurer cannot set up in defence that it was caused by the negligence of the insured or his servant, for these are generally the very things which an insurance is intended to guard against. When a fire happens, it is generally always provided by the policy that notice of the loss is to be sent in, and full particulars of the damage done, and the alleged value, for it is only the actual loss which is insured against, and that only can be recovered. Thus, if a person insures his house or furniture for £600, and damage only to the extent of £50 has been done by fire, he can only recover the £50, for otherwise he would be better off than he was before the fire, and the contract is one merely of indemnity—i. e., it does not add to one's wealth, but merely secures against loss. It is often provided that the annual payment of the premium on a contract of insurance may be paid within 15 days after the first or previous year has expired, but it is dangerous to allow the payment to be postponed so long, for if a fire happen in the interval, the insurer will not in general be liable. Sometimes the same property is insured in several offices, but in that case the insured party can nevertheless only recover the value of his loss once and no more. He can sue either of the insurers, however, for the amount, if each policy cover the whole value, and the party who pays can then recover a proportionate part from the other co-insurers, for they all divide the loss among them. In cases where carriers and others take out a floating policy of fire insurance, the carrier can sue for the full loss of the goods, though far exceeding the extent of his own interest in them, but in that case the owner of the goods destroyed is entitled to recover the balance from the carrier, even though originally he never gave authority to the carrier to insure them. And so, in like manner, if a person is insured, and recovers his loss from the insurer, and then sues a third party for the wrong which caused the loss, the insurer gets the benefit of what may thus be recovered, in diminution of his own loss.

Life Insurance is not a contract of indemnity, like fire insurance, and therefore a person may insure his life in as many insurance offices as he pleases, and his executors will recover the full amount insured from each of the insurers, regardless of the rest. In order, however, to insure a life, the insurer must either himself be 'the life' or must have a pecuniary interest in the life. Thus, a creditor is entitled to insure his debtor's life; a wife may insure her husband's or her own, as if she were unmarried; and he may insure the wife's, if she has an annuity or property settled upon her for life, in which he has an interest. It is enough, also, that the interest of the insurer exist at the time the policy is entered into, and hence, though the interest afterwards cease, he will still be entitled to recover the amount, if the policy is kept up. Thus, a creditor whose debt is satisfied, may still recover on the policy. In entering into contracts of life insurance, scrupulous good faith is exacted in the description of the nature of the life insured, and any fraudulent misrepresentation in a material point is fatal to the insurer's right to recover. Some companies even go the length of inserting in their policies a clause, that if any misrepresentation (i. e., however trifling) be made, the policy will be void. But particular care should be taken to avoid such offices, for the policies taken out on such terms will generally be so much waste paper, as far as any security is concerned. At the same time, it is often dangerous for the insurer to treat lightly any misrepresentation, for in the end the question, whether it is material or not, will be one not for him or his executors, but for a jury, in case an action is brought. When the policy is effected through an agent on the principal's life, and the agent, unconsciously and without the authority of the principal, makes a misrepresentation, this will bind the principal. Where the person whose life is insured commits suicide, or is hanged, the policy is void, unless, in the case of suicide, he was in a state of insanity at the time. The policy, however, frequently has an express provision on this subject, the terms of which will be in that case all-important, and will govern the liability. In case the policy provides, as it often does, for its continuance, if payment after the expiration of the year is made within 15 or 21 days, it is dangerous to run the risk of this interval, for if the party dies during the 15 days before the premium is paid, the policy will not be set up by his executors coming forward to pay within those days. But the policy sometimes expressly allows of this, in which case it will be competent for the executors to make the payment. Life assurances are often assigned in security of a debt, in which case the assignor generally covenants to pay the premiums, so as to keep the security up; and failing payment by the assignor, the assignee is generally authorised to pay them himself, and recover the amount from the assignor. Notice of an assignment of a life policy should always be given to the insurance company, so as to let them know whom they are to pay.

Maritime Insurance is effected either on a voyage from one port to another, in which case it is called a voyage policy, or it is from one given day to another, in which case it is called a time policy. When the value of the property insured is expressed in the policy, it is called a valued policy, and when not so expressed it is an open policy. In general, wagering or gaming policies are void by statute, and the insurer must have some interest in the ship, such as the profits of the voyage or the freight. The insurance of seamen's wages, however, is not competent, for it tends to take away the stimulus of exertion from the crew. When the policy states a fixed sum as the value of the property, and expressly provides that the policy shall be deemed sufficient proof of interest, the insurance is an insurance 'interest or no interest,' and void by the statute. When the policy is a voyage policy, there is an implied warranty by the insurer that the ship is seaworthy at the commencement of the voyage, but there is no such warranty in a time policy. As is the case in fire and life policies, any fraudulent concealment of material circumstances which increase the risk will void the policy. But everything done in the usual course of navigation and trade is presumed to have been foreseen, and in contemplation of both parties. The policy is understood to cover the risk, not only of the perils of the sea, properly so called, but of ignorance or negligence on the part of the master or mariners. But the loss caused by mere tear and wear is not covered by the policy; the cause of the loss must be something fortuitous or accidental. Every policy impliedly assumes that the vessel will proceed straightway to her place of destination, without unnecessary delay. But sometimes, from unforeseen causes, it is absolutely necessary for the master to deviate, in which case, and in which only, the policy will remain good, strict proof, however, being always given of this imperious necessity. When the ship has been so injured or deteriorated as to render it hopeless to restore it, and the repairs will cost more than the ship is worth, the assured may abandon the ship, and claim for a total loss. See AVERAGE.

INTA'GLIO (Ital. 'cutting in'), a term in art, the opposite of relief (see ALTO-RILIEVO), means the representation of a subject by hollowing it out in a gem, or other substance; so that an impression taken from the engraving presents the appearance of a bas-relief.

I'NTEGRAL CALCULUS. See Calculus.

INTEGRA'TION. See Calculus.

I'NTELLECT, the name for the thinking portion of our mental constitution. Mind contains three elementary constituents—Emotion or Feeling, Volition or the Will, and Intelligence or Thought. See Emotion, Will. The intellectual powers are explained in part by their contrast with feeling and will. When we enjoy pleasure or suffer pain, we are said to feel; when we act to procure the one or avoid the other, we put forth voluntary energy; when we remember, compare, reason, our intelligence is exerted.

The powers of the intellect have been variously classified. Among the commonly recognised designations for them, we may mention Memory, Reason, and Imagination, which imply three very distinct applications of our mental forces. Reid classified them as follows: Perception by the Senses, Memory, Conception, Abstraction, Judgment, Reasoning. Stewart added Consciousness, to denote the power of recognising our mental states, as Sensation and Perception make us cognizant of the outer world; likewise Attention (a purely voluntary function, although exerted in the domain of intelligence), Imagination, and the Association of Ideas.

It might be easily shewn that in such a classification as the above there is no fundamental distinctness of function, although there may be some differences in the direction given to the powers. There is not a faculty of Memory which is all memory, and nothing but memory. Reason and Imagination equally involve processes of recollection. And with regard to the Association of Ideas, it has been shewn by Mr Samuel Bailey (*Letters on the Human Mind*) that if this is to be introduced into the explanation of the intellect, it must supersede the other faculties entirely; in short, we must proceed either by faculties (as Memory, Reason, &c.) or by Association, but not by both.

In endeavouring to arrive at a satisfactory account of the human intellect, we must make a deeper analysis than is implied in the foregoing designations. We find at least three facts, or properties, which appear in the present state of our knowledge to be fundamental and distinct, no one in any degree implying the rest, while taken together they are considered sufficient to explain all the operations of Intelligence, strictly so called.

1. Discrimination, or the consciousness of Difference. When we are affected by the difference of two tastes or odours, or sounds or colours—this is neither mere feeling nor volition, but an intelligent act, the foundation of all other exercises of our intelligence. We must recognise the impressions on our senses as differing, before we can be said to have the impression of anything; and the greater our powers of discrimination in any department, as colour, for example, the more intellectual are we in that special region. We could have no memory if we did not first recognise distinctness of character in the objects that act on the senses, and in the feelings that we experience. In some of the senses, discrimination is more delicate than in others; thus, Sight and Hearing give us a greater variety of impressions than Taste or Smell, and are therefore to that extent more intellectual in their nature. In the course of our education, we learn to discriminate many things that we confounded at first. Every craft involves acquired powers of discrimination as well as habits of manipulation. A man is in one respect clever or stupid, according as his perceptions of difference in a given walk are delicate or blunt.

2. The next great intellectual property is Retentiveness, or the property whereby impressions once made persist after the fact, and can be afterwards recovered without the original cause, and by mental forces alone. When the ear is struck by a sonorous wave, we have a sensation of sound, and the mental excitement does not die away because the sound ceases; there is a certain continuing effect, generally, although not always, much feebler than the actual sensation. Nor is this the whole. After the sensation has completely vanished, and been overlaid by many other states of mind, it is possible to evoke the idea of it by inward or mental links, shewing that some abiding trace had been left in the mental system. The means of operating this revival is to be found in the so-called forces of Association. See Association of Ideas.

3. The last great fundamental fact of intellect is Agreement or Similarity. See Association of Ideas.

It is believed that these three properties, in combination with the other two powers of the mind (Feeling and Volition or Will), are adequate to explain all the recognised intellectual faculties or processes—Memory, Reason, Imagination, &c. Memory is almost a pure case of Retentiveness, or Contiguity, aided occasionally by Similarity. Perception by the senses is only another name for Discrimination, the basis of all characteristic mental appreciation of matter or mind. Judgment is either Discrimination or Similarity, according as it discovers difference or agreement in the things judged of.

Sir W. Hamilton, in departing from the common classifications of the intellect, adopted the following division into six faculties or powers. 1. The *Presentative* Faculty, by which he meant the power of recognising the various aspects of the world without and the mind within, called in the one case External Perception; in the other, Self-consciousness, and sometimes Reflection. 2. The *Conservative* Faculty, or Memory proper, meaning the power of storing up impressions, to be afterwards reproduced as occasion requires. 3. The *Reproductive* Faculty, or the means of calling the dormant impressions up into consciousness again. These means are, as stated above, the Associating principles. 4. The *Representative* Faculty, for which Imagination is another name, which determines the greater or less vividness of the impressions or ideas thus reproduced. 5. The *Elaborative* Faculty, or the power of Comparison, by which Classification Generalisation, Abstraction, and Reasoning are performed. This, in fact, is one (not the only) application of the general power of Similarity. Lastly, 6. The *Regulative* Faculty, or the cognition of the *à priori* or supposed instinctive notions of the intellect, as Space, Time, Causation, Necessary Truths, &c. This corresponds to what in German philosophy is called the 'Reason,' as contrasted with 'Understanding,' which deals with experienced or contingent truth.

On examining the above distribution, it will appear that while the first faculty, the Presentative, coincides with the primary fact of Discrimination, the three subsequent, Conservation, Reproduction, Representation, are merely modes or distinct aspects of Retentiveness. All the three must concur in every case of the effective retention or recollection of anything. The last power, the Regulative, is of course disputed by the opposite school, who refuse to recognise a primary or distinct faculty as giving birth to the ideas in question. See Consciousness, Cause.

INTE'MPERANCE. See Intoxication.

INTENDANT, or **INTENDANT MILITAIRE,** an officer in the French army charged with the organisation and direction of all the civil services attending a force in the field. The officers acting under his orders are those in charge of all the finance services, the provisions, stores, hospitals, artillery train, and transport departments, besides the interpreters, guides, and such like temporary services. The *intendant-en-chef* of an army is the representative of the Minister of War; and, short of superseding the general's orders, can exercise, in case of need, all the functions of that high officer of state. The intendance is divided into intendants, ranking with general officers, sub-intendants with colonels, and assistant-intendants with majors; besides cadets, who receive no pay, and constitute a probationary grade.

Intendant was the name given in France before the Revolution to the overseer of a province. Such permanent officers were first appointed by Henry II. (1551). Under the complete system of centralisation established by Richelieu, these intendants, as they were now called, became the mere organs of the royal minister, to the exclusion of all provincial action. To them belonged the proportioning of assessments, the levying of soldiers, &c. The National Assembly, in 1789, established in each department an elective administration. Napoleon virtually restored the intendants, but exchanged the hated name for that of *Prefects* (q. v.).

INTERCA'LARY (Lat. *intercalaris*, for insertion), an epithet applied to those months or days which were occasionally inserted in the calendar, to make it correspond with the solar year. See CALENDAR.

INTERCE'SSION, DOCTRINE OF. Scripture, in many places, represents Christ, after having finished his redemptive work on earth, and ascended into his state of glory and exaltation, as ever pleading with God on behalf of those whom he has redeemed by the shedding of his blood (Rom. viii. 34; Heb. vii. 25; 1 John, ii. 1). Theologians say, however, that we are not to suppose that God needs to be interceded with, as if he were still reluctant to forgive men, or that Christ's intercession makes him more merciful than before. They tell us, that since it is evident from the whole tenor of the New Testament, as well as from a multitude of special passages, that the penal sacrifice of Christ on Calvary reconciled God to man, we must regard the intercessory work of Christ rather as serving to illustrate the eternal holiness of God and the changeless love of the Saviour, and as intended to keep continually in view the sacrifice of atonement on which it is founded. The doctrine of the intercession of Christ is held both by Protestants and Roman Catholics; but the latter, in addition, believe in the efficacy of the intercession of the Virgin and the saints, who, however, do not directly intercede for men with God, but with the Saviour, the sinless One, who alone has the ear of the King of the universe.

INTERCOLUMNIA'TION, in Classic Architecture, the distance between the columns of a building, measured at the bottom of the shaft. The intercolumniation varies in different examples, but the most favourite distance for the columns to be placed apart is 2¼ diameters of the column, which by Vitruvius is called *Eustyle*. The central intercolumniation of a colonnade is frequently made wider than the others when required for access to a gate or door. In Doric architecture, the intercolumniation is decided by the spacing of the triglyphs, the columns being usually placed under the centre of every other triglyph.

INTERCO'MMUNING, LETTERS OF, was an ancient writ issued by the Scotch Privy Council, warning persons not to harbour rebels.

I'NTERDICT, an ecclesiastical censure or penalty in the Roman Catholic Church, consisting in the withdrawal of the administration of certain sacraments, of the celebration of public worship, and of the solemn burial-service. Interdicts are of three kinds—*local*, which affect a particular place, and thus comprehend all, without distinction, who reside therein; *personal*, which only affect a person or persons, and which reach this person or persons, and these alone, no matter where found; and *mixed*, which affect both a place and its inhabitants, so that the latter would be bound by the interdict even outside of its purely local limits. The principle on which this ecclesiastical penalty is founded may be traced in the early discipline of public penance, by which penitents were for a time debarred from the sacraments, and from the privilege of presence at the celebration of the Eucharist; but it was only in the medieval period that, owing to circumstances elsewhere explained (see EXCOMMUNICATION), it came into use as an ordinary church censure in the then frequent conflicts of the ecclesiastical and civil power. It was designed to awaken the national conscience to the nature of the crime, by including all alike in the penalty with which it was visited. The most remarkable interdicts are those laid upon Scotland in 1180 by Alexander III.; on Poland by Gregory VII., on occasion of the murder of Stanislaus at the altar; by Innocent III. on France, under Philippe Auguste, in 1200; and on England under John in 1209. The description of England under the last-named interdict, as detailed by some of the contemporary chroniclers, presents a strangely striking picture of the condition of the public mind, which it is difficult with our modern ideas fully to realise or to understand. It would be a great mistake, however, to suppose that, during the continuance of an interdict, the people were *entirely* destitute of spiritual assistance. The interdict mainly regarded the *solemnities* of public worship; it was permitted to administer baptism, confirmation, and the Eucharist in all cases of urgency; to confess and absolve all who were not personally the guilty participators in the crime which the interdict was meant to punish; to celebrate marriage, but without the solemnities; and to confer orders in cases of necessity. And under the popes Gregory IX., Innocent III. and IV., and Boniface III., still further mitigations of its rigour were introduced, one of which was the removal of the interdict and restoration of public worship on certain great festivals, especially Christmas, Easter, Pentecost, Assumption, and All Souls. The council of Basel enacted very stringent rules as to the use of this penalty, and in later times the general interdict has been entirely disused, although occasionally, in very special circumstances, and to mark the horror of the church for some enormous crime, instances are still recorded in which a particular place or church has been visited with the penalty of a local interdict.

INTERDICT, in Scotch Law, is an order issued by the Court of Session to stop or prohibit a person from doing an illegal or wrongful act. It is obtained on presenting a note of suspension and interdict to the Lord Ordinary on the Bills. The party applying for it must have both title and interest—that is, he must be more than a mere stranger. The principles on which it is granted in Scotland are substantially the same as those in which the parallel Writ of Injunction (q. v.) is granted by the Court of Chancery in England.

INTERDI'CTION is a process peculiar to the law of Scotland, by which persons of imbecile minds may either restrain themselves, if conscious of their weakness—then called voluntary interdiction—or may be restrained by the Court of Session *in invitum*, then called judicial interdiction. The effect of both is to appoint trustees or interdictors, whose consent is necessary to all deeds whereby the imbecile's heritable estate is alienated. See IMBECILITY.

INTERE'SSE TE'RMINI, a term sometimes used in English law to denote the kind of interest which a lessee takes in land when the lease is executed. It amounts to a right of entry on the lands, which is assignable.

INTEREST, the payment due by the borrower of a sum of money to the lender for its use. The interest of £100 for one year is called the rate *per cent.*; the money lent, the principal; and the sum of any principal and its interest, the amount. The current or market rate of interest fluctuates widely, by reason, not, as is often supposed, of the extent of the supply of money, but of the variable rates of profit, as in Holland, where it has always been comparatively low, and in our own time in Australia and California, where mercantile profits being in excess, the rate of interest is relatively high.

A strong prejudice against exacting interest existed in early times, arising from a mistaken view of some enactments of the Mosaic law;[*] and as late as the reign of Edward VI., there was a prohibitory act passed for the alleged reason that 'the charging of interest was a vice most odious and detestable, and contrary to the word of God.' Calvin, the famous reformer, was one of the first to expose the error and impolicy of this view, although a series of enactments, known as the Usury Laws, to some extent perpetuated it, by an attempted restriction of the maximum rate to be paid. In England, this rate was fixed by act 21 James I. at 8 per cent. During the Commonwealth, it was reduced to 6 per cent.; and by the act 12 Anne, c. 16, to 5 per cent., at which rate it stood till 1839, when the law was repealed. In Scotland, any charge for interest was prohibited before the Reformation. In 1587, the rate was fixed by law at 10 per cent.; in 1633, at 8 per cent.; in 1661, at 6 per cent.; and by the act of Anne, as above noted, at 5 per cent. It is now admitted that the operation of such laws tended only to raise the real rate of interest, by driving men in distress to adopt extravagant methods of raising money—the bonuses thus paid being really and in effect an addition to the nominal interest.

Interest is computed on either of two principles: 1. Simple interest, where, should the interest not be paid as due, no interest is charged upon the arrears. Although this mode of reckoning has little to recommend it in reason, it is adopted in many transactions, and receives the sanction of the law. The computation of simple interest is easy, it being only necessary to calculate the product of the principal, the rate per cent., and the period in years and fractions of a year, the result, divided by 100, giving the sum required. Thus, wanted the interest of £356, 6*s.* 8*d.* for 3½ years at 4 per cent.

356⅓ × 3½ × 4 ÷ 100 = £49, 17*s.* 9*d.*

2. Compound interest is the charge made where—the interest not being paid when due—it is added to the principal, forming the amount upon which the subsequent year's interest is computed. The rules for most readily making computations by compound interest can only be effectively expressed algebraically, and, using the symbols in article DISCOUNT, we annex a few of the elementary formulæ.

1. Since £1, increased by its interest r, at the end of one year becomes $1 + r$, this amount at the end of the second year becomes $(1 + r)^2$, and generally at the end of the n^{th} year $(1 + r)^n$. Example: To find the amount of £1, improved at 5 per cent. for six years. r, the interest for £1, is ·05, and $n = 6$; therefore $(1·05)^6 = 1·34$, or £1, 6*s.* 9½*d.* 2. Since £1 becomes in one year $1 + r$, it is found by ordinary proportion that the fraction of £1 which will amount to £1 in a year is $(1 + r)^{-1}$ $\left(\text{i. e., } \frac{1}{1+r}\right)$ $= v$; and reasoning as above, the sum which will amount to £1 n years hence is $(1 + r)^{-n} = v^n$. 3. The amount of £1 in n years being $(1 + r)^n$, it will be seen that the excess of this sum over the original £1 invested, or $(1 + r)^n - 1$, is the amount of an annual increment or 'annuity' of £r for the period, and from this, by proportion, is deduced the formula for the amount of an annuity of £1 for the same time, being

$$\frac{1}{r}\ (1 + r)^n - 1.$$

4. Reasoning as in (3), the present value of an annuity certain of £1 for n years, or the sum which, improved at interest, will meet the annuity is

$$\frac{1}{r}\left[1 - \frac{1}{(1 + r)^n}\right] = \frac{1 - v^n}{r}$$

Tables for the four classes of values above described, based on various rates of interest, are given in most works on annuities. Those by Mr Rance are computed for each quarter per cent. from ¼ to 10 per cent. It may be useful to note two results that can be easily deduced from a table of the present values of annuities (4). 1. The annuity which £1 will purchase for any number of years is the reciprocal of the corresponding value in such a table. Example: A person borrows £100, to be repaid by annuity in 15 years, with interest at 5 per cent.; required the annuity? The present value of an annuity of £1 per annum for that period, at the rate stated, is £10·38, and $100 \times 10·38^{-1} = 9·6342$ = £9, 12*s.* 8¼*d.* 2. To find the annuity which in a given period will amount to £1—subtract from the annuity that £1 will purchase, ascertained as above, r, the interest of £1 for a year. Example: The annuity which, paid for 15 years, will amount to £1, taking interest at 5 per cent. is—

Value of annuity which £1 will purchase as last found, ...	£·096342
Subtract r, at 5 per cent., ...	·050000
Annuity required, . . .	£·046342

Or £4, 12*s.* 8¼*d.* will amount in 15 years to £100.

INTEREST, IN LAW.—In England and Ireland, when a debt has been for some time due, there is no obligation imposed on the debtor by the common law to pay any interest whatever, though the sum has been fixed and often demanded. The creditor can always sue for his debt, which is his proper remedy, but he derives no benefit from giving time to his debtor. Therefore, if interest is to be paid, this must be, as a general rule, by virtue of express agreement. Nevertheless, there has always been one or two exceptions to this rule. Thus, by the usage of merchants, it has always been usual, when an action has been brought to recover the amount of a bill of exchange or promissory-note, for the jury to add interest from the time it was due; but even this was not a matter of course—it was a matter of discretion for the jury, and was generally withheld when there was delay in bringing the action. Another exception existed in the case of money due upon an award by an arbitrator, in which case interest is due from the day when the award was made. A third exception was in the case of a bond for money, in which case interest was added from the day it ought to have been paid. And lastly, if a surety had to pay money for his principal, he could recover it back with interest. In all other cases, if there was no express agreement about interest, none could be claimed. If, however, there was a course of dealing between the parties, or a usage affecting a particular trade to give interest, then, without express agreement, this was understood. A recent statute somewhat amended the above defect of the common law, for by 3 and 4 Will. IV. c. 42, s. 28, a jury may now add interest at the ordinary rate on all debts or sums certain, which are made payable under some written instrument at a certain time; and even if not due under a written instrument, then if a written demand has been made, expressly giving notice that interest will be charged from and after the date of the demand, if not paid then, interest will also be due. But even in these last cases, it is discretionary in the jury to give the interest, and therefore it is not claimable as a matter of course. As regards compound interest, it is *à fortiori* not claimable in any case, except where it has been expressly stipulated for, or where there is in some particular trade a definite custom to pay interest, and such custom must always be proved.

---

[*] See Exodus, xxii. 25; Leviticus, xxv. 39; Deuteronomy, xxiv. 19: the application being to money lent for the relief of distress, and not advanced to the borrower that he might improve it.

It ought also to be added, that the Court of Chancery has always been in the habit of charging trustees who have misapplied funds with 5 per cent. interest on the amount, and also compound interest; but in simple cases of retaining moneys in hand without investing them, they have been charged 4 per cent. Formerly, it was prohibited by statute in England to lend money on the security of real estate at a higher rate than 5 per cent.; but these statutes have been abolished, and now any person may borrow or lend at whatever rate of interest he can agree with the other party. Pawnbrokers are allowed to charge interest not exceeding a fixed sum. See PAWNBROKING.

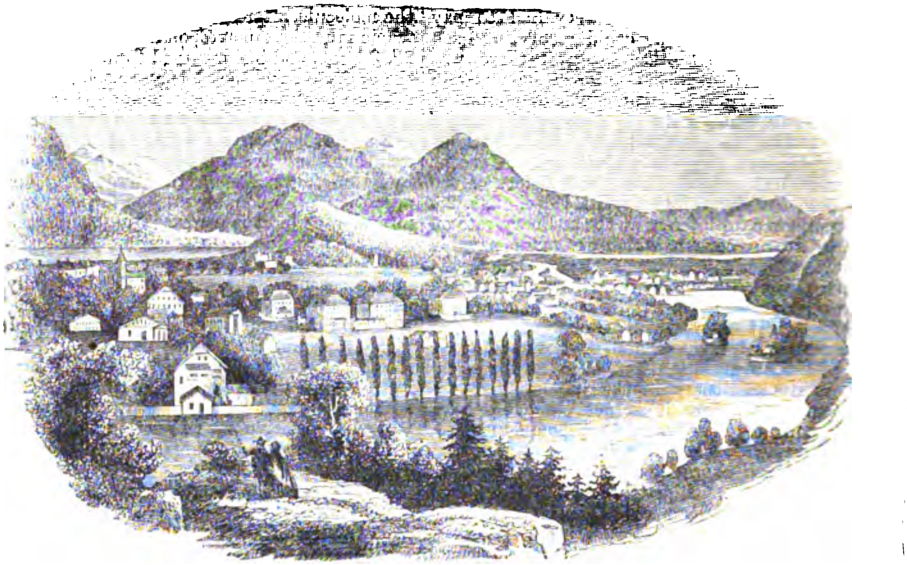
In Scotland, the law has always been much more liberal in allowing interest to be claimed on outstanding debts, for there the converse principle was acted on, that on nearly all debts whatever, interest was claimable either by statute or by common law. Thus, interest is due on bills of exchange, on the amount contained in a horning or charge to pay, on sums paid by cautioners, on the price of lands sold, on money advanced at request, on the price of goods sold, if the usual time of credit has expired, and generally on all debts which there has been delay in paying.

INTERFE'RENCE, a term employed to express the effect which rays of light, after being bent or diffracted, produce on each other. If the rays meet after diffraction, their light, when allowed to fall on a surface, will be divided into bars or stripes, alternately light and dark, as is shewn in the article DIFFRACTION (q. v.). This phenomenon has been made the touchstone of the two rival theories of light, the *undulatory* and the *emission*. According to the former, it is thus explained: if two luminous waves simultaneously impel a molecule of ether, its motion will be the resultant of the original impulses; and if the two motions (as in the case of diffraction) be nearly in the same direction, the resultant will be nearly their sum; if opposite, their difference. Thus, when a particle has begun to undulate from the action of a luminous wave, and if, while in motion, another wave impinge upon it, the result will be increase of light, if the motion of the second wave conspire with that of the first; but a decrease, if they oppose each other; and total darkness, if, while opposing, they are equal in velocity. Let d be the distance corresponding to a complete period of vibration; then, if the second wave impinge upon the molecule after it has accomplished one or more whole vibrations corresponding to the distances d, $2d$, $3d$, &c., and has returned to its original position, the two waves will evidently conspire together, and produce more violent motion; but if it impinge on the molecule, when the latter has only accomplished half a vibration, corresponding to distances $\frac{1}{2}d$, $\frac{3}{2}d$, $\frac{5}{2}d$, &c., then the wave will oppose the particle's return to its original position; thus producing diminution of motion, or, if equal, rest. In the former case, the intensity of light is increased; in the latter, diminished; and if the undulations are of equal velocity, the light is doubled in the first case, and destroyed in the second. The emission theory totally fails to explain interference. In light of different colours, the value of d differs for each colour, being least for violet, and greatest for red light. The principle of interference accounts in the most satisfactory way for the colours of thin plates, the fringes that accompany shadows, &c.; and its explanation forms the most decisive reason yet known for adopting the *undulatory* in preference to the *emission* theory of light. See LIGHT.

INTERJE'CTIONS are exclamations expressive not so much of a thought as of an emotion—as, ah! alas! hurrah! pooh! They are, therefore, hardly parts of speech, and never form part of a sentence. They are, in fact, more akin to the sounds emitted by the lower animals, than to articulate language.

I'NTERIM, in the history of the Reformation, the name given to certain edicts of the German emperor for the regulation of religious and ecclesiastical matters 'in the meantime' (Lat. *interim*), till they could be decided by a general council. The first is the *Ratisbon Interim*, the result of the deliberations of a commission appointed during the diet of Ratisbon (Regensburg) in 1541, of which Eck, Pflug, and Gropper were the Roman Catholic, and Melancthon, Bucer, and Pistorius the Protestant members. On the greater number of doctrinal points, the commission found it possible to agree on terms which might be deemed consistent with the views of both parties; but as to the sacraments and the power of the church, the differences were irreconcilable. By the Protestants in general, the whole movement was looked on as a scheme to entrap them into a formal return to the Church of Rome. At the next diet, at Augsburg in 1548, a new interim was by the emperor's command prepared by Pflug, Helding (Sidonius), and Agricola. It is called the *Augsburg Interim*. In it the use of the cup by the laity, the marriage of priests, and some other minor things, were conceded to the Protestants; but it met with very general opposition, particularly in the north of Germany, and was revoked in 1552. By the exertions of the Elector Maurice of Saxony, a third interim, the *Leipsic Interim*, was adopted at the diet of Leipsic on 22d December 1548, which guarded the Protestant creed, but admitted great part of the Roman Catholic ceremonial, and recognised the power of popes and bishops, when not abused. But the offence given to the more zealous Protestants by this interim, which Melancthon, Bugenhagen, and Major supported, led to division in the Protestant Church.

INTERLA'KEN ('between the lakes'), a village of Switzerland, is delightfully situated on the right bank of the Aare, in a plain between Lakes Thun and Brienz. Along the *Walnut Avenue* or *Highway*, between the lakes, there is an almost uninterrupted line of hotels or *pensions*. Within a few miles of the village are many of the most wonderful sights that the country affords. Ten miles southward is the Staubbach (the 'sky-born waterfall'), with its perpetual iris; a few miles further south, and is full view from the village, are the magnificent Jungfrau and several other remarkable peaks of the Bernese Alps. The visitors are the chief source of income to the inhabitants, who number only about 1370.



View of Interlaken and Unterseen.

INTERLINEA'TIONS in a deed are additions or corrections written either on the margin or between the lines. In England, interlineations in a deed are not fatal, provided only it is proved that they were made before executing the deed. It is usual to put the parties' initials opposite the place where the interlineations occur, in proof of this, or at least by way of memorandum. In affidavits and other documents, the initials should also be put at the places interlined. In Scotland, if the interlineation is at all material, it ought to be signed by the parties, and the fact mentioned in the testing clause, otherwise it will be presumed that the interlineations were made after the execution, and will vitiate the deed.

INTERLO'CUTOR, in Scotch Law, means a finding or judgment of a judge or court in a cause. In England, the word is not used.

INTERLO'CUTORY JUDGMENT, in England, Ireland, and Scotland, means a judgment which is not final, but which is merely a step in the suit or action. So as to interlocutory decrees or orders.

I'NTERLUDE, in Music, is a short melodious phrase played by the organist (generally extempore) between the verses of a psalm-tune. In the German Protestant Church, the interlude (or *zwischenspiel*) is generally played between each line of the verse, to give the congregation time to breathe. To accompany the *choräle* of the Lutheran Church with scientific and appropriate interludes, is reckoned in Germany the chief test of a good organist.

INTERMA'RRIAGE. The intermarriage or intercourse of near relatives has been universally believed to entail degeneration upon the offspring, and the act has been condemned and *prohibited*. The physical deformity and mental debasement of the Cagots of the Pyrenees, of the Marrons of Auvergne, of the Sarrasins of Dauphiné, *of the* Cretins of the Alps, and the gradual deterioration of the slave population of America, have been attributed to the consanguineous alliances which are unavoidable among these unfortunate peoples. More recently, the same opinion has been supported by the history of deaf-mutism and *of idiocy*. Of 235 deaf and dumb children whose parentage could be traced, 70, or nearly 30 per cent., were the offspring of the intermarriage of blood-relations. But in opposition to, and apparently destructive of such an hypothesis, may be adduced the unimpaired condition and symmetry of the Jews, of the small Mohammedan communities in India, of the isolated tribes in North America, among whom the repeated intermarriage of near relatives is compulsory. Moreover, this opinion does not hold in the analogous cases among the inferior animals, as the Arabs can trace the pedigree of their most valuable horses to the time of Mohammed, whilst they avoid all crossing; the stud-books in this country record the ascendants of racers for 200 years, and shew the perpetuation of the qualities of strength and weight, and fleetness by propagation within the endowed family, both Eclipse and Childers being descended from a horse the offspring of a parent and foal; and the descendants, again, of these horses, which still maintain the highest estimation, afford many instances of very close breeding; and lastly, the Durham ox and the Ditchely sheep were the result and triumph of breeding in and in. The present state of the controversy, as it has been recently conducted in France, may be summed up in the proposition, that consanguineous alliances are not necessarily hurtful to the offspring, provided the parents be healthy and robust; but the observations of Devay and Bemiss in America shew that such generalisations should be received with caution. It should be added, that even were it established that mental disease generally followed such unions, the transmission might depend rather upon the increased certainty of reproducing hereditary tendencies, than upon the violation of any physiological law.—Steinau, *Essay on Hereditary Diseases and Intermarriage;* Devay, *Du Danger des Mariages Consanguins* (1862); Boudin, *Dangers des Unions Consanguins,* &c.; *Annales d'Hygiène Publique, Juillet* (1862).

INTERME'DIATE HARMONIES, in Music, are the harmonies introduced between extreme non-related keys, while modulating from the one key to the other, which harmonies prepare the ear to receive the new key.

INTERME'ZZO, a short dramatic comic scene, with singing, peculiar to the Italian stage, and introduced between the acts of an opera or play.

INTERMI'TTENT FEVER. See AGUE.

INTERNA'TIONAL LAW is divided into public international law and private international law. 1. *Public International Law,* or the law of nations, consists of those rules which independent nations agree among themselves to be just and fair in regulating their dealings with each other in times of war and peace. The mode in which they arrive at this common understanding of what is just and fair, is by comparing the opinions of text-writers who profess to set forth and collect the general opinion of civilised nations, for all these writers appeal ultimately to the principles of natural reason and common sense, as the test of what they profess to be the proper rule. Treaties of peace, alliance, and commerce also define and modify the existing international law as between the contracting parties. The decisions of prize-courts, which profess to proceed on principles of natural justice, of universal application, are also declarations of this international law. The leading doctrines thus adopted are as follows: A sovereign state is one which governs itself independently of foreign powers. In the event of a civil war in one nation, other nations may remain indifferent spectators, and treat the ancient government as sovereign, and the government *de facto* as entitled to the rights of war against its enemy. If the foreign state profess neutrality, it is bound to allow impartially to both belligerent parties the free exercise of those rights which war gives to public enemies against each other, such as the right of blockade, and of capturing contraband and enemy's property. Where a colony or province asserts its independence, and has shewn its ability to maintain this independence, the recognition of its sovereignty by other foreign states is a question of policy and prudence only; but until acknowledged, courts of justice and private individuals are bound to consider the ancient state of things as remaining unaltered. When a change occurs in the person of the sovereign, or in the internal constitution of a state, all treaties made by such state which were not personal to the former sovereign, continue to be binding on the succeeding sovereign.

All sovereign states are, in the eye of international law, on a footing of equality. Each state has the right to require the military service of its own people for purposes of self-defence, and to develop all its resources in the manner it thinks fit, so long as it does not interfere with the same equal rights of other nations. When, however, one state unduly aggrandises itself, and augments its military and naval forces beyond what all the other states consider proportioned to its position, then those other states have some ground to interfere. This, however, is considered a delicate business, and not to be attempted rashly; and it is difficult to define what is a just ground of interference. The acquisition of colonies and dependencies has never been considered a just motive for such interference. According to Wheaton (*International Law,* 88, 6th ed.), interferences to preserve the balance of power have been generally confined to prevent a sovereign, already powerful, from incorporating conquered provinces into his territory, or increasing a dictatorial influence over the councils and conduct of other independent states. The aversion to interference has no doubt, in modern times, become stronger and stronger; and it may be taken to be now almost an axiom, that no foreign state has any just ground of interfering in what is merely an internal revolution of a state, or a mode of readjusting its own constitution; in short, each state ought to be allowed to manage its own internal affairs, and to choose whatever form of government best suits the people, for the exercise of this right can, in general, nowise affect other states.

Each state has the natural right to make its own laws regulating the property and status of all the subjects within its territory. On the high seas, both the public and private vessels of every nation are subject to the jurisdiction of the state to which they belong. Offences there committed against its own municipal laws give to the state to which the vessels belong jurisdiction; but no right of visitation and search belongs to a nation in time of peace, though piracy and other offences against the law of nations, being crimes not against any particular nation, but against all mankind, may be punished by any state in which the offenders can be found. The traffic in slaves is, however, not classed with piracy by the law of nations, though nations may declare it to be so as regards their own subjects; and they may also enter into a compact as to that matter, as has been done by Great Britain with other nations. With regard to crimes and their punishment, though each state will punish all crimes by whomsoever committed, if committed within its own territory, and also all crimes committed in its public and private vessels on the high seas, or in a foreign port; likewise all crimes, wherever committed, by one of its own subjects, yet it cannot arrest one of its own citizens if he is within the territory of another state; to do so would be an invasion of the municipal law of that state; hence it can only arrest its criminals in foreign states by the leave of such state, and such state is not bound to accede to such a request. Hence arises the expediency of two states entering into an extradition treaty, by which they bind themselves to give up to each other criminals who have committed certain specified offences.

There are certain usages or ceremonials of respect shewn by one nation to another in certain circumstances, and these are founded on the theory of the equality of sovereign states. As regards the right of precedence among kings, emperors, and princes, there is nothing settled and binding, except, perhaps, that Catholic powers concede the precedency to the pope. But as regards minor matters, it is the settled courtesy for one nation to salute by striking the flag or the sails, or by firing a certain number of guns on approaching a fleet or a ship of war, or entering a fortified port or harbour. Sometimes these ceremonials are regulated by express treaty, as, for example, as regards the maritime honours formerly exacted by Denmark from vessels passing the Sound and Belts at the entrance of the Baltic Sea.

The rights of states in time of peace consist of the rights of legation and of negotiation. Every independent state has a right, in point of courtesy and usage, to send public ministers or representatives to, and receive ministers from, any other sovereign state with which it desires to maintain relations of peace and amity. See Ambassador; Envoy; Chargés d'Affaires; Consul.

When war is commenced between two countries, there are certain rights acknowledged to exist towards each other. Before war is proclaimed, intermediate methods are sometimes adopted, with a view to avoid that last necessity; these are laying an embargo on the ships or property of the offending state found in the territory of the offended state; also taking forcible possession of the thing in controversy, also retaliating and making reprisals. When war is once declared, the first step is to seize and confiscate all the enemy's property within the territory. It becomes unlawful for the subjects of each belligerent state to trade with the subjects of the other belligerent. The test of whether a person is a subject of either state is generally his domicile; so the character of ships depends on the national character of the owner, as ascertained by his domicile. As regards the conduct of one belligerent state against the other, some writers have laid it down, that everything is fair against an enemy, and that no means of punishment are too severe; but this rigid rule has been qualified by the more humane practice of modern times. Instead of putting prisoners of war to death, the practice is to exchange or discharge them on conditions. Instead of indiscriminate destruction of the enemy's property, temples, public edifices, monuments of art and science, are spared. The laws of war are more unsparing at sea than on land; the practice prevails of commissioning privateers to prey on the commerce of the enemy, the captor being in general entitled to the property. When property taken is recaptured, states differ as to the mode of dealing with the property recaptured. The validity of a capture at sea must be determined in a prize court of the captor's country or of an ally, and the prize court professes to act on universal principles applicable to all countries.

As regards neutrals in time of war, the leading doctrines are stated under the heads Contraband of War; Blockade; Foreign Enlistment Act.

At the Congress of Paris, 1856, the ambassadors of Great Britain, France, Russia, Austria, Prussia, Turkey, and Sardinia, agreed to a joint declaration, modifying the state of the laws of war as follows: 1. To abolish privateering; 2. To adopt the maxim, 'free ships free goods'—i. e., an enemy's goods shall not be taken in a neutral ship unless they are contraband of war; 3. To allow a neutral's goods in an enemy's ship to be free except as to contraband; 4. To abolish blockades unless they are real, and kept up by an effective force. These declarations were not acceded to by America, because it objected to the abolition of privateering, so that though, in the event of war between the countries which agreed in the declaration, the above modifications will probably be adopted, this will not be the case in the event of America being at war with one or other of these parties. See Wheaton's *International Law*; Mackenzie's *Studies in Roman Law*; Macqueen's *Chief Points in the Laws of War*.

2. *Private International Law* is that collection of laws that regulates the mode in which ordinary courts of justice administer the remedies and give effect to the rights of parties where such rights were acquired partly or wholly in a foreign country, and where different remedies must otherwise have necessarily applied. In such cases, the court which administers the remedy, acting on what is called the courtesy of nations, or *comitas gentium*, endeavours to put the parties in the same position as if they were still bound by the foreign laws, and gives effect to those laws so far as they do not conflict with the native laws in essential principles. The fundamental doctrine which underlies this branch of law is, that each subject of a foreign independent state is entitled to have the protection of his own laws, so far as is compatible with the equal independence of the state whose courts administer the remedy, and hence, though a court can in general only administer the laws of its own state, it may, *pro hac vice*, incorporate part of the foreign laws as part of its own remedies. Accordingly, in carrying out this doctrine, certain fair and equitable rules are adopted in dealing with foreigners in certain situations, the chief of which arise out of the heads of marriage, death, intestacy, and remedies generally.

This branch of the law has been long cultivated by the continental countries of Europe, where many learned jurists have discussed its principles. But probably owing to the insular position of the United Kingdom, little attention was given to it there; and indeed no work even incidentally treated of the subject until Mr Justice Story, an American judge, in 1834, first produced his celebrated treatise on the *Conflict of Laws*, and gave to British lawyers a methodical view of the results at which foreign jurists had arrived. In the United States, where each independent state had its own municipal laws, which often differed materially from those of the other federal states, it was natural and inevitable that some system should be adopted as to the way each state should deal with the rights of persons coming from the neighbouring states; and hence America preceded England in the development of this branch of the law. Story's work is still the standard authority in the United Kingdom. Since the laws of Scotland differ in many respects from those of England and Ireland, and each country has its own courts exercising independent jurisdiction, it is a matter of course that questions of conflict under these two codes of law should often arise. Not only do the courts of Scotland and England treat the laws of the other country as foreign laws, and deal with each other in much the same way as they would deal with France or any other foreign country, but the laws in other respects are materially different, and give rise to conflicts. On this particular branch of the law affecting England and Scotland, Mr Paterson's *Compendium of English and Scotch Law* contains a summary of all the material differences existing between the laws of these two countries, that are of the greatest practical importance to residents in the United Kingdom.

As regards marriage, the leading doctrine of the *comitas gentium* is, that it is immaterial in what part of the world a man is married provided he is married, and when once married according to the law of the place where he then is, such marriage will be held a valid marriage all the world over, and wherever he goes. This doctrine, however, is qualified in this way, that the *lex loci contractus*—i. e., the law of the place where the marriage was contracted—shall regulate the validity of the marriage only so far as any ceremony is essential to the institution of marriage; but it is not allowed to dictate who the parties are who may validly marry, nor to vary any essential part of the contract. The reason of the latter qualification is, that there may be rules of policy in one country which may prohibit marriages between certain persons, or may prohibit certain consequences, and therefore the evasion of the native law by persons going abroad for such a purpose is not to be tolerated. For example, in Scotland, marriage is treated as a mere contract, which requires no particular ceremony beyond mere mutual consent; while in England some ceremony is absolutely essential—viz., the ceremony of the marriage being celebrated in a parish church by a priest, or in a superintendent-registrar's office, if there is no priest. Accordingly, any two English persons may go to Scotland, and be married there by exchanging a verbal declaration of marriage; and if one had resided there 21 days before, they will be held to be married persons, and may immediately return to England, if so disposed. On the other hand, if two Scotch persons go to England, they cannot be married by exchanging mere verbal declarations; they must be married, according to the English law, either by a priest in a church, or without one in a superintendent-registrar's office; and if so, they will be held to be married all the world over. Again, the law of England declares that no marriage shall be valid within certain prohibited degrees, and amongst others no man is there allowed to marry his deceased wife's sister. Hence, if a man and his deceased wife's sister go from England to Denmark, where the law allows such persons to marry, and they there are married according to the form there prevailing, and then return to England, where their domicile is, they will not be treated as married persons, because they went to evade their own law in a matter which is considered of vital importance. It would, however, be different if a man and his deceased wife's sister, who were Danes, and domiciled in Denmark at the time of their marriage, came afterwards to this country; they would in that case be treated as properly married, for their domicile was then Danish, and they had a right to follow their own law.

Another important head of international law is as to the law which regulates the succession to the property of a person deceased. On this subject, the rule is, that it is the law of the country in which a man was domiciled at the time of his death which regulates the succession to his personal property, even though such property is scattered over all parts of the world; hence, it is necessary first to ascertain where the deceased person had his domicile. See DOMICILE. The above rule as to the domicile of a deceased person governing the succession applies only to his personal property; as to his landed or real property, the succession to it is governed by the law of the country where such land is situated. Hence, if an Englishman dies domiciled in England, leaving a Scotch estate, such estate will descend according to the Scotch, and not the English law, and it is well known the rules of succession differ materially in the two countries. See Paterson's *Compendium of English and Scotch Law.* Where the person does not die intestate, but leaves a will, then it is now, by statute, almost immaterial whether his will was made according to English or Scotch law.

Another important head of private international law is as to the court in which a remedy can be obtained on ordinary contracts. The rule is, that wherever a contract was made, the contract must be valid according to the law of the place where it was made, but the remedy may be had anywhere else wherever the defendant can be found. Thus, if a person makes a contract or incurs a debt in Scotland, and afterwards goes to England, he may be sued in the English courts, though the English court will only allow the remedy, provided the contract was valid according to Scotch law. It follows also from this rule that if a debt be incurred in Scotland which would prescribe in three years, yet, if the debtor be in England, he can be sued any time within six years, for that is part of the English remedy. It is often of no small importance to know where and in what country a person may be sued. The general rule is, that one must follow his debtor, and sue the debtor in whatever country such debtor resides. In this respect, however, Scotchmen have greater advantages over Englishmen than Englishmen over Scotchmen, for while the rule in England is, that a Scotchman can only be sued there in ordinary cases, provided such Scotchman is actually present in England, and can be personally served with process of the court—i. e., with a copy of a writ of summons—in Scotland the rule is, that in many cases an Englishman can be sued though he never in his life were in Scotland at all; it is enough if he has some debt due to him there, or has left some trifling article of property—such, for example, as his umbrella—which can be arrested. In the latter case, the chattel or debt is first seized by the Scotch creditor, in order to found jurisdiction, or, as it is technically called, *arrestum jurisdictionis fundandæ causa*, and then the Englishman can be sued, and judgment may be obtained against him in his absence, even though he never heard of the action. Englishmen have often complained of this as a barbarous practice of the Scotch courts; nevertheless, the very same practice exists in the city of London, though nowhere else in England. When judgment is once obtained either in England, Scotland, or Ireland, it is now competent for the judgment creditor at once to attach or seize the goods of the debtor in either of the two other countries, if in the meantime the debtor has gone there. The creditor used formerly a fresh action in the new country to which the debtor had removed, and went over precisely the same process again. This circuitous process has been at last effectually remedied by an act of parliament, which allows execution to follow judgment in any of the three kingdoms, except where a Scotch judgment was founded on arrestment only.

INTERPLEADER SUIT is a suit brought in the Court of Chancery in England or Ireland to determine which of several parties claiming the same thing is entitled. Formerly, there was no analogous process in courts of common law whereby several parties claiming one thing could be brought into the field to contest their claims, but in 1831 a statute gave power to do this to a limited extent. The corresponding process in the law of Scotland is an action of Multiplepoinding (q. v.).

INTERPOLATION, the insertion of a word, line, verse, sentence, part of a sentence, or whole passage, generally with a view to secure respect for some opinion by the apparent support of antiquity, or of those whose authority is greatest. Many instances of interpolation are well known, and others are with great probability suspected, in which the works of early Christian writers have been tampered with, to make them yield support to novel doctrines and practices.—In mathematics, interpolation is the insertion between two members of a series increasing according to a certain law, of other members such as, if not absolutely, yet very nearly, may accord with the same law.

I'NTERVAL, in Music, is the difference of pitch between sounds in respect to height or depth, or the distance on the stave from one note to another, in opposition to the unison, which is two sounds exactly of the same pitch. From the nature of our system of musical notation, which is on five lines and the four intervening spaces, and from the notes of the scale being named by the first seven letters of the alphabet, with repetitions in every octave, it follows that there can only be six different intervals in the natural diatonic scale until the octave of the unison be attained. To reckon from C upwards, we find the following intervals; thus, C to D is a second; C to E is a third; C to F is a fourth; C to G, a fifth; C to A, a sixth; C to B, a seventh; and from C to C is the octave, or the beginning of a similar series. Intervals above the octave are therefore merely a repetition of those an octave lower; thus from C to D, above the octave, although sometimes necessarily called a ninth, is neither more nor less than the same interval which, at an octave lower, is termed the second. A flat or a sharp placed before either of the notes of an interval does not alter the name of the interval, although it affects its quality; for example, from C to G♯ is still a fifth, notwithstanding that the G is raised a semitone by the sharp. Intervals are classified as Perfect, Major, and Minor. Perfect intervals are those which admit of no change whatever without destroying their consonance; these are the fourth, fifth, and the octave. Intervals which admit of being raised or lowered a semitone, and are still consonant, are distinguished by the term *Major* or *Minor*, according as the distance between the notes of the interval is large or small. Such intervals are the third and sixth; for example, from C to E is a major third, the consonance being in the proportion of 5 to 4; when the E is lowered a semitone by a flat, the interval is still consonant, but in the proportion of 6 to 5, and is called a minor third. The same description applies to the interval of the sixth from C to A, and from C to A flat. The second and seventh, though reckoned as dissonances, are also distinguished as major and minor. The terms 'extreme sharp' and 'diminished' are applied to intervals when they are still further elevated or depressed by a sharp or a flat. For the mathematical proportions of intervals, see HARMONICS.

INTE'STACY, the state of a person who has died without leaving a will. Every person in the United Kingdom has the right, as one of the incidents of ownership, of regulating the succession of his property after his death; that is, of executing a will which must comply with certain requisites, so as to shew that it was solemnly and deliberately made, by which will the owner can give his property to whomsoever he pleases. The forms in Scotland differ from those in England and Ireland, and there is some restriction on the right of testing or bequeathing property, but in all places the principle is, that if no will, or deed equivalent to a will, is executed, or, if a will executed is invalid from defect of form, then an intestacy occurs, and the law provides an heir or next of kin, in lieu of the owner himself doing so. See HEIR; SUCCESSION; WILL. A person may die partially intestate, for his will may have included only some of his property, in which case the property not so included goes to the heir-at-law, or next of kin, according as it is real or personal estate, as if no will had been made. But it is often a difficult question in construing the will, whether the property not specially mentioned was not conveyed by general words to the residuary legatee or devisee—a question which turns entirely on the language used in each case.

INTE'STINES. See DIGESTION, ORGANS AND PROCESS OF.

INTO'NING, according to the general use of the word, is the recitative form of offering prayer. Intoning differs from ordinary reading in having fewer inflections of the voice, and these only at stated parts of the prayers, and according to certain rules. The greater part of the prayer is recited on one note, the last two or three words being sung to the proximate notes of the scale. In the longer prayers, the terminal inflection is generally omitted. The words Intoning and Chanting are sometimes used interchangeably, but, though there is ground common to both, each has a domain peculiar to itself. Intoning may be defined as ecclesiastical recitative, and when several voices are employed in its performance, they sing, for the most part, in unison, breaking into harmony at the termination of the clause or sentence. Chanting embraces recitative and rhythm, both divisions being in continuous harmony. In the Anglican service, as performed in cathedral churches, all those parts of the ritual, speaking generally, which are not set to rhythmical music are intoned; these embrace that part of the morning and evening service which precedes the daily psalms, the litany, and the prayers in general.

John Marbeck (1550) was the first in England to adapt the offices of the reformed church to music; his work contained melody only. He was followed by Thomas Tallis, who flourished during the reigns of Henry VIII., Edward VI., Mary, and Elizabeth. The grave melody (founded on the ancient usage) and sublime harmonies of Tallis have never been equalled, and have continued in use till the present day with but slight modification. Tallis seems to have invented the form of the Anglican chant now used for the psalms. In the Roman Catholic Church these are sung to the Gregorian tones. See GREGORIAN CHANT. The canticles are sung to rhythmical music of a more elaborated character, in which form they are technically named 'Services.' The lessons, previous to the last review (1661) of the *Book of Common Prayer*, were intoned; since then, the invariable practice has been to read them.

The practice of intoning existed among the Jews at a very early period, and there is great probability that the ecclesiastical chant in present use throughout Christendom is but a modification of that which formed part of the ancient Jewish ritual. The eastern and western churches, at variance on most points, are at one on this. Mohammedans also make use of this mode of prayer; and barbarous tribes (American Indians and South Sea Islanders) are wont to propitiate their false gods in a species of rude chant; all which seems to point to some deeply seated instinct of human nature, and to indicate an intuitive perception of the truth, that a solemn and reverential manner, distinct from his manner of ordinary intercourse with his fellows, best befits the creature in his approaches to the Creator. The Lutheran Church and the Church of England have continued the practice, though only to a permissory and non-essential extent. The latter uses it in her cathedral and collegiate churches, and in these vast edifices its advantages over reading are strikingly manifest.

INTOXICA'TION. Whether induced by fermented liquors or by distilled spirits, it is through the alcohol contained in either that the effects of intoxication ensue. These may be considered under two heads: 1. As they immediately manifest themselves during a single act of intoxication; and, 2. As they gradually arise through the frequent repetition of the act. The one refers to the state of drunkenness simply, the other to the habit (Intemperance).

The effects of alcohol, in a single act of intoxication, vary according to the way in which the spirit has been taken. If swallowed rapidly, in large quantities or in a concentrated form, the agency is that of a powerful narcotic poison. The mode of action here is partly through a direct impression by the alcohol on the nerves of the stomach, and partly by its absorption into the blood, and its transmission thus to the brain, which is proved to take place with great rapidity. The individual falls into a deep stupor, from which it is impossible to rouse him. The face is ordinarily livid, with a swollen aspect, but sometimes it is ghastly pale. The skin is covered with chilly damps; the pulse is feeble, or perhaps wholly imperceptible; the breathing is slow and weak, though sometimes laborious and snorting; the eyes are rolled upwards, with contracted or, occasionally, dilated pupils; the jaws are clenched, and there are frequently convulsions. Where death follows, it may ensue in a few minutes, or after a period varying from a single hour to a day. Where the quantity taken is swallowed more slowly, as in ordinary drinking, the consequences are those which are too familiarly known as characterising a fit of drunkenness, and are the product of the more gradual and less excessive absorption. The first effect is that of a feeling of wellbeing, diffused over the body, and imparted to the mind. This gradually leads to a state of exhilaration, and thence to boisterous mirth and loquacity, attended at first by a swift transition and vivacity of the ideas, but speedily lapsing into indistinctness and confusion. In the increasing whirl of excitement, the individual loses all sense of prudence and self-government, betrays himself by his indiscretions, provokes pity and ridicule by his follies, or incurs danger by his recklessness. Along with this mental condition, the flushed face, flashing eye, and throbbing brain shew, at first, the corresponding state of excitement of the bodily functions; while, along with the subsequent confusion of thought, the reeling gait and the look of stolid incomprehension denote the enthralment that has followed. In a further stage, the memory fails, the individual maunders and mumbles in his speech, and the surrounding objects, recently seen imperfectly and misapprehended, wholly cease to impress him. At length, amid other loathsome concomitants, he sinks powerless, and stupor intervenes, from which he again awakens to consciousness after an indefinite number of hours; but then usually to suffer from qualms of sickness and other feelings of pain and depression, entailed upon him by a natural law as the reaction from his excess, and only dispelled after a still longer interval. The outline of the effects may vary. With some, the progress of a fit of drunkenness is never attended by hilarity or other conspicuous excitement, and a dreamy and subdued forgetfulness seems all that is produced or that is sought for. With some, even, it leads to a state of querulousness or of unreasoning melancholy. With others, the condition is one of furious madness, hesitating before no extreme of violence and outrage.

It is chiefly to the after-effects of the paroxysm that we are to trace the original growth and ultimate inveteracy of the drunken habit. The uneasy sensations of depression, following upon the excitement of the previous debauch, are sought to be relieved by a fresh recurrence to the stimulant; and a morbid appetite is thus created which craves its relief, and finds it, in the renewed administration of spirituous drinks, just as the natural appetite of hunger develops those sharp disquietudes that are allayed by food. This morbid appetite, in so far as it is morbid, may in itself be regarded and treated as a disease. But the universal health shews ultimately signs of a more deep injury. The cheeks begin to have a bloated and flabby look, with a complexion that either wears a peculiar pallor, or verges into shades of purple, while the nose not rarely presents a suspicious tinge of crimson. The appetite for ordinary food fails, the digestion is impaired, the sleep is disturbed, and the vigour of frame and capacity for exertion sink accordingly, the limbs often aching and trembling, and the heart drooping, with a miserable feeling of nervous exhaustion. Even prior to this, the drunkard is often liable to those minor illusions which end in the full development of what is known as the drunkard's delirium, or *delirium tremens*, a form of temporary insanity characterised by a state of abject terror, with shaking of the limbs, the sufferer fancying that he is surrounded with monstrous phantasms, or that he is devoted otherwise to horrors, disasters, or crimes. One effect, and a leading one, of the customary presence of alcohol in the blood of the drinker, is to reduce the vitality of that fluid, so that it tends to sustain only the lowest forms of nutrition and animalisation, and deposits, in great part, merely an inert fat within those organs where it should minister to the growth and maintenance of a delicate construction, destined for uses essential to life. Thus we have fatty deposits, or changes of higher structures into fat, in the heart, the liver, and in the blood-vessels, the coats of the last becoming easily ruptured. Hence, liability to diseases of the heart and of the liver often followed by dropsies, or to affections of the other intestines, or to attacks of apoplexy and palsy. If not cut off abruptly in his career, the life of the drunkard becomes one long malady towards its close, the final condition being usually one of imbecility of mind and body, yet with throes of suffering to the last. It has been authoritatively shewn that, while the average expectation of future life to the temperate man at fifty may be reckoned at twenty years, that of the drunkard at the same age is only four years. Again, between the ages of twenty-one and thirty, the deaths among drunkards have been found to be more than five times, and between thirty-one and fifty, more than four times what occur among the general community at the like ages. See DIPSOMANIA and DELIRIUM TREMENS in SUPP.

INTOXICATION, or DRUNKENNESS, is, in point of law, no excuse for any wrong done by the drunken party. Crimes which are committed in a state of drunkenness are punishable in the same way as if the actor were sober, though it is discretionary in the court to mitigate the sentence. As regards contracts entered into by a drunken party, there is no peculiarity, unless the fact of drunkenness was taken advantage of by the sober party, in which case it lies on the drunken party to prove this. Cases may no doubt arise where the drunkenness may be an element of fraud, and so the contract or deed may be rescinded or set aside. The mere act or state of drunkenness, when privately indulged in, is not an offence against the law; but if it be shewn in public, it may become so. If, for example, a person be drunk in the streets or a public place, he was made, by a statute of James I., liable to be fined 5s., or, if unable to pay, to be committed to the stocks for six hours. By a more modern enactment of 1872, called the Intoxicating Liquors Licensing Act, which repealed the older statute, every person found drunk in a highway or public place, or in a licensed house, is liable to a penalty of ten shillings; and on a second offence within 12 months, to twenty shillings, and on a third offence within 12 months, to forty shillings. To be drunk and riotous, or be drunk while in charge of a horse or carriage, or of a gun, is punishable with a fine of twenty shillings, or imprisonment for one month. Local acts also often impose other penalties. In Scotland, several ancient statutes were passed against drunkenness, which, however, are in desuetude. In several local police acts, a penalty is imposed on drunkenness in the streets, and the Police and Improvement Act of Scotland, 25 and 26 Vict. c. 101, s. 254, subjects drunken persons in the streets to a penalty of 40s., or 14 days' imprisonment, in all places where that act is adopted.

INTRA'DOS, the under or inner side or soffit of an Arch (q. v.), the upper or outer curve being called the *extrados*.

INTRE'NCHMENT, in a general sense, is any work, consisting of not less than a parapet and a ditch, which fortifies a post against the attack of an enemy. As a means of prolonging the defence in a regular work of permanent fortification, intrenchments are made in various parts, to which the defenders successively retire when driven in from forward works. Bastions are ordinarily intrenched at the gorge by a breastwork and ditch, forming either a re-entering angle or a small front of fortification. Such a work across the gorge of the Redan at Sebastopol caused the repulse of the British attack in September 1855. A cavalier, with a ditch, is also an intrenchment. An army in the field often strengthens its position by intrenchments, as by a *continued line* of parapet and ditch, broken into redans and curtains, or by a *line with intervals*, consisting of detached works of more or less pretension flanking each other.

INTRODU'CTION (Ital. *introduzione*), in Music, is a kind of preface or prelude to a following movement. Formerly, the introduction was only to be found in large musical works, such as symphonies, overtures, oratorias, &c.; but now it is found in every rondo, fantasia, polonaise, waltz, &c., on the principle that it is considered abrupt to begin all at once, without preparing the audience for what is to come. In a stricter sense, introduction is applied to the piece of music with which an opera begins, and which immediately follows the overture. In some cases, the overture and introduction are united, the composition going on without any formal pause, as in Gluck's *Iphigénie en Tauride*, Mozart's *Idomenio* and *Don Giovanni*. As the overture, which contains a harmonical sketch of the opera, should make a permanent impression on the audience, the custom of uniting it with the introduction has very properly been discontinued, and the introduction treated as an independent movement.

INTROMI'SSION, in Scotch Law, is the assumption of legal authority to deal with another's property. It is divided into legal and vicious. Legal intromission is where the party is expressly or impliedly authorised, either by adjudgment or deed, to interfere, as by drawing the rents or getting in debts. Vicious intromission is where an heir or next of kin, without any authority, interferes with a deceased person's estate; as, for example, where a person not named by a will, or without the authority of any will, collects the property of the deceased person, as if he were regularly appointed. By so doing, the vicious intromitter incurs the responsibility of paying all the debts of the deceased. The vitiosity, however, may be taken off by the intromitter being regularly confirmed executor. The corresponding phrase in England to a vicious intromitter is an *executor de son tort*.

INTRU'SION, the Scotch law-term for a trespass on lands.

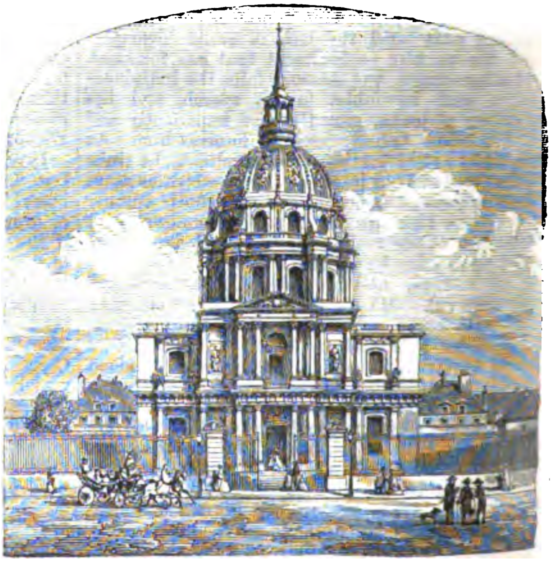
INTUI'TION. See INSTINCT, and COMMON SENSE.

I'NTUS-SUSCE'PTION, or **INVAGINA'TION**, is the term applied to that partial displacement of the bowel in which one portion of it passes into the portion immediately adjacent to it, just as one part of the finger of a glove is sometimes pulled into an adjacent part in the act of withdrawing the hand. In this case, the contained portion of intestine is liable to be nipped and strangulated by the portion which contains it, and all the danger of Hernia (q. v.) results, with far less chance of successful interference on the part of the surgeon or physician. It is one of the most frequent and fatal causes of obstruction of the bowels. The extent of the intussusception may vary from a few lines to a foot or more. Even when inflammation is set up, the affection, although in the highest degree perilous, is not of necessity fatal. The invaginated portion mortifies and sloughs, while adhesion is established between the peritoneal surfaces of the upper and lower portions at their place of junction, so that the continuity of the tube is preserved, although a large portion may be destroyed. If the patient is strong enough to bear the shock of the inflammation, gangrene, sloughing, &c., a complete recovery ensues.

I'NULIN. See ELECAMPANE.

I'NUUS, or **INNUUS**, a genus of apes, to which the Barbary Ape (q. v.) belongs. The Barbary Ape is *I. sylvanus*.

INVALIDES, wounded veterans of the French army, maintained at the expense of the state. The *Hôtel des Invalides* is an establishment in Paris where a number of these old soldiers are quartered. Its chapel contains the tomb of the Great Napoleon, and is an object of much attraction to all visitors. It was founded by Louis XIV. in 1671, and during his reign, and for a long time afterwards, was a place of retirement for the aged servants of court favourites as well as for invalided soldiers; but this abuse was put an end to by St Germain in Louis XV.'s reign. In 1789, the Hôtel had a revenue of £68,000, but during the time of the Republic its property was alienated, and the institution supported from the public revenue. The Hôtel can accommodate 5000 men, and the actual number of inmates is not much below this.



Hôtel des Invalides.

INVALI'DING signifies the return home, or to a more healthy climate, of soldiers or sailors whom wounds or the severity of foreign service has rendered incapable of active duty. The man invalided returns to his duty as soon as his restored health justifies the step.

INVARIABLE PLANE. The position of a point in space is determined—as explained in the article CO-ORDINATES—by referring it to planes intersecting one another at right angles; and in ascertaining the motion of the point by this means, the planes must either be immovable, or allowance must be made for their altered position, an operation of considerable complexity. In astronomy, none of the obviously marked planes, such as that of the Ecliptic (q. v.) or of the Equator (q. v.), possess this requisite quality of fixity so as to form a convenient basis for determining the position of heavenly bodies with absolute exactness. Laplace, therefore, conferred a boon on astronomy, when he discovered that, in the solar system, there does exist 'an invariable plane, about which the orbits perpetually oscillate, deviating from it only to a very small extent on either side. This plane passes through the centre of gravity of the solar system, and it is so situated, that if all the planets be projected on it, and if the mass of each planet be multiplied into the area, corresponding to any given time, which is described by the projected radius vector, the sum of such products will be a maximum. By means of this property, which is independent of any particular epoch, it will be easy for astronomers in future ages to determine the exact position of the plane, and to compare observations together by means of it.' (*Grant's History of Physical Astronomy.*) Such a plane is not peculiar to the solar system, but must exist in all systems where the bodies are acted on by no other force than their mutual attraction. See FORCE.

INVE'CTA ET ILLA'TA, a phrase used in Scotch law to denote all things which a tenant has brought upon the premises, as his household furniture, tools, utensils, &c.; also, in case of thirlage, all corn brought within the limits of the thirl or servitude.

INVE'CTED, or **INVECKED.** See ENGRAILED.

INVENTION. See PATENT.

I'NVENTORY, a list or schedule of goods or property setting forth the particulars, so as to inform parties interested. The term is used in England in reference to an executor or administrator making out a list of the deceased person's effects. In Scotland, it is also used in reference to the property of an infant, pupil, or minor, whose estate is under the care of a guardian, tutor, curator, judicial factor. In Scotland, it is also used in connection with the various pleadings and deeds and documents produced or used in a suit or action, then called an inventory of process. So as to an inventory of titles, that is, the titles of an estate shewn to a purchaser.

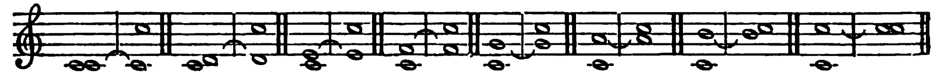
INVERA'RAY, a small royal and parliamentary burgh and seaport of Scotland, the county town of Argyleshire, is picturesquely situated on the west shore of Loch Fyne, where the river Aray falls into the loch, 45 miles north-west of Glasgow. It consists of one principal street running parallel to the loch, and a square with a church in the centre. An obelisk, standing near the church, commemorates the death of 17 gentlemen, all Campbells, who were executed here without trial in 1685, for their adherence to Presbyterianism. Close to the town stands Inveraray Castle, the chief residence of the Dukes of Argyle. I., the ancient town, the capital of the West Highlands, was situated at some distance to the north of the present town. Not a vestige of it now remains. The trade of I. is chiefly in herring-fishing. Pop. in 1871, 905.

INVERCARGILL, a town in the province of Otago, New Zealand, formerly capital of Southland when a province, lies at the mouth of the New River. It possesses four banks and several churches. The surrounding district is principally taken up with pastoral operations. The town is a telegraph station, and two newspapers are published. It is a terminus of the Bluff harbour and Invercargill Railway; and several other lines are in course of construction, or projected. Pop. (1871) 1960.

INVERNE'SS, a royal, parliamentary, and municipal burgh, situated at the mouth, and mostly on the right bank, of the river Ness. It is the chief town of the county to which it gives name, and may be regarded as the capital of the Highlands. Its environs, well cultivated and beautifully wooded, are almost surrounded by mountains and hills of various heights, forming altogether a most picturesque and interesting landscape. Pop. (1871) 14,510; annual value of real property, £52,113; corporation revenue, £3205 a year. It unites with Fortrose, Nairn, and Forres, in returning one member to parliament. The first charters of I. as a burgh are granted by King William the Lion (1165—1214 A.D.). By one of these, it is stipulated that when the king has made a ditch round the burgh, the burgesses shall make a palisade on the edge of the ditch, and keep it in good repair for ever. In 1411, the town was burned by Donald, Lord of the Isles, on his way to Harlaw (q. v.). Macaulay, writing of the year 1689, describes I. as 'a Saxon colony among the Celts, a hive of traders and artisans in the midst of a population of loungers and plunderers, a solitary outpost of civilisation in a region of barbarians.' The Castlehill, on the south side of the town, part of an old sea-terrace, was the site of a castle, which, in 1303, was taken by the adherents of King Edward I. of England, but subsequently retaken by those of King Robert Bruce. King James I. is said to have held a parliament in the castle in 1427. An iron suspension-bridge, constructed in 1855, connects the two parts of the town. In the High Street stand the town-cross, and beside it the famous Clach-na-cuddin, a lozenge-shaped blue slab, formerly regarded as the palladium of the burgh. In the same street, are the Town-hall and Exchange, built in 1708. Of the old religious foundations of I., there is little more than mere tradition. The Dominicans seem to have had a monastery, founded by King Alexander II., in 1233. The Franciscans also are believed to have had a convent in the town. Among more modern buildings and foundations, may be enumerated Raining's School, established 1747; the spire of the old jail, 150 feet high, built in 1791, curiously twisted by the earthquake of 1816, and since readjusted; the Royal Academy, 1792; the County Buildings and jail, on the site of the castle, 1835; and St Andrew's Cathedral, a fine Gothic building, the foundation-stone of which was laid in October 1866 by Dr Longley, Archbishop of Canterbury. There is a small woollen manufactory, a Workmen's Club and library, several printing establishments, three newspapers, a native bank (the Caledonian), and five other banking-offices. Inverness has still its four great annual fairs, but the establishment of shops throughout the county has greatly diminished their importance. It has three harbours, built at different times, and a considerable amount of shipping by the Moray Firth and the Caledonian Canal, which connects it with the west coast.

INVERNESS-SHIRE, the largest county of Scotland, includes Badenoch, Glenroy, and the valley of the Spey on the east; Lochaber on the south; Glenelg, Glen Garry, Arisaig, Moydart, and Frasers' County on the west; Glen Urquhart and Glen Morriston towards the centre. It includes also Strathglass on the north; and several of the western islands, viz., Skye, Harris, North and South Uist, and Barra, &c. The mainland portion lies between N. lat. 56° 40′ and 57° 36′, and W. long. 3° 30′ and 5° 55′; and is bounded on the E. by the counties of Aberdeen, Banff, Elgin, and Nairn; on the S. by Perth and Argyleshire; on the W. by the Atlantic and Ross-shire; and on the N. by Ross-shire. It measures from north-east to south-west 85 miles, and from north-west to south-east 57 miles; and has an area of 4256 square miles, of which more than two-thirds consist of barren heath. The wildest and most mountainous portion is towards the west, comprising a tract 70 miles in extent, and designated the *Rough Bounds*. The most extensive moss in Great Britain lies on the south of Badenoch, where, in the naturally formed wooded islands, large herds of deer find a refuge. These mosses had at one time been mostly, if not wholly, covered with trees, some of them of great magnitude. In Strathspey, three tiers of stocks, one above another, have been found, shewing that a succession of forest trees must have grown up, flourished for ages, and then, one after another, disappeared by the work of time or the axe. At present, the natural pines occupy a larger space than in any other county of Britain. There are also many thousand acres of plantations of ordinary forest trees. Some mountains attain considerable altitude. Ben Nevis, now ascertained to be the highest in Great Britain, is 4406 feet above the level of the sea. Cairngorm, partly in this county, is 4050 feet high. The geological formation of the county is various; but primary rocks consisting of gneiss, mica-slate, granite, porphyry, and trap rocks, mostly prevail. The most fertile soil of the county rests on the red sandstone in the valley of the Aird, and between the county town and Beauly. There are several lakes of some extent, as Loch Ness, Loch Lochy, Loch Laggan, Loch Ericht, and a number of other lochs forming arms of the sea. The principal rivers are the Ness, Spey, Lochy, Beauly, Findhorn, Nairn, Garry, Morriston, and the Foyers (q. v.). The county is divided among 80 or 90 proprietors, a few of whom possess above 100,000 acres of surface. The old valued rent (1674) was £6099; the valuation for 1873—1874 was £308,137. The assessment on the land for all county purposes amounts to £5500. According to the agricultural returns of 1872, the total acreage under all kinds of crops, fallow and grass, was 118,552: 40,099 acres were under corn crops, 19,254 under green crops, 24,579 under clover and grasses under rotation, 38,872 with permanent pasture (exclusive of heath and mountain-land). Of the land under crops, 1778 acres were wheat, 7083 barley, 30,006 oats, 1081 rye. Of land under green crops, 8423 acres were potatoes, 10,657 turnips, 159 vetches, &c. Of live-stock, there were 8371 horses, 47,038 cattle, 788,001 sheep, and 5099 swine. There are comparatively few antiquities worth noting in the county. These consist principally of remains of vitrified forts and ruins of old castles. The battle which decided the fate of the Stuarts was fought 16th April 1746, on Culloden Moor, a few miles from Inverness. The Gaelic language is still generally, but in scarcely any district exclusively, spoken. Pop. in 1871, 87,531. The constituency returns one member to parliament.

INVERSION, in Music, is the transposing of one of the two notes of an interval by an octave upwards or downwards, to a position the reverse of that which it before occupied with respect to the other note, so that if the transposed note was the lower note of the two, it shall now be the higher one, and *vice versâ*. The new interval thus formed takes its name from the complement of the octave; for example, a unison inverted becomes an octave, a second becomes a seventh, a third becomes a sixth, a fourth becomes a fifth, a fifth becomes a fourth, a sixth becomes a third, a seventh becomes a second, and an octave becomes a unison. The following shews how these arise:



By inversion diminished intervals become augmented, and augmented become diminished; major become minor, and minor become major; but perfect intervals are also perfect when inverted. For inversion of chords, see CHORD. An important use is also made of the word inversion, in reference to a whole passage or phrase, for which see article COUNTERPOINT.

INVE'RTEBRATE ANIMALS (*Invertebrata*) are those animals which have not a vertebral column or spine. The division of animals into *Vertebrate* and *Invertebrate* is a natural and unavoidable one, acknowledged in all systems of zoology. But these groups being formed, the one on a positive, and the other on a negative character, are by no means of equal value in the classification of the animal kingdom. In Cuvier's system, the invertebrate animals form three of the great divisions of the animal kingdom—viz., *Mollusca*, *Articulata*, and *Radiata*, each of which, like *Vertebrata*, exhibits a peculiar type of structure. There are also animals of lower organisation than those which can with certainty be referred to these divisions, although included by Cuvier amongst the *Radiata*, forming the *Acrita* and *Protozoa* of recent systems. Amongst the lower invertebrate animals, much more than amongst vertebrate animals, the arrangement into groups must be regarded as at present, in a great measure, tentative and provisional; although in the higher departments of invertebrate zoology many of the classes and other groups are very well defined. The organisation of some of them, as Insects, however different from that of vertebrate animals, is not evidently lower, but exhibits a perfection as admirable as in any of them, whilst all vital powers are most fully displayed.

INVE'STITURE (Lat. *in*, and *vestio*, to clothe), in feudal and ecclesiastical history, means the act of giving corporal possession of a manor, office, or benefice, accompanied by a certain ceremonial, such as the delivery of a branch, a banner, or an instrument of office, more or less designed to signify the power or authority which it is supposed to convey. The contest about ecclesiastical investitures is so interwoven with the whole course of medieval history, that a brief account of its origin and nature is indispensable to a right understanding of many of the most important events of that period. The system of feudal tenure had become so universal that it affected even the land held by ecclesiastics, and attached to most of the higher ecclesiastical dignities, monastic as well as secular. Accordingly, ecclesiastics who, in virtue of the ecclesiastical office which they held, came into possession of the lands attached to such offices, began to be regarded as becoming by the very fact feudatory to the suzerain of these lands; and, as a not unnatural result, the suzerains thought themselves entitled to claim, in reference to these personages, the same rights which they enjoyed over the other feudatories of their domains. Among these rights was that of granting solemn investiture. Now, in the case of bishops, abbots, and other church dignitaries, the form of investiture consisted in the delivery of a pastoral staff or crosier, and the placing a ring upon the finger; and as these badges of office were emblematic—the one of the spiritual care of souls, the other of the espousals, as it were, between the pastor and his church or monastery—the assumption of this right by the lay suzerains became a subject of constant and angry complaint on the part of the church. On the part of the suzerains it was replied, that they did not claim to grant by this rite the spiritual powers of the office, their function being solely to grant possession of its temporalities, and of the temporal rank thereto annexed. But the church-party urged, that the ceremonial in itself involved the granting of spiritual powers; insomuch that in order to prevent the clergy from electing to a see when vacant, it was the practice of the emperors to take possession of the crosier and ring, until it should be their own pleasure to grant investiture to their favourites. The disfavour in which the practice had long been held found its most energetic expression in the person of Gregory VII., who having, in the year 1074, enacted most stringent measures for the repression of simony, proceeded, in 1075, to condemn, under excommunication, the practice of investiture, as almost necessarily connected with simony, or leading to it. This prohibition, however, as is observed by Mosheim (ii. 326), only regarded investiture in the objectionable form in which it was then practised, or investiture of whatever form, when the office had been obtained simoniacally. But a pope of the same century, Urban II., went further, and (1095) absolutely and entirely forbade, not alone lay investiture, but the taking of an oath of fealty to a lay suzerain by an ecclesiastic, even though holding under him by the ordinary feudal tenure. The contest continued during the most of the 11th century. In the beginning of the 12th c., it assumed a new form, the pope, Pascal II., having actually agreed to surrender all the possessions and royalties with which the church had been endowed, and which alone formed the pretext of the claim to investiture on the part of the emperor, on condition of the emperor (Henry V.) giving up that claim to investiture. This treaty, however, never had any practical effect; nor was the contest finally adjusted until the celebrated concordat of Worms in 1122, in which the emperor agreed to give up the form of investiture *with the ring and pastoral staff*, to grant to the clergy the right of free elections, and to restore all the possessions of the church of Rome which had been seized either by himself or by his father; while the pope, on his part, consented that the elections should be held in the presence of the emperor or his official, but with a right of appeal to the provincial synod; that investiture might be given by the emperor, but only *by the touch of the sceptre;* and that the bishops and other church dignitaries should faithfully discharge all the feudal duties which belonged to their principality.

Such was the compact entered into between the contending parties, and for a time it had considerable effect in restraining one class of abuses; but it went only a little way towards eradicating the real evil of simony and corrupt promotion of unworthy candidates for church dignities. Still the principle upon which the opposition to investiture was founded was almost a necessary part of the medieval system, and Mosheim (ii. 327) regards it as 'perfectly accordant with the religious principles of the age.' It was, in fact, but one of the many forms in which the spirit of churchmanship has arrayed itself, whether in ancient or modern times, against what are called the Erastian tendencies which never fail to develop themselves under the shadow of a state church, no matter what may be its creed or its constitution.

INVESTITURE, the term used in Scotch law to denote the giving feudal possession of heritable property. It was formerly given to the vassal in presence of the *pares curiæ*, but latterly has been superseded by infeftment or sasine, and now it is effected by mere registration of the deed of conveyance.

INVOCATION OF ANGELS AND SAINTS, the act of addressing prayers to the blessed spirits who are with God, whether the angels or the souls of the just who have been admitted to the happiness of heaven. The practice of addressing prayers to angels, especially to the angel-guardian, to the Virgin Mary, and to other saints, prevails in the Roman, the Greek, the Russo-Greek, and the eastern churches of all the various rites. In the Christian religion, the principle of the unity of God excludes all idea of subordinate sharers of the divine nature, such as is to be found in paganism, and all alike, Roman Catholics as well as Protestants, agree that its very first principles exclude the idea of rendering divine worship, no matter how it may be modified, to any other than the One Infinite Being. But while Protestants carry this principle so far as to exclude every species of religious worship and every form of invocation addressed to angels or saints, as trenching upon God's honour, and irreconcilable with the Scriptures, which hold Him forth as the sole object of worship and the only fountain of mercy, the Roman Catholic religion permits and sanctions a worship (called *douleia*) of the saints, inferior to the supreme worship (*latreia*) offered to God, and an invocation of the saints, not for the purpose of obtaining mercy or grace from themselves directly, but in order to ask their prayers or intercession with God on our behalf. For this doctrine and the analogous practice, they do not advance the direct authority of Scripture (except a few passages which seem to them to imply the intercommunion of the two worlds, as Matt. xiii. 3, Luke xiv. 17, Exod. xxxii. 13), but rely on what to them is equally decisive testimony, viz., the unwritten word of God conveyed by tradition. Origen (Opp. ii. p. 273) speaks of the belief that 'the saints assist us by their prayers' as a doctrine which is 'doubted by no one.' St Cyprian, addressing the confessors going to martyrdom, engages by anticipation their prayers in his behalf when they shall have received their heavenly crown (Ep. 60, Dodwell's edition). To the same effect are cited the testimonies of Basil (Opp. ii. 155), Gregory Nazianzen (Opp. i. 288), Gregory of Nyssa (ii. 1017), Ambrose (ii. 200), Chrysostom (iv. 449), and many other Fathers, as well as the liturgies of the various ancient churches, whether of the Roman, the Greek, the Syrian, or the Egyptian rite.

On the other hand, Protestant historians, even admitting the full force of these testimonies to the existence of the practice, allege that the practice is an early, but unscriptural addition, dating only from the infusion into the church system of Alexandrian Neo-platonism and Oriental Magianism, which they believe to have left traces even in the so-called orthodox Christianity of the fourth and fifth centuries. But leaving aside the doctrinal controversy, the fact at least is certain, that in the fourth, and still more in the fifth and following centuries, the usage was universal; and a curious evidence of its prevalence is furnished by the fact, that the very excess to which it was carried was condemned as a heresy (that of the Collyridians) by those who themselves confessed the lawfulness of the practice when confined within its legitimate limits. That similar excesses in the practice, and similar abuses as to the nature and limits of the legitimate invocation of the saints continued through the medieval period, Roman Catholics themselves admit, although they allege that such abuses were at all times reprobated by the authentic teaching of the church; and the multiplied devotions to the saints, especially to the Blessed Virgin, the efficacy claimed for them, and the extraordinary legends connected with them, and the prominence which the worship had assumed in the church, were among the most fertile themes of invective with the first Reformers. The Council of Trent (25th Sess., *On the Invocation of Saints*) defines very precisely what is the doctrine of the Catholic Church on this subject. It declares 'that the saints who reign with God offer up their prayers to God for men; that it is good and useful suppliantly to invoke them, and to resort to their prayers, aid, and help, for the purpose of obtaining benefits of God through his son Jesus Christ our Lord, who alone is our Redeemer and Saviour.' From this decree it is inferred that the Catholic doctrine on the saints does not prescribe the practice of invoking them as necessary or essential, but only as 'good and useful,' and that what is to be asked of them is not the direct bestowal of grace and mercy, as from themselves, but only their prayers, their assistance, and their help in obtaining benefits from God; and although many forms of prayer which are in use among Catholics bear, especially to a Protestant reader, all the appearance of direct appeals to the saints themselves for the benefits which are implored, yet all Catholic authorities are unanimous in declaring that these forms of words are to be interpreted, and that, from habitual use, they are so interpreted, even by the most superficially instructed Catholics, with the understood explanation, that all the power of the saints to assist us consists exclusively in their prayers for us, and seconding our prayers by their own. See Bellarmine, *Controversia de Sanctorum Beatitudine*, lib. i. cap. xvii.

Protestants object to the invocation of saints and of angels, that it is without evidence of divine authority, contrary to the whole tenor of Scripture, and derogatory to the mediatorship of Christ. They ask what reason can be adduced for believing that prayers addressed to saints are even *heard* by them, or that they have always a knowledge of the worship addressed to them? They further deny that the prayers addressed to saints—and particularly to the Virgin Mary—are always capable of explanation as merely an asking of their prayers on behalf of those who invoke them, and quote many instances in proof.

I'NVOICE, a list or account of merchandise or goods sold, either sent along with the goods themselves or separately.

INVOLU'CRE (Lat. a wrapper or envelope), in Botany, is a group of bracts surrounding flowers in their unexpanded state, and occupying a place on the floral axis beneath them after their expansion. The bracts which form an involucre are generally grouped in a whorl. In umbelliferous flowers, there is very commonly an involucre, not only to the umbel, but to each division of the umbel, or umbellule. The former is called the *general involucre*, or simply the *involucre;* the latter are *partial involucres* or *involucels*. The cup of the acorn, hazel, chesn &c., may be regarded as an involucre.

I'NVOLUTE. See EVOLUTE.

INVOLUTION AND EVOLUTION are two operations the converse of each other. The object of the first is to raise a number to any power, which is effected by continuously *multiplying* the number by itself till the number of factors is equal to the number designating the power, thus, 2 raised to the *third* power is 2 × 2 × 2, or 8; 7 raised to the *fourth* power is 7 × 7 × 7 × 7, or 2401, &c. Evolution, on the other hand, is the extraction of a root of any number, *that is, it is a* method for discovering *what* number, when raised to a certain power, will give a certain known number—e. g., the square root of 64 is 8, that is, 8 is the number which, raised to the second power, will give 64; 3 is the fourth root of 81, that is, 3 raised to the fourth power is 81, and so on. The symbols expressive of the two operations are as follow: 5^3 means that 5 is to be raised to the third power; $(7^2)^5$ means that the *square* or *second* power of 7 is to be raised to the fifth power; $\sqrt{9}$ or $\sqrt[2]{9}$ or $9^{\frac{1}{2}}$ signifies that the extraction of the *second* or square root of 9 is required; $\sqrt[4]{256}$ or $256^{\frac{1}{4}}$, that the fourth root of 256 is to be extracted; and so on. Involution and evolution, like *multiplication* and division, or differentiation and integration, differ in the extent of their application; the former, or direct operation, can always be *completed*, while there are numberless cases in which the latter fails to express the result with perfect accuracy.

I'ODINE (symb. I, equiv. 127) is one of a group of four non-metallic elements to which the term Halogens (q. v.) has been applied. It derives its name from Gr. *iōdēs*, violet-like, in consequence of its magnificent purple colour when in a state of vapour. At ordinary temperatures, it usually occurs in solid dark-gray glistening scales; it is, however, crystallisable, and sometimes appears as an octahedron with a rhombic base. It is soft, and admits readily of trituration, has the high specific gravity of 4·95, and evolves a peculiar and disagreeable odour, which indicates its great volatility. It fuses at 225°, and at about 350° it boils, and is converted into the purple vapour to which it owes its name; it has an acrid taste, and communicates a brownish-yellow colour to the skin. It is very slightly soluble in water, but dissolves readily in watery solutions of iodide of potassium and of hydriodic acid, and in alcohol and ether. Iodine vapour is the heaviest of all known vapours, its specific gravity being 8·716. It combines directly with phosphorus, sulphur, and the metals. Its behaviour with hydrogen is analogous to that of chlorine and bromine (see HYDROCHLORIC ACID), but its affinities are weaker than those of the last-named elements. It likewise combines with numerous organic substances, and the compound which it forms with starch is of such an intense blue colour, that a solution of starch forms the best test for the presence of free iodine. By means of this test, one part of iodine may be detected when dissolved in one million parts of water.

The following are some of the most important iodine compounds. With hydrogen, it forms only one compound, *hydriodic acid* (HI), a colourless pungent acid gas, which in most respects is analogous with hydrochloric acid. It is obtained by the action of water on teriodide of phosphorus.

The soluble iodides of the metals may be obtained by the direct combination of hydriodic acid with the metallic oxides, the resulting compounds being the metallic iodide and water. Some of these iodides are of extreme brilliancy, and others are of great value in medicine; amongst the latter must be especially mentioned iodide of potassium, iodide of iron, and the iodides of mercury.

Iodide of potassium is, next to quinine and morphia, the most important medicine in the pharmacopœia. It crystallises in colourless cubes, which are sometimes clear, but usually have an opaque whitish appearance, and are soluble in water and spirit. It is decomposed and the iodine set free, by chlorine, bromine, fuming nitric acid, and ozone (q. v.). There are various ways of obtaining this salt; the following is one of the best. If iodine be added to a warm solution of potash until a brown tint begins to appear, iodide of potassium (KI) and iodate of potash (KO,IO_5) are formed. By gentle ignition of the residue obtained by evaporation, the iodate is decomposed into iodide of potassium and oxygen, so that all that remains is fused iodide of potassium, which is dissolved in water, and allowed to crystallise. Iodide of iron is formed by digesting iron wire or filings in a closed vessel with four times the weight of iodine suspended in water. Direct combination takes place, and a pale-green solution is formed, which by evaporation *in vacuo* yields crystals. It is the solution which is most commonly employed in medicine, but as, on exposure to the air, it becomes decomposed, and iodine is liberated, it is usually mixed with strong syrup, which retards this change.

There are two iodides of mercury, viz., the green sub-iodide (Hg_2I) and the red iodide (HgI). They may be formed either by the direct union of the two elements, or by the double decomposition of iodide of potassium and mercurial salts. There are two well-defined compounds of iodine and oxygen, viz., iodic acid (IO_5) and periodic acid (IO_7), corresponding to chloric and perchloric acid, neither of which are of any special interest.

Iodine in small quantity, and usually in combination with sodium, magnesium, or calcium, is very widely diffused over the earth's surface. It exists in sea-water, in marine animals and plants, and in certain mineral springs. It is also found in several minerals, as, for example, in certain Mexican silver ores, in Silesian zinc ores, in phosphorite from the Upper Palatinate, and in coal.

Iodine was discovered in 1811, by Courtois, in the waste liquors produced in the manufacture of carbonate of soda from the ashes of sea-weeds. A few years later, Gay-Lussac discovered that it was a simple elementary body. It is obtained from the half-fused ash of dried sea-weeds, which is known in this country as Kelp (q. v.), and in Normandy as Varek, and contains the iodides of sodium, potassium, magnesium, and perhaps calcium in considerable quantity. The iodine is liberated by the addition of binoxide of manganese and sulphuric acid. Most of our commercial iodine is prepared in Glasgow.

The preparations of iodine are employed extensively in medicine and in Photography (q. v.). Iodide of potassium, and the preparations of iodine generally, are almost entitled to be regarded as specifics in cases of goître, bronchocele, or Derbyshire neck. Out of 364 cases (collected by Bayle) which were treated with iodine, 274 were cured. Manson, Lugol, and others have shewn the value of the iodine-treatment in scrofula. The preparations of iodine are also eminently successful as resolvents in chronic induration, and enlargement of the liver, spleen, uterus, &c. In many forms of chronic rheumatism, and in certain affections of the osseous system, due to a syphilitic taint, iodide of potassium is of the greatest service; and its value in the treatment of chronic lead-poisoning is not so generally known, even in the medical profession, as it deserves to be. The iodide of potassium dissolves the compounds of lead with albumen, fibrine, &c., which abound in the body in chronic lead-poisoning; and these dissolved compounds are excreted by the kidneys. In these cases, lead may often be detected in the urine, almost immediately after the administration of the iodide. This salt has a similar action in chronic mercurial poisoning, and cases are recorded of mercurial salivation having come on during the use of iodide of potassium, in consequence of the liberation of mercury, which had been previously fixed in the system.

Iodide of iron, which may be given either in syrup or in the form of Blancard's Pills (an excellent French mode of administering this salt), is especially serviceable in scrofulous affections of the glandular system, in which the use both of iodine and of iron is indicated. The iodides of mercury have been prescribed with good effect in various forms of syphilis. They must be given with caution, on account of their energy, the average dose of the red iodide being a fraction ($\frac{1}{16}$ to $\frac{1}{4}$) of a grain. Pure iodine is seldom prescribed internally; but in the form of tincture and ointment, it is a most useful topical application in cases of goître, local enlargements, diseases of joints, chilblains, &c.

In large doses, iodine and most of the iodides act as irritant poisons; but very few fatal cases are on record. In the event of poisoning with the tincture of iodine, the first point is to evacuate the stomach; and the vomiting is assisted by the copious use of tepid liquids, containing starchy matter, as, for instance, starch, flour, or arrow-root boiled in water; the object being to form iodide of starch, which is comparatively inert.

IO'NA, the modern name of the most famous of the Hebrides, is believed to have originated in a mistaken reading of *n* for *u*; the word, in the oldest manuscripts, being clearly written *Ioua*. From the 6th c. to the 17th c., the island was most generally called *I*, *Ii*, *Ia*, *Io*, *Eo*, *Hy*, *Hi*, *Hii*, *Hie*, *Hu*, *Y*, or *Yi*—that is, simply, 'the Island;' or *Icolmkill*, *I-Columb-Kille*, or *Hii-Colum-Kille*—that is, 'the Island of Columba of the Church.'

It is about three miles long, and varies in breadth from a mile to a mile and a half. In 1871, it had a population of 236. Its area, computed by Bede at 'five families' (or 'five hides of land,' as the passage is rendered in the Anglo-Saxon Chronicle), is estimated at 2000 imperial acres, of which rather more than a fourth part is under tillage. The soil is naturally fruitful, and yields earlier crops than most parts of Great Britain, barley sown before the middle of June being ready for the sickle in August. This remarkable fertility was regarded as miraculous in the dark ages, and, no doubt, led to the early occupation of Iona. Dunii, the highest point of the island, is 330 feet above the sea-level.

Its history begins in the year 563, when St Columba (q. v.), leaving the shores of Ireland, landed upon I. with twelve disciples. Having obtained a grant of the island, as well from his kinsman Conall, the son of Comghall, king of the Scots, as from Bruidi, the son of Melchon, king of the Picts, he built upon it a monastery, which was long regarded as the mother-church of the Picts, and was venerated not only among the Scots of Britain and Ireland, but among the Angles of the north of England, who owed their conversion to the self-denying missionaries of Iona. From the end of the 6th to the end of the 8th c., I. was scarcely second to any monastery in the British Isles; and it was this brilliant era of its annals which rose in Johnson's mind when he described it as 'that illustrious island which was once the luminary of the Caledonian regions, whence savage clans and roving barbarians derived the benefits of knowledge and the blessings of religion.' But neither piety nor learning availed to save it from the ravages of the fierce and heathen Norsemen. They burned it in 795, and again in 802. Its 'family' (as the monks were called) of 68 persons were martyred in 806. A second martyrdom, in 825, is the subject of a contemporary Latin poem by Walafridus Strabus, abbot of the German monastery of Reichenau, in the Lake of Constance. On the Christmas evening of 986, the island was again wasted by the Norsemen, who slew the abbot and 15 of his monks. Towards the end of the next century, the monastery was repaired by St Margaret, the queen of King Malcolm Canmore. It was visited in 1097 by King Magnus the Barefooted, of Norway. It was now part of that kingdom, and so fell under the ecclesiastical jurisdiction of the Bishop of Man and the Archbishop of Drontheim. In 1203, the bishops of the north of Ireland disputed the authority of the Manx bishop, pulled down a monastery which he had begun to build in the island, and placed the abbey under the rule of an Irish abbot of Derry. The Scottish Church had long claimed jurisdiction in I., and before the end of the 13th c., the island fell under the rule of the Scottish king. Its abbey was now peopled by Clugniac monks; and a nunnery of Austin canonesses was planted on its shores. Towards the end of the 15th c., it became the seat of the Scottish Bishop of the Isles, the abbey church being his cathedral, and the monks his chapter.

No building now remains on the island which can claim to have sheltered St Columba or his disciples. The most ancient ruins are the Laithrichean, or Foundations, in a little bay to the west of Port-a-Churraich; the Cobhan Cuildich, or Culdees' Cell, in a hollow between Dunii and Dunbhuirg; the rath or hill-fort of Dunbhuirg; and the Gleann-an-Teampull, or Glen of the Church, in the middle of the island, believed to be the site of the monastery which the Irish bishops destroyed in 1203. St Oran's Chapel, now the oldest church in the island, may probably be of the latter part of the 11th century. St Mary's Nunnery is perhaps a century later. The Cathedral, or St Mary's Church, seems to have been built chiefly in the early part of the 13th century. It has a choir, with a sacristy on the north side, and chapels on the south side; north and south transepts; a central tower, about 75 feet high; and a nave. An inscription on one of the columns of the choir appears to denote that it was the work of an Irish ecclesiastic who died in 1202. On the north of the cathedral are the chapter-house and other remains of the conventual or monastic buildings. In the 'Reilig Oran'—so called, it is supposed, from St Oran, a kinsman of St Columba, the first who found a grave in it—were buried Ecgfrid, king of Northumbria, in 684; Godred, king of the Isles, in 1188; and Haco Ospac, king of the Isles, in 1228. No monuments of these princes now remain. The oldest of the many tombstones on the island are two with Irish inscriptions, one of them, it is believed, being the monument of a bishop of Connor who died at I. in 1174.

After centuries of neglect, this interesting island seems now to be in the way of improvement. It possesses a church connected with the Establishment, also a Free Church, and a school. A small and commodious inn—the St Columba—was erected in 1863 by the Duke of Argyll, proprietor of I.; by which means tourists and antiquarian explorers are enabled to make visits of satisfactory duration. During summer, steamers from Oban (see HEBRIDES) call at I. twice a week; they land passengers by boats at Baile Mor, the only village on the island, and usually stay an hour, to allow time for visiting the ruins.

IO'NIA, the ancient name of the most flourishing country of Asia Minor. It received its name from the Ionians (one of the four most ancient tribes in Greece), who, again, according to the mythological account, derived theirs from Ion, the son of Apollo by Creusa, a daughter of a king of Athens. According to the usually received tradition, they were driven out of the Peloponnesus by the Achaians, and removed to Attica, whence, about 1050 B.C., bands of them went forth to settle on the coast of Asia. I. was a beautiful and fertile country, extending, according to Ptolemy, from the river Hermus to the river Meander, along the coast of the Ægean Sea, but Herodotus and Strabo make it somewhat larger. It soon reached a high point of prosperity; agriculture and commerce flourished, and great cities arose, of which Ephesus, Smyrna, Clazomenæ, Erythræ, Colophon, and Miletus were the most celebrated. These free cities, which formed the nucleus of the IONIAN LEAGUE, were, however, gradually subdued by the kings of Lydia, and passed (557 B.C.) under the sway of the Persians, but were allowed a considerable measure of internal liberty. During the great Persian war, the contingent which they were compelled to furnish to their Oriental masters deserted to the Greeks, at the battle of Mycale (479 B.C.), whereupon the Ionians entered into an alliance with Athens, upon which they now became dependent. After the Peloponnesian war, they were subject to the Spartans, and again (387 B.C.) to the Persians till the time of Alexander the Great. From this period, I. shared the fate of the neighbouring countries, and in 64 B.C. was added to the Roman empire by Pompey, after the third Mithridatic war. In later times, it was so ravaged by the Turks that few traces of its former greatness are now left.—The Ionians were regarded as somewhat effeminate. They were wealthy and luxurious, and the fine arts (see IONIC ARCHITECTURE) were cultivated amongst them at a much earlier date than amongst their kinsmen in the mother-country. The *Ionic Dialect* excels the other Greek dialects in softness and smoothness, chiefly from the greater number of vowels introduced.

IO'NIAN ISLANDS, a group, or rather chain, running round the west coast of Epirus, and west and south of Greece. It consists of about 40 islands, of which Corfu, Paxo, Santa Maura, Theaki, Cephalonia, Zante, and Cerigo, are of considerable size; the total area is about 1041 square miles, and the population (1864) 228,531, is mostly of Greek descent. The proportion of females to males is as 100 to 116. The collective term 'Ionian' is of modern date. After the division of the Roman Empire, these islands were included in the eastern half, and so continued till 1081, when the Duke of Calabria (subsequently king of Naples) took possession of them. From this time they underwent a continual change of masters, till the commencement of the 15th c., when they by degrees came into the possession of the Venetians, who in 1797 ceded them to France. They were seized by Russia and Turkey in 1800, by France in 1807, by Britain in 1809, and on November 5, 1815, were formed into a republic ('The Septinsular Republic') under the protectorate of the latter. While they were connected with England, the government was carried on by two assemblies, and the *Lord High Commissioner*, who was the representative of Her Majesty. The *lower assembly* consisted of 40 members, who required to be nobles; 29 were elected by the islanders themselves, and 11 by the Lord High Commissioner; their term of office was five years, during which period they held three sessions, of three months each. The *senate*, composed of five members, which the commissioner had power to increase to seven, formed the executive. The commissioner was invested with extensive powers; he could convoke an extraordinary meeting of parliament, confirm or reject the resolutions of the senate, and veto all bills passed by the legislature. Up to 1848, the press was restricted, and the government was really a despotism, but in that and the following year wide-spread dislike of the English government became apparent. To remove what were supposed to be grievances, Lord Seaton, then Lord High Commissioner, introduced sweeping changes in the constitution, including vote by ballot, lowering of the franchise, and freedom of the press. A demand was then made for annexation to the kingdom of Greece, and an insurrection broke out in August 1849 in Cephalonia. It was suppressed by Sir Henry Ward, who had succeeded Lord Seaton, with what was considered by some persons as undue severity. Fresh concessions were granted, but without appeasing the malcontents. In the end of 1858, Mr Gladstone was sent as a special commissioner to ascertain what could be done to meet the claims of the population. But he found that they would be satisfied with nothing but annexation to Greece. There was no great desire on the part of the English government to continue their connection with the Ionian Islands. They had cost the United Kingdom £100,000 per annum, and had been a perpetual source of annoyance. In 1863, the election of the son of the king of Denmark as constitutional king of Greece supplied England with an opportunity of getting rid of this troublesome dependency. On the 29th March 1864, a treaty was concluded at London by which they were annexed to Greece, and since this period they have formed a province of the Hellenic kingdom. In February 1867, they were visited by a series of shocks of earthquake, most violent in Cephalonia, where they caused great destruction of life and property, and almost destroyed the two chief towns. See Murray's *Handbook for Greece and the Ionian Islands*, by R. G. Watson, 4th edition, 1872.

IONIAN MODE, in Music, one of the old church modes, said to be the same as the ancient Greek mode of that name, and the only one of the old church modes which agrees with our modern system of music, the Ionian mode being the same as our key of C major. The character of the Ionian mode, however, must have appeared to the ancients more properly defined than it can to us, as it was the only one of their modes which had a major third and a sharp seventh.

IO'NIC ARCHITECTURE, a style of Greek architecture which took its origin in Ionia, and seems to have derived many of its characteristic features from Assyria. See GRECIAN ARCHITECTURE. The chief peculiarity of Ionic architecture is the capital of the Columns (q. v.), which is decorated with spiral ornaments called Volutes (q. v.). The columns have also bases, which were not used in Doric architecture. The cornice is distinguished by the dentil band, an ornament first introduced in this style. The Honeysuckle ornament (q. v.), so much used in Ionic architecture, is one of the features which indicate its eastern origin.

Many large temples were erected in this style in Asia Minor and Greece. Among the finest examples now existing are the temples of Erechtheus and Minerva Polias on the Acropolis at Athens, Apollo Didymæus at Miletus, Minerva Polias at Priene, and Bacchus at Teos; and the temple of Fortune at Rome.

IONIC SCHOOL is the collective name given to the earliest Greek philosophers, Thales, Anaximander, Anaximenes, Heraclitus, and Anaxagoras, on account of their following one general tendency, and belonging for the most part to Ionia. See the biographies of these philosophers.

I. O. U., a memorandum of debt given by a borrower to a lender, so called from being made in this abbreviated form:

LONDON, *January* 1, 1873.

Mr A. B., I. O. U. £20.

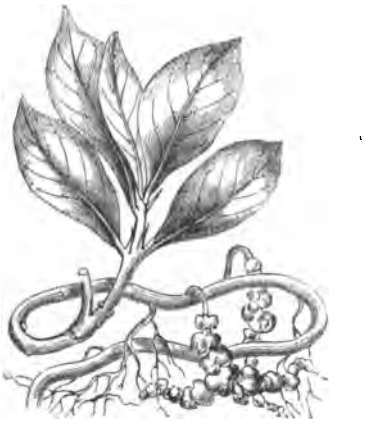
C. D.

It is a convenient document, because it requires no stamp, and yet it is valuable evidence of the existence of the debt, in case an action is afterwards brought. If, however, the I. O. U. contain any promise to pay the debt, then it will amount to a promissory-note, and be void unless it have a stamp.

I'OWA, one of the United States of America, was organised as a state, with governor and legislature, in 1846. It lies between 40° 20′ and 43° 30′ N. lat., and 90° 12′ and 96° 53′ W. long., and extends 208 miles from north to south, and 300 from east to west, with an area of 55,045 square miles, or 35,228,800 acres. It is bounded on the N. by Minnesota; E. by Wisconsin and Illinois, from which it is separated by the Mississippi River; S. by Missouri; and W. by the state of Nebraska, from which it is separated by the Missouri River. It has 100 counties, with Des Moines for its capital. The population in 1840 was 43,112; in 1850, 192,214; in 1860, 674,948; in 1870, 1,182,933. The rivers are the Mississippi and Missouri on its eastern and western borders, and the Des Moines, Iowa, Red Cedar, and their branches. The surface is undulating and beautiful, with alternate forests and prairies. There are no mountains; but bold bluffs, with picturesque ravines, line the rivers. In the north-east, there are rich deposits of lead, and coal in the south and west, with iron, marble, clay, gypsum, &c. The soil is exceedingly fertile, and the climate healthful; the peach blossoms in the middle of April, but the winters are severe, with an average of 26°. The chief productions are wheat, maize, flax, tobacco, cattle, and hogs. It has not much direct foreign commerce, but trades extensively with the Atlantic and Gulf towns, and with the interior. The chief river ports of I. are Keokuk, Fort Madison, Burlington, Muscatine, Davenport, Clinton, Bellevue, and Dubuque. There are many manufactories, and in 1872 there were 3144 miles of railway. In 1870 there were 7322 public schools, 49 colleges, and 103 other schools, with a total attendance of 217,654.

IOWA CITY, a city in Iowa, United States of America, formerly the capital of the territorial government, is situated on the Iowa River, 80 miles from its mouth. It is built on a succession of plateaux, rising from the river. The first is a public promenade; the third is crowned by the capitol, now the state university. It has also county buildings, and the state asylums, with factories on the falls of the river. There is steamboat navigation to the Mississippi, and connection with the east by railway. Pop. (1870) 5914.

IPECACUA'NHA, the name both of a very valuable medicine and of the plant producing it. The plant (*Cephaëlis Ipecacuanha*) belongs to the natural order *Cinchonaceæ*, and grows in damp shady woods in Brazil and some other parts of South America. It is somewhat shrubby, with a few oblongo-lanceolate leaves near the ends of the branches, long-stalked heads of small white flowers, and soft dark purple berries. The part of I. used in medicine is the root, which is simple or divided into a few branches, flexuous, about as thick as a goose-quill, and is composed of rings of various size, somewhat fleshy when fresh, and appearing as if closely strung on a central woody cord. The different kinds known in commerce (*Gray*, *Red*, *Brown*) are all produced by the same plant; the differences arising from the age of the plant, the mode of drying, &c. I. root is prepared for the market by mere drying. It is collected at all seasons, although chiefly from January to March; the plant is never cultivated, but is sought for in the forests chiefly by Indians, some of whom devote themselves for months at a time to this occupation. It has now become scarce in the neighbourhood of towns.



Ipecacuanha.

Various other plants, containing emetine, are used as substitutes for true ipecacuanha. The I. of Venezuela is produced by *Sarcostemma glaucum*, of the order *Asclepiadeæ;* and to this order belongs *Tylophora asthmatica*, the root of which is found a valuable substitute for I. in India.

It is in the bark of the root that the active principle, the *emetine*, almost entirely lies, and in good specimens it amounts to 14 or 16 per cent.; the other ingredients, such as fatty matters, starch, lignine, &c., being almost entirely inert. Emetine is represented by the formula $C_{37}H_{27}NO_{10}$. It is a white, inodorous, almost insipid powder, moderately soluble in alcohol, and having all the characters of the vegetable alkaloids. It acts as a violent emetic in doses of $\frac{1}{16}$th of a grain or less, and is a powerful poison. The incautious inhalation of the dust or powder of I.—as in the process of powdering it—will often bring on a kind of spasmodic asthma.

In small and repeated doses—as, for instance, of a grain or less—I. increases the activity of the secreting organs, especially of the bronchial mucous membrane, and of the skin. In larger doses of from 1 to 5 grains it excites nausea and depression, while in doses of from 15 to 30 grains it acts as an emetic, without producing such violent action or so much nausea and depression as tartar emetic.

I. is useful as an emetic when it is necessary to unload the stomach in cases where there is great debility, or in childhood. As a nauseant, expectorant, and diaphoretic, it is prescribed in affections of the respiratory organs, as catarrh, hooping-cough, asthma, &c.; in affections of the alimentary canal, as indigestion, dysentery, &c.; and in disorders in which it is desired to increase the action of the skin, as in diabetes, febrile affections, &c.

Besides the Powder, the most useful preparations are the Wine of I.—of which the dose to an adult as a diaphoretic and expectorant ranges from 10 to 40 minims, and as an emetic from 2 to 4 drachms—and the Compound I. Powder, commonly known as *Dover's Powder* (q. v.). To produce the full effect as a sudorific, a dose of ten grains of Dover's Powder should be followed by copious draughts of white-wine whey, treacle-posset, or some other warm and harmless drink.

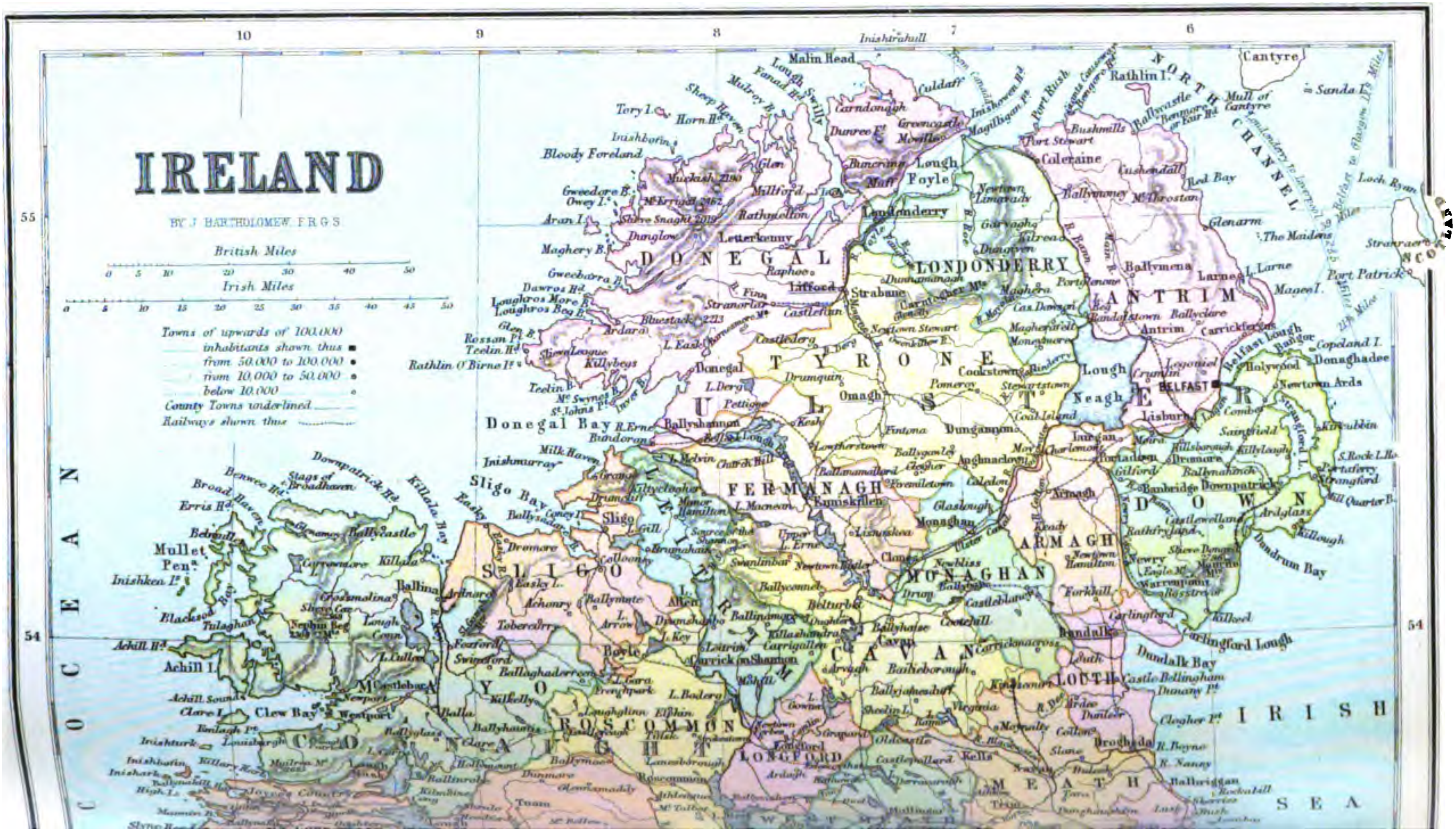
IPHIGENI'A, in Grecian legend, a daughter of Agamemnon and Clytemnestra, or, according to others, an adopted daughter of Clytemnestra. Her father, having offended Diana, vowed to make atonement by sacrificing to the goddess the most beautiful thing born within the year. This happened to be Iphigenia. Agamemnon long delayed the fulfilment of his vow, but at length the Trojan expedition drew on, and the Greek fleet being detained in Aulis by a calm, the seer Calchas declared that Agamemnon must keep his promise. When I. was brought to the altar, however, she disappeared, and a hind lay there in her stead, Diana herself having carried her off in a cloud to Tauris, where she became her priestess, but was afterwards recognised by her brother, Orestes, who carried her, along with the image of Diana, to Attica. The legend is of post-Homeric origin. It has, however, been much wrought into Grecian poetry, and afforded many subjects to painters and sculptors. In modern literature, it has been again employed with great power of genius and poetic art by Goethe in his *Iphigenia auf Tauris*.

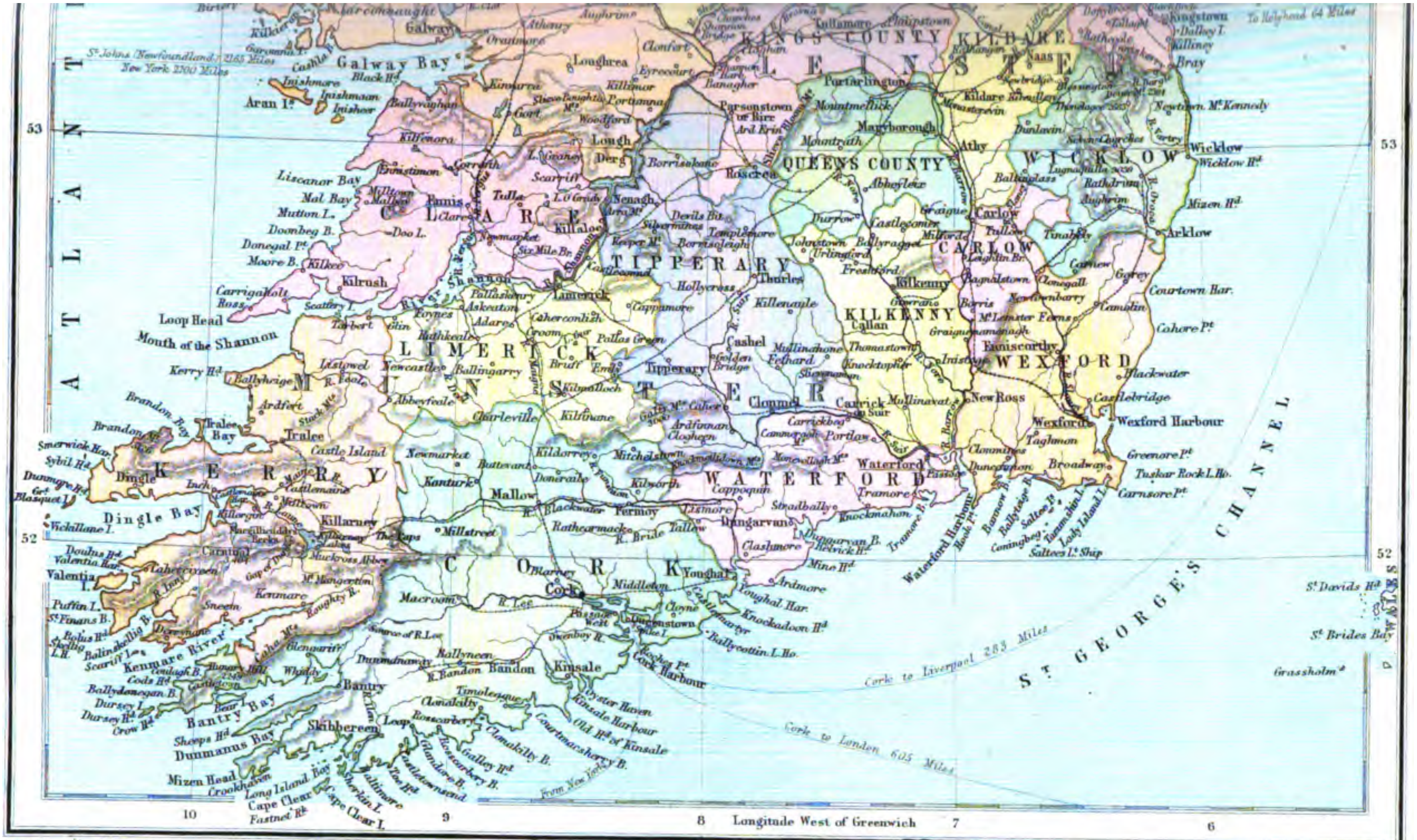
IPOMÆ'A, a genus of plants of the natural order *Convolvulaceæ*, differing very little from the genus *Convolvulus*. The species are numerous. They are mostly natives of warm countries. Some of them are often to be seen in flower-gardens and hot-houses, being very ornamental, and readily covering trellises with their twining stems, large leaves, and large beautiful flowers. The roots of some of them yield a resinous substance, which possesses properties resembling those of jalap, and the true Jalap (q. v.) plant itself has sometimes been referred to this genus.

IPSAMBU'L. See ABOUSAMBUL.

I'PSICA. See MODICA.

I'PSWICH, a market-town, parliamentary and municipal borough, and river-port of England, capital of the county of Suffolk, is agreeably situated on the river Orwell, at the foot of a range of hills, 68 miles north-east of London. The older portions of the town consist of narrow and irregular streets, some of the old houses of which are ornamented with curious carved work. It contains numerous churches and benevolent institutions, a town-hall, a mechanics' institution, with about 700 members; and a Working Men's College, with 200 members. Of its educational establishments, the principal is the grammar-school, founded by Cardinal Wolsey, and endowed by Queen Elizabeth. It has an income from endowment of £116, 6*s*. 8*d*., has six scholarships, exclusive of an Albert scholarship,


IRELAND
BY J. BARTHOLOMEW, F.R.G.S.
British Miles
0 5 10 20 30 40 50
Irish Miles
0 5 10 15 20 25 30 35 40 45 50
Towns of upwards of 100,000 inhabitants shown thus ■
from 50,000 to 100,000 ●
from 10,000 to 50,000 ●
below 10,000 ○
County Towns underlined
Railways shown thus
10
9
8
7
6
55
54
OCEAN
NORTH CHANNEL
IRISH SEA
Inishtrahull
Malin Head
Lough Swilly
Tory I.
Bloody Foreland
DONEGAL
Donegal Bay
LONDONDERRY
Londonderry
Lough Foyle
ANTRIM
BELFAST
Lough Neagh
TYRONE
FERMANAGH
ARMAGH
DOWN
MONAGHAN
CAVAN
LOUTH
MEATH
LONGFORD
SLIGO
Sligo Bay
ROSCOMMON
MAYO
Clew Bay
Achill I.
Mullet Pen.
Killala Bay
ULSTER
CONNAUGHT
Dundalk Bay
Carlingford Lough
Dundrum Bay
Strangford L.
Rathlin I.
Cantyre
Mull of Cantyre
Port Patrick
Stranraer
Loch Ryan
SCOTLAND



Printed in Colours by

W. & A.K. Johnston. Edinburgh.

W. & R. CHAMBERS LONDON & EDINBURGH.

founded as a memorial of the late Prince Consort, and two exhibitions at Pembroke College, Cambridge. There are large iron and soap factories, breweries, corn-mills, and ship-building docks. In 1869, 2213 vessels, of 179,469 tons, entered and cleared the port. The exports are chiefly agricultural produce, and agricultural implements and machinery; imports, wine, coal, iron, and timber. The town can be approached by vessels of 500 tons. It sends two members to the imperial parliament. Pop. (1871) 42,947. I. was pillaged by the Danes in 991, and again in 1000.

IRA'K-A'JEMI, a large province of Persia, is bounded on the N. by the provinces of Azerbijan, Ghilan, and Mazanderan, and on the E. by Khorasan. On the S. and W., the boundaries are not definitely laid down. In the extreme north are the Elburz Mountains, and throughout the province are several other chains, all of them running from south-east to north-west. A great portion of the surface of the province consists of elevated tablelands, but there are also numerous fertile valleys traversed by rivers. Many of the rivers of I. are swallowed up by sandy tracts into which they flow. The chief towns of the province are the capital Teheran and Ispahan.

IRA'K-A'RABI, a district in Turkey in Asia, the ancient Babylonia (q. v.), comprises the ruins of the ancient cities of Babylon, Seleucia, and Ctesiphon. During the last 250 years of the califate, this was the poor remnant of their once wide dominion which remained to the successors of Mohammed.

IRA'N, the modern native name of Persia. See ARYAN RACE.

IRBIT, a district town of the government of Perm, Eastern Russia, since 1775; founded (1635) by Russian emigrants. The town is situated on the rivers Irbit and Nitza, in lat. 57° 35′ N., and long. 62° 50′ E., is 1760 miles distant from St Petersburg, and contains 4244 inhabitants. It is remarkable for its extensive fair, the largest in Russia, after that of Nijui-Novgorod. The fair takes place annually from the 27th of February till the end of March, has been instituted for more than 200 years, and attracts about 10,000 merchants and visitors from Russia, Siberia, Persia, Bokhara, &c. The principal goods are cloths, silk stuffs, brocades, sugar, coffee, china, and hardware from Russia; tea and nankeen from China, through Kiachta; furs and fish from Siberia; cotton stuffs from Bokhara, &c. The whole quantity of goods brought to market is valued at £5,500,000.

I'RELAND, an island, forming part of the United Kingdom of Great Britain and Ireland, lies between lat. 51° 26′ and 55° 23′ N., and long. 5° 20′ and 10° 26′ W. It is washed on the N., W., and S. by the Atlantic, and on the E. by a strait, called at different places the North Channel, the Irish Sea, and St George's Channel, which separates it from the larger island of Great Britain. Its greatest length, from Fair Head in Antrim to Crow Head in Kerry, is 306 miles, but its greatest meridional length is not more than 225; its greatest breadth, between the extreme points of Mayo and Down, is 182 miles, but between Galway Bay and Dublin, it is not more than 120. The total area is about 32,524 square miles, of which 15,464,825 acres are arable land; 4,357,338 acres are uncultivated; 316,597 are covered with wood; 49,236 are occupied by towns of 2000 inhabitants and upwards; while the lakes and waters of the country cover 627,464 acres. Pop. (1871) 5,411,416. I. is divided into the four provinces of Ulster, Leinster, Munster, and Connaught, which again are subdivided into 32 counties. The following table exhibits the area of the different provinces and counties, the number of inhabited houses, and the population in 1861 and 1871:

Provinces and Counties.	Area in Stat. Acres.	Inhabited Houses, 1871.	Population, 1871.	Population, 1861.
LEINSTER.				
Carlow, . . .	221,342	9,704	51,472	57,137
Dublin, . . .	226,517	51,924	405,625	410,252
Kildare, . . .	418,436	14,263	84,198	90,946
Kilkenny, . . .	509,732	20,609	109,302	124,515
King's, . . .	493,985	14,842	75,781	90,043
Longford, . . .	269,409	12,000	64,408	71,694
Louth, . . .	203,149	16,781	84,198	90,713
Meath, . . .	578,657	18,660	94,480	110,373
Queen's, . . .	424,854	15,001	77,071	90,650
Westmeath, . . .	453,468	15,138	78,416	90,879
Wexford, . . .	576,588	24,972	132,506	143,954
Wicklow, . . .	500,178	14,114	78,509	86,479
Total, . .	4,876,315	227,108	1,335,966	1,457,635
MUNSTER.				
Clare, . . .	827,994	26,159	147,994	166,305
Cork, . . .	1,849,685	85,030	516,046	544,818
Kerry, . . .	1,185,917	32,233	196,014	201,800
Limerick, . . .	680,842	31,847	191,313	217,277
Tipperary, . . .	1,061,731	38,354	216,210	249,106
Waterford, . . .	461,552	21,139	122,825	134,252
Total, . .	6,067,721	234,762	1,390,402	1,513,558
ULSTER.				
Antrim, . . .	762,079	74,037	419,782	369,210
Armagh, . . .	328,086	34,429	179,221	190,086
Cavan, . . .	477,360	26,372	140,555	153,906
Donegal, . . .	1,193,442	40,800	217,992	237,395
Down, . . .	612,335	55,653	277,775	298,680
Fermanagh, . . .	457,370	17,516	92,688	105,768
Londonderry, . .	522,314	32,601	173,932	184,209
Monaghan, . . .	319,741	21,821	112,785	126,482
Tyrone, . . .	806,657	41,263	215,668	238,500
Total, . .	5,479,384	344,492	1,830,398	1,914,236
CONNAUGHT.				
Galway, . . .	1,566,852	45,747	248,257	271,478
Leitrim, . . .	392,363	17,495	95,324	104,744
Mayo, . . .	1,367,618	44,091	245,855	254,796
Roscommon, . .	603,955	25,792	141,246	157,272
Sligo, . . .	461,752	20,955	115,311	124,845
Total, . .	4,392,040	153,990	845,993	913,135
General Total (Ireland)	20,815,460	960,352	5,402,759	5,798,564

Physical Aspect.—I. is of oblong form, and like Great Britain, the eastern coast is comparatively unbroken, while the west, north, and south are deeply indented. It is an undulating or hilly country—less rugged than the Highlands of Scotland, and not so tame as the eastern section of England. Its hills are more rounded than abrupt, and lie not so much in ranges as in detached clusters round the coasts. These mountain tracts rarely extend more than twenty miles inland, and they seem to form a broad fringe round the island; while the interior appears as a basin composed of flat or gently swelling land. The principal ranges are the Mourne Mountains in Down, which attain their highest elevation in Slieve Donard, 2796 feet above the sea; the mountains of Wicklow, which rise to a height of 3039 feet; and Macgillicuddy Reeks in Kerry, which, in the peak of Carran-Tual, the loftiest point in Ireland, reach 3414 feet. The purely flat or level portions of the island, with the exception of some fine tracts of fertile valley-land in Kilkenny, Tipperary, and Limerick, consist mainly of *bog* or morass, which occupies, according to Dr Kane, 2,830,000 acres, or about a seventh part of the entire superficies. The largest of these morasses is the Bog of Allen, which stretches in a vast plain across the centre of the island, or over a large portion of Kildare, Carlow, King's and Queen's counties—having a summit elevation of 280 feet. Extensive tracts of deep wet bog also occur in Longford, Roscommon, and other counties, and give a peculiarly dreary and desolate aspect to the scenery. Notwithstanding the quantity of water in these bogs, they exhale no miasma injurious to health, owing to the large quantity of tannin which they contain.

Hydrography.—The principal river of I., and the largest in the United Kingdom, is the Shannon (q. v.). The streams which drain the eastern part of the central plain are the Liffey and the Boyne; the south-eastern part, the Suir, the Barrow, and the Nore; while the waters of the north-eastern part are collected into Lough Neagh, chiefly by the Blackwater, and thence discharged into the sea by the Lower Bann. The rivers *external* to the great central plain are necessarily short. The principal are the Erne, flowing to the north-west; the Foyle and the Bann, to the north; the Lagan, to the north-east; the Slaney, to the south-east; and the Bandon, Lee, and Blackwater, flowing in an easterly course through the county of Cork, the most southern county in the island. None of these rivers are naturally of importance to navigation. The Shannon, however, has been made navigable to its source by means of locks and lateral cuts; the Barrow, by similar means, to Athy; the Foyle, by canal to Strabane; and several of the others have been artificially united by such lines as the Lagan, Newry, Ulster, Royal, Grand, Athy, and other canals—which now intersect a considerable portion of the island.

The lakes of I. (called loughs) are, as might be expected from the surface-character of the country, both numerous and extensive in proportion to the size of the island. The largest is Lough Neagh in Ulster, covering an area of 100,000 acres. The other loughs of consequence are Loughs Erne and Derg, also in Ulster; Conn, Mask, and Corrib, in Connaught; the Allen, Ree, and Derg, which are expansions of the river Shannon, and the lakes of Killarney (q. v.) in Kerry.—The bays and salt-water loughs which indent the island are also numerous and of considerable importance. About seventy are suitable for the ordinary purposes of commerce; and there are fourteen in which the largest men-of-war may ride in safety. The principal are Loughs Foyle and Swilly, on the north coast; the Bays of Donegal, Sligo, Clew, and Galway, the estuary of the Shannon, Dingle Bay, and Bantry Bay, on the west; the harbours of Cork and Waterford, on the south; Wexford harbour, the Bays of Dublin, Drogheda, and Dundalk, and Loughs Carlingford, Strangford, and Belfast, on the east. —The islands are, generally speaking, small and of little importance. On the east coast, the largest is Lambay, about two and a half miles off the coast of Dublin; on the south and south-east coasts are Clear Island, the Saltees, a dangerous group of islets, about eight miles south of the Wexford coast, indicated by a floating light, and Tuscar Rock, about eight miles east of Carnsore Point, also a dangerous ledge, rising 20 feet above the sea, and surmounted by a light-house after the model of the Eddystone; on the west coast, the Skelligs, Valentia, the Blaskets, the South Arran Isles, Innisbofin, Innisturk, and Clare, Achil or 'Eagle' Island, and the Inniskea Islets; on the north coast, the North Arran Isles, the Tory Isles, and Rathlin.

Geology.—A great series of grits and slates of Cambrian age occur in the south-east of I.; the upper portion contains a few fossils of zoophytes and worms. Lower *Silurian strata* rest unconformably on the Cambrian rocks in the same district. They consist of flags, slates, and grits many thousand feet in thickness, extending over large portions of Kildare, Wicklow, Wexford, and Waterford. Several detached patches occur to the west of this district, forming the Keeper, Arra, and Inchiquin Mountains. A tract of similar beds stretches from the centre of I., near the source of the Shannon, to the coast of Down. The strata in proximity to the Wicklow and Dublin granites are converted into gneiss and mica-slate. This is the condition of all the beds in the north-west, in Donegal, Tyrone, and Mayo; they appear to be a continuation of the highly altered strata of the north of Scotland. Detached portions of Upper Silurian measures occur on the western side of the island, in Kerry, Galway, and Mayo.

Between the Silurian and Old Red Sandstone is an enormous thickness (11,000 feet) of sandstone grit and shale in Kerry and Cork. These strata are almost wholly unfossiliferous.

Old Red Sandstone strata, consisting of red and yellow sandstone and slate, cover a large tract of the south of I., stretching almost continuously from the extreme west of Cork and Kerry into Waterford and Kilkenny, being stopped by the Silurian rocks of Wexford and Carlow. Along the bases of the Silurian mountains of the south centre of I., and in the southern portion of the county of Cork, occurs a great thickness of sandstones, which have hitherto yielded no fossils; some geologists refer these to the Old Red series, others hold them to be Lower Carboniferous.

The *Carboniferous Limestone* is extensively developed in I., occupying the whole of the centre of the country, except in those places already alluded to, where the older rocks appear on the surface. This great tract is an extensive plain covered with drift, and with peat-moss and freshwater marl, in which are found the remains of *Megaceros Hibernicus* and *Bos longifrons*. In Kerry, Cork, and Waterford, the strata are very much contorted, the coal-seams are changed into anthracite, and so squeezed and crushed as to be got only in small dice-like fragments. Further north, the strata are nearly horizontal, but the coal-fields are limited, and the seams are generally of inconsiderable thickness. They occur chiefly in Tipperary, Kilkenny, Tyrone, and Antrim.

Small deposits of *Permian strata* are found at Ardtrea in Tyrone, and at Cultra near Belfast; the sandstones of Roan Hill near Dungannon are probably of the same age. The red and variegated marls containing beds of gypsum and rock-salt, which exist on the coast north from Belfast, are probably *Triassic*. Resting on these marls are a few thin beds of *Lias*. *Cretaceous* strata occur in Antrim and Derry.

Climate.—Though the climate of I. bears, as might have been expected, a strong resemblance to that of Great Britain (q. v.), it has yet a character peculiar to itself, owing to the marked difference in the configuration of its surface, its greater distance from the continent of Europe, and its being, as it were, more completely bathed in the warm waters of the Gulf Stream. The mean annual temperature of the central parts of the country is about 50°·0, rising in the south to 51°·5, and falling in the north to 48°·5. There are thus 3°·0 of difference between the extreme north and south, and it may be noted that, speaking generally, this difference is constant through all the seasons of the year. The mean temperature in winter is 41°·5; in spring, 47°·0; in summer, 60°·0; and in autumn, 51°·0.

The annual rainfall averages from 25 to 28 inches, except in the neighbourhood of hills, where the precipitation is considerably augmented; thus, at Valentia, in Kerry, the rainfall of 1861 amounted to 73 inches, and doubtless this large fall was greatly exceeded in those parts which are situated among the higher hills. The rainfall in winter, particularly in the west, is greatly in excess of the other seasons, owing to the low temperature of the surface of the ground during winter, which suddenly chills the warm and moist south-west winds that prevail, especially at this time of the year, and condenses their vapour into rain. Since in Great Britain the chief mountain ranges are in the west, it follows that over the whole eastern slope of the island the climate is drier, the amount and frequency of the rainfall much less, and the sunshine more brilliant than in the west. In I., on the other hand, the hills in the west do not oppose such a continuous barrier to the onward progress of the south-west winds, but are more broken up and distributed in isolated groups. It follows that the sky is more clouded, and rain falls more frequently in I., and the climate is thus rendered more genial and fostering to vegetation; hence the appropriateness of the name 'Emerald Isle.' Again, owing to its greater distance from the continent, the parching and noxious east winds of spring are less severely felt in I., because the north-east winds have acquired more warmth and moisture in their progress. It is on this account that the most salubrious spring climates possessed by England, Scotland, and I. are situated in the south-west of their respective countries. Thus, Queenstown, in the south-west of I., enjoys an average spring temperature as high as 50°·0, which is about the highest in the British Islands, and nearly 3°·0 higher than the east of Kent, which is nearly in the same latitude.

Since wheat ripens in these latitudes with a mean summer temperature of 56°·0, it follows that the climate of I. is quite sufficient for the successful cultivation of the finer sorts of grain, which are subjected to much less risk in backward seasons than is the case in North Britain, where the summer temperature is only a degree and a half from the extreme limit of wheat-cultivation. Also, considering its remarkably open winters, which lengthen out the period of grazing, its mild and genial climate through all the seasons, and its comparative freedom from droughts, it will be seen that its climate is equally well adapted for the rearing of cattle. These considerations, combined with the fertility of the soil, open up for I., as far as the physical conditions are concerned, a prospect of great national prosperity, based on most remarkable, though as yet only partially developed agricultural resources.

Soil and Vegetation.—Until the middle of last century, I. was almost exclusively a pasturing country, and in 1727 an attempt was made (unsuccessfully, however) to pass an act compelling landholders to 'till five acres out of every hundred in their possession, and to release tenants to the same extent from the penal covenants in their leases against tillage.' The result of this state of things is the wretchedly poor system of agriculture, from which I. still suffers largely. The natural fertility of the country is nevertheless great.

The extent under each of the principal crops in 1871, 1872, and 1873 is given in the following table:

Crops.	Extent cultivated in 1871. Acres.	1872. Acres.	1873. Acres.
Wheat, ...	244,451	225,294	168,435
Oats, ...	1,636,136	1,624,711	1,510,089
Barley, bere, and rye,	232,534	228,988	239,428
Beans and pease, .	10,913	11,084	12,872
Potatoes, . . .	1,056,434	991,871	903,282
Turnips, . . .	327,035	346,711	347,904
Other green crops, .	126,220	135,652	121,234
Flax, ...	156,670	121,992	129,432
Meadow and clover,	1,829,044	1,800,273	1,837,483

The estimated produce in 1871 and 1872 was as under:

Crops.	Produce, 1871.	Produce, 1872.
Wheat, ...	705,939	609,831 qrs.
Oats, ...	7,410,814	6,654,456 "
Barley, bere, and rye, .	965,709	896,311 "
Beans and pease, .	49,690	54,627 "
Potatoes, ...	2,793,641	1,805,827 tons.
Turnips, ...	4,246,332	3,963,805 "
Mangel and cabbage, .	761,863	819,716 "
Flax, ...	12,919	17,089 "
Meadow and clover, .	3,315,525	3,495,996 "

Live-stock.—According to the census returns of 1851, the estimated value of the live-stock was £27,737,393; for 1861, £33,434,385; and for 1871, £37,515,211.

Fisheries.—In her fisheries, I. is supposed to possess an almost inexhaustible mine of wealth, but, strange to say, they are much neglected. The surrounding seas abound with cod, ling, hake, herrings, pilchards, &c., and yet the Irish markets are extensively supplied with cured fish from Scotland and the Isle of Man. The number of vessels and boats engaged in the sea-fisheries in 1846 was 20,000, employing 100,000 men and boys; but in 1872, it had decreased to 8000, employing only 31,000 persons. The inspectors of fisheries have recommended the advance of a loan, for the repair and purchase of boats and gear.

Manufactures.—According to M'Culloch, 'Ireland is not, and never has been, a manufacturing country. Its unsettled turbulent state, and the general dependence of the population on land, have hitherto formed insuperable obstacles to the formation of great manufacturing establishments in most parts of the country; whilst the want of coal, capital, and skilful workmen, and the great ascendency of England and Scotland in all departments of manufacture, will, there is reason to think, hinder Ireland from ever attaining eminence in this department.' Linen is the staple manufacture, of which Belfast and the surrounding districts of Ulster are the chief seats. The export of linen manufactures from I. to Great Britain was, in 1864, £10,327,000. The manufacture of woollen stuffs is limited to a few localities, as Dublin, Cork, Waterford, Queen's County, and Kilkenny. Silk and cotton manufactures are also carried on, but only to a comparatively inconsiderable extent. In 1870, the number of factories (cotton, woollen, worsted, flax, jute, and silk) in I. amounted to 273, employing 1,081,694 spindles, 18,630 power-looms, and 63,952 persons of both sexes; of these, 154 were flax-factories, employing 916,660 spindles, 14,834 power-looms, and 55,039 persons. A great source of employment for females has of late years sprung up in the north of I., in the working of patterns on muslin with the needle. Belfast is the centre of this manufacture, which employs about 300,000 persons, chiefly females, scattered through all the counties of Ulster, and some localities of the other provinces. About forty firms are engaged in the trade, and the gross value of the manufactured goods amounts to about £1,400,000. Silk manufactures, since their introduction by French emigrants in the beginning of the last century, have been almost entirely confined to Dublin; but poplin is now extensively manufactured there, and in a few other towns.

Commerce and Shipping.—The exportation of the agricultural produce of the country has always been the chief commercial business carried on in Ireland. By far the greater part of this trade is carried on with Great Britain. It cannot, however, be traced later than 1825, when the commercial intercourse between Great Britain and I. was assimilated by law to the coasting-traffic carried on between the different ports of England, except in the single article of grain.

The number of sailing and steam vessels, with their tonnage, registered in the ports of I., in 1871, was 1776 vessels, tonnage 218,162; the number of men being 11,887.

Government.—The government of I., since the Union in 1801, is identical with that of Great Britain. It is represented in the imperial parliament by 32 members of the House of Lords, and 105 of the House of Commons. The executive government is invested in a Lord-lieutenant, assisted by a Privy Council and Chief Secretary; and the law is administered by a Lord Chancellor, a Master of the Rolls, and twelve judges of the supreme courts of Queen's Bench, Common Pleas, and Exchequer. County, peace, and municipal matters are conducted much in the same way as in England, with the exception of an armed national constabulary or police force of nearly 12,000 men, with 348 horses.

Religion.—A vast majority of the inhabitants of I. are Roman Catholics; but the established church was a branch of the Episcopal Church of England till January 1871, when it was at length disestablished, after much opposition. According to the statistics of 1871, the number of Roman Catholics was 4,150,877; of Protestants, 1,260,568; and of Jews, 258.

Education.—I. possesses several universities: Dublin University (q. v.), was founded by Queen Elizabeth in 1591; the Queen's Colleges of Belfast, Cork, and Galway, were opened in 1849, and are united in one university. Maynooth College, for the education of Roman Catholic priests, is supported at the public expense, and is attended by 520 students. There are also several Irish colleges and medical schools in connection with the London University. The primary schools of I. are mostly under the management of the 'Commissioners of National Education.' This system, established in 1833, proceeds on the principle that 'the schools shall be open alike to Christians of every denomination; that no pupil shall be required to attend any religious exercise, or receive any religious instruction which his parents may not approve; and that sufficient opportunity shall be afforded to pupils of each religious persuasion to receive separately such religious instruction as their parents or guardians may think fit.' The following table exhibits the progress of the system:

Years.	No. of Schools.	No. of Pupils.	Parliamentary Grants.
1834	1,106	145,521	£20,000
1840	1,978	232,560	50,000
1850	4,547	511,239	125,000
1860	5,632	804,000	270,722
1870	6,806	998,999	394,209
1871	6,914	1,021,700	408,388

Taking the pupils of 1871, we find the number of Roman Catholic children to be 822,016; of Presbyterian, 113,227; of Episcopalian, 78,789; belonging to other sects, 7668. Besides these national schools, the 'Church Education Society' had, in 1870, 52,166 scholars, of whom 44,662 belonged to the established church, 3747 to other Protestant churches, and 3757 to the Roman Catholic.

History.—According to ancient native legends, I. was in remote times peopled by tribes styled Firbolgs and Danauns, eventually subdued by Milesians or Gaels, who acquired supremacy in the island. The primitive inhabitants of I. are now believed to have been of the same Indo-European race with the original population of Britain. Although I., styled *Iernis*, is mentioned in a Greek poem five centuries before Christ, and by the names of *Hibernia* and *Juverna* in various foreign pagan writers, little is known with certainty of her inhabitants before the 4th c. after Christ, when, under the appellation of *Scoti*, or inhabitants of *Scotia*, they became formidable by their descents upon the Roman province of Britain. These expeditions were continued and extended to the coasts of Gaul till the time of Laogaire MacNeill, monarch of Ireland (430 A.D.), in whose reign St Patrick (q. v.) attempted the conversion of the natives. Although Christianity had been previously introduced in some parts of the island, Patrick encountered great obstacles, and the new faith was not fully established in I. till about a century after his decease.

From the earliest period, each province of I. appears to have had its own king, subject to the *Ard-Righ* or monarch, to whom the central district called Meath was allotted, and who usually resided at Tara. Each clan was governed by a chief selected from its most important family, and who was required to be of mature age, capable of taking the field efficiently when occasion required. The laws were peculiar in their nature, dispensed by professional jurists styled *Brehons*, who, as well as the poets and men of learning, received high consideration, and were endowed with lands and important privileges. Cromlechs, or stone tombs and structures, composed of large uncemented stones, ascribed to the pagan Irish, still exist in various parts of Ireland. Lacustrine habitations, or stockaded islands, styled *Crannóga* or *Crannoges* (q. v.), in inland lakes, also appear to have been in use there from early ages. Of articles of metal, stone, clay, and other materials in use among the ancient Irish, a large collection has been formed in the Museum of the Royal Irish Academy at Dublin. It is remarkable that a greater number and variety of antique golden articles of remote age have been found in I. than in any other part of Northern Europe; and the majority of the gold antiquities illustrative of British history, now preserved in the British Museum, are Irish.

In the 6th c., extensive monasteries were founded in I., in which religion and learning were zealously cultivated. From these establishments, numerous missionaries issued during the succeeding centuries, carrying the doctrines of Christianity under great difficulties into the still pagan countries of Europe, whose inhabitants they surprised and impressed by their self-devotion and asceticism. Many students of distinction from England and the continent frequented I., and received gratuitous instruction at this period. To these ages has been ascribed the origin of the peculiar style of art-ornamentation, specimens of which are still extant in Irish manuscripts, and which was long erroneously assigned to the Anglo-Saxons, who now appear to have been indebted to the Irish mainly for Christianity, and entirely for letters. Among the eminent native Irish of these times were Columba (q. v.), or Colum Cille, founder of the celebrated monastery of Iona; Comgall, who established the convent of Bangor, in the county of Down; Ciaran of Clonmacnoise; and Adamnan, abbot of Iona, and biographer of Columba. Of the Irish missionaries to the continent, the more distinguished were Columbanus (q. v.), founder of Bobio; Gallus of St Gall, in Switzerland; Dichuill, patronised by Clotaire; and Ferghal, or Virgilius, the evangeliser of Carinthia. The progress of Irish civilisation was checked by the incursions of the Scandinavians, commencing towards the close of the 8th c., and continued for upwards of 300 years. Establishing themselves in towns on the eastern coast of I., with the assistance of friendly native tribes, they continued to make predatory expeditions into the interior until their signal overthrow at the battle of Clontarf, near Dublin (1014 A.D.), by Brian, surnamed Borumha, monarch of Ireland. From the close of the 8th to the 12th c., I., although harassed by the Scandinavians, produced many writers of merit, among whom were Ængus, the hagiographer; Cormac MacCullenan, king of Munster, and Bishop of Cashel, the reputed author of *Cormac's Glossary;* Cuan O'Lochain; Gilla Moduda; Flan of Monasterboice; and Tigerhnach, the annalist. The Irish scholars who during these times acquired highest eminence on the continent were Joannes Erigena, the favourite of Charles the Bald of France; Dungal, one of the astronomers consulted by Charlemagne; Dichuill, the geographer; Donogh, or Donatus, Bishop of Fiesole; and Marianus Scotus. Of the state of the arts in Ireland during the same period, elaborate specimens survive in the shrine of St Patrick's bell, the Cross of Cong, in Mayo (12th c.); the Limerick and Cashel crosiers, and the Tara brooch, all displaying minute skill and peculiar style. To these times some are inclined to assign the *Book of Kells*, a Latin copy of the four Gospels in the Irish character, in the library of Trinity College, Dublin, which Mr Westwood has pronounced to be the most elaborately executed manuscript of early art now in existence, and of portions of which fac-similes are given in his work *Palæographia Sacra Pictoria.* Of the Irish architecture of the period, examples survive at Cashel. The well-known round towers of I. are believed to have been erected about this era as belfries, and to serve as places of security for ecclesiastics during disturbances. The skill of the Irish musicians in the 12th c. is attested by the enthusiastic encomiums bestowed by Giraldus Cambrensis upon their performances. The Scandinavians have left behind them in I. no traces of civilisation except coins struck at Dublin, Waterford, and Limerick, in which towns they were, for the most part, subject and tributary to the natives.

The first step towards an Anglo-Norman descent upon I. was made by Henry II., who obtained in 1155 a bull from Pope Adrian IV., authorising him to take possession of the island, on condition of paying to the papal treasury a stipulated annual revenue. Political circumstances prevented Henry from entering upon the undertaking till 1166, when Dermod MacMurragh, the deposed king of Leinster, repaired to him, and obtained authority to enlist such of his subjects as might be induced to aid him in attempting to regain his forfeited lands. Dermod, returning to I. in 1169, with the aid of his foreign mercenaries, and still more numerous Irish allies, succeeded in recovering part of his former territories, and in capturing Dublin and other towns on the eastern coast. After his death in 1171, the succession to the kingdom of Leinster was claimed by his son-in-law, Richard FitzGislebert, Earl of Pembroke, surnamed 'Strongbow.' In the following year, King Henry, with a formidable armament, visited I., received homage from several of the minor native chiefs, and from the chief adventurers, granting to the latter charters authorising them, as his subjects, to take possession of the entire island, in virtue of the grant made to him by the pope. The chief Anglo-Norman adventurers, FitzGislebert, Le Gros, De Cogan, De Lacy, and De Curci, encountered formidable opposition before they succeeded in establishing themselves on the lands which they thus claimed. The government was committed to a viceroy, and the Norman legal system was introduced into such parts of the island as were reduced to obedience to England. The youthful Prince John was sent by King Henry into I. in 1184; but the injudicious conduct of his council having excited disturbances, he was soon recalled to England. John, when king, made an expedition into I. in 1210, to curb the refractory spirit of his barons, who had become formidable through their alliances with the natives. During the 13th c., the principal Anglo-Norman adventurers succeeded in establishing themselves, with the feudal institutions of their nation, in some parts of I., by the assistance or suppression of native clans. The Fitzgeralds, or Geraldines, acquired almost unbounded power in Kildare and East Munster, or Desmond; the Le Botillers, or Butlers, in Ormond or West Munster; and the De Burghs, or Burkes, in Connaught. After the battle of Bannockburn, the native Irish of the north invited over Edward Bruce, and attempted to overthrow the English power in Ireland. The court of Rome, at the instigation of England, excommunicated Bruce with his Irish allies; but although his enterprise failed of success, the general result was a comparative collapse of the English dominion in Ireland. The descendants of the most powerful settlers gradually became identified with the natives, whose language, habits, and laws they adopted to so great an extent, that the Anglo-Irish parliament passed, in 1367, the 'Statute of Kilkenny,' decreeing excommunication and heavy penalties against all those who followed the customs of, or allied themselves with, the native Irish. This statute, however, remained inoperative; and although Richard II., later in the 14th c., made expeditions into I. with large forces, he failed to effect any practical result; and the power and influence of the natives increased so much, that the authority of the English crown became limited to a few towns on the coast, and the district termed 'the Pale,' comprising a small circuit about Dublin and Drogheda.

In 1534, Thomas Fitzgerald, son of the viceroy of Henry VIII., revolted, but not meeting with adequate support from his Anglo-Irish connections, he was, after a short time, suppressed and executed. Henry received the title of 'King of Ireland' in 1541, by an act passed by the Anglo-Irish parliament in Dublin; and about the same period, some of the native princes were induced to acknowledge him as their sovereign, and to accept peerages. The doctrines of the Reformation met little favour either with the descendants of the old English settlers or with the native Irish. About the middle of the 16th c., Shane O'Neill, a prince of the most powerful ancient family of Ulster, attempted to suppress his rivals, and to assume the kingship of that province, in which he was eventually unsuccessful; but after his death in 1567, his successor received the title of Earl of Tirone from Elizabeth. The attempts of the English government in I. to introduce the Reformed faith and English institutions stirred up great dissensions in Ireland. Among the first to revolt was the Earl of Desmond, after whose death, in 1583, his vast estates in Munster were parcelled out to English settlers. Soon after, the chief clans of Ulster took up arms; and in opposing them, the forces of Elizabeth, commanded by officers of high military reputation, encountered many reverses, the most serious of which was that in 1598 at the battle of the Yellow Ford, near Armagh, where the English army was routed and its general slain. Philip III. of Spain, at the solicitation of the Irish chiefs, despatched a body of troops to their assistance in 1601, which, landing in the extreme south, instead of in the north, as had been expected, were unable to effect anything, and were constrained to surrender. Although Elizabeth was supported by numbers of native Irish, the northern chiefs, O'Neill and O'Donnell, held out till the queen's government came to terms with them in 1603, recognising them as Earls of Tirone and Tirconnell. In 1608, these noblemen, having apprehensions for their personal safety, quitted Ireland unexpectedly, and retired to the continent. Their withdrawal enabled James I. to carry out that project of parcelling out the north of Ireland to Scottish and English settlers, which is usually known as the 'Plantation of Ulster.' The Irish took advantage of the contentions in England to rise in insurrection (1641) and massacre the Protestants. It is believed that nearly 40,000 fell victims to their fury. The country continued in a state of anarchy till 1649, when Cromwell overran it. At the Revolution, the native Irish generally took the part of James II., the English and Scotch 'colonists' of William and Mary; and the war was kept up for four years (1688—1692). From this time till 1778, history records little beyond the passing of penal statutes against the Roman Catholics. In 1778, parliament relaxed the stringent pressure of these acts; but the widely spread disaffection which they caused gave birth to numerous societies, resulting in the rebellion of 1798, which was not suppressed till 1800. On January 1 of the following year, the legislative union of Great Britain with I. was consummated, and from this period the history of the country merges in that of Great Britain.

IRELAND, Arms of. The insignia of Ireland have been variously given by early writers. In the reign of Edward IV., a commission appointed to inquire what were the arms of I., found them to be three crowns in pale. It has been supposed that these crowns were abandoned at the Reformation, from an idea that they might denote the feudal sovereignty of the pope, whose vassal the king of England was, as lord of Ireland. However, in a MS. in the Heralds' College of the time of Henry VII., the arms of I. are blazoned azure, a harp or, stringed argent; and when they were for the first time placed on the royal shield on the accession of James I., they were thus delineated: the crest is on a wreath or and azure, a tower (sometimes triple-towered) or, from the port, a hart springing argent. Another crest is a harp or. The national flag of I. exhibits the harp in a field vert. The royal badge of I., as settled by sign-manual in 1801, is a harp or, stringed argent, and a trefoil vert, both ensigned with the imperial crown.

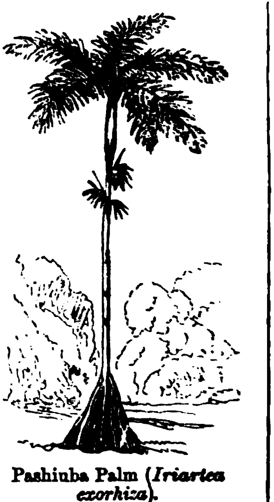
IRELAND, New. See New Ireland.

IRELAND ISLAND, one of the Bermudas (q. v.).

IRENÆ'US, one of the most important of the ante-Nicene Christian writers, was an Asiatic by birth, but is known in history solely through his connection with the Greco-Gaulish church of Southern France, of which he was a bishop. He was a scholar of Polycarp, through whom he may be regarded as having sat at the feet of St John the apostle and evangelist. I. was a priest of the church of Lyon under the Bishop Pothinus, upon whose martyrdom, in the persecution of Marcus Aurelius in 177, he was himself elected to the same see, which he continued to govern for twenty-five years. I. is commonly believed to have suffered martyrdom at Lyon in the persecution under Septimius Severus in 202. His principal, indeed almost his only perfect, work is that which is commonly cited as *Adversus Hæreses* (Against Heresies). It is directed against the Gnosticism of his own age, and is most valuable as a picture of the doctrinal and moral condition of that age. Most of his other works also were doctrinal, but they are known only by description or by fragments. The earliest edition of the works of this Father is that of Erasmus (Basel, 1526). They have been several times re-edited, the most prized edition being that of the Benedictine, Dom Massuet (Paris, 1710, and Venice, 1734).

IRE'NE, a celebrated Byzantine empress, was born in Athens about 752 A.D. Her beauty and talent excited the admiration of the Emperor Leo IV., who married her, 769 A.D. She is believed to have poisoned her husband, 780 A.D., after which event she became regent during the minority of her son, Constantine VI., then only nine years of age. A great worshipper of images—in fact, this species of idolatry had during the lifetime of her husband caused her to be banished from the imperial palace—she quickly began to plot for their restoration, and with this purpose assembled a council of bishops at Constantinople, 786 A.D., which, however, was broken up by the troops of the capital. A second council held at Nice in the following year was more successful, and image-worship was re-established in the Eastern Church. In 788 A.D., her army was defeated in Calabria by Charlemagne, who threatened the Byzantine empire. In 790 A.D., Constantine succeeded in taking the government out of her hands; but seven years after, she caused him to be deprived of his eyes, and shut up in a dungeon, where he soon died. Still she was not free from anxieties. Her two favourites, Stauracius and Ætius, were constantly embroiled with each other, and their jealousies only ceased with the death of the former, 800 A.D. She now tried to secure her possession of the throne by a marriage with Charlemagne, but the Frank emperor had apparently no relish for a woman who had committed so many crimes, and the scheme proved abortive. Two years later, her treasurer, Nicephorus, rebelled against her, and suddenly seizing her person, banished her to the isle of Lesbos, where she was forced to spin for a livelihood. Here she died of grief, 803 A.D. I. was a wise, able, and energetic ruler; but her crimes were so great and unnatural, that history can speak of her character as a whole only in the language of reprobation. The Greek Church, however, on account of her zeal for image-worship, has placed her in the catalogue of its saints.

IRIARTEA, a genus of palms, all South American, having lofty, smooth, faintly ringed stems, and pinnate leaves with somewhat triangular leaflets. The leaf-stalks rise from a sheathing column. The Pashiuba or Piziuba Palm (*I. exorhiza*), common in swamps and marshy grounds in the forests of the Amazon district, is remarkable for sending out roots above ground, which extend obliquely downwards, and often divide into many rootlets just before they reach the soil; the tree as it grows still producing new roots from a higher point than before, whilst the older and more central ones die, so that at last a lofty tree is supported as on three or four legs, between which a man may walk erect with a palm of seventy feet high rising straight above his head. The outer wood is very hard, so as to be used for harpoons; splits easily, and into perfectly straight laths; is excellent for floors,



Pashiuba Palm (*Iriartea exorhiza*).

ceilings, shelves, &c.; and is exported to North America for umbrella-sticks.

IRIDE'Æ, or **IRIDA'CEÆ**, a natural order of endogenous plants, mostly herbaceous, although a few are somewhat shrubby. They have very generally either root-stocks or corms. The leaves are generally sword-shaped, in two rows, and *equitant* (so placed that one seems to ride on the back of another). The perianth is 6-partite, coloured, often very beautiful, in some regular, in others irregular. The stamens are three, with anthers turned outwards. The ovary is inferior; there is one style, with three stigmas, which are often petal-like, and add much to the beauty of the flower. The fruit is a 3-celled, 3-valved capsule. Almost 600 species are known, of which the greater number are natives of warm countries. They are particularly abundant in South Africa. A few are British. *Iris, Gladiolus*, and *Crocus* are familiar examples of the order. Saffron is the principal economical product. Acridity is a prevailing characteristic, and some species are medicinal; but the corms and root-stocks of some are edible.

IRI'DIUM (sym. Ir, eq. 99, sp. gr. 15·93) is one of the so-called noble metals. It is occasionally found native and nearly pure in considerable masses among the Uralian ores of platinum, but is usually combined with osmium as an alloy in flat scales. It is a very hard, white, brittle metal, which may be melted by the oxyhydrogen blowpipe, or by the heat of a voltaic current. In its isolated form, it is unacted upon by any acid, or by aqua regia, but as an alloy it dissolves in the latter fluid.

It forms three oxides, IrO, Ir_2O_3, and IrO_2, which pass readily into one another, and thus occasion the various tints which solutions of the salts of this metal assume. It was in consequence of these varying tints that the name of iridium, derived from *Iris*, the rainbow, was given to this metal. Three sulphides and chlorides, corresponding to the oxides, have been obtained. This metal was discovered at the same time as osmium, in 1803, by Smithson Tennant.

I'RIS, in Classic Mythology, the daughter of Thaumus and Electra. She is described (in Homer) as a virgin goddess; but later writers state that she was married to Zephyrus, by whom she became the mother of Eros. She was employed, like Mercury, as the messenger of the gods, and to conduct female souls into the shades, as he conducted those of men. She is frequently represented on vases and in bas-reliefs as a youthful winged virgin, with a herald's staff and a pitcher in her hands. There can be no doubt that this myth originated in the physical phenomena of the rainbow, which was personified at first as the messenger of peace in nature.

The broad coloured ring in the eye is called the Iris. See Eye.—Iris is also the name of one of the Planetoids (q. v.), discovered in 1847.

IRIS, or **FLOWER-DE-LUCE**, a genus of plants of the natural order *Irideæ*, having the three outer segments of the perianth reflexed, the three inner arched inwards, and three petal-like stigmas covering the stamens. The species are numerous, chiefly natives of temperate climates. The Yellow I., or Corn Flag (*I. pseudacorus*), is a well-known native of moist grounds in all parts of Britain, often spreading over a considerable extent of land, and conspicuous even at a distance by its tall leaves and large deep yellow flowers. The Stinking I. (*I. fœtidissima*) is very abundant in some of the southern parts of England, but does not extend far north. It has livid purple flowers. The leaves have a very disagreeable smell. The south of Europe produces a greater number of species, as also does North America. The flowers of most of the species are beautiful. Some of them have received much attention from florists, particularly *I. xiphium*, sometimes called Spanish I.; *I. xiphioides*, or English I.; and *I. Germanica*, or Common I., all corm-rooted species, and all European. Many fine varieties have been produced. The Persian I. (*I. Persica*), the Snake's-head I. (*I. tuberosa*), and the Chalcedonian I. (*I. Susiana*) are also much esteemed. The Persian I. is delightfully fragrant. The roots of all these species are annually exported in considerable quantities from Holland. Many other species are of frequent occurrence in flower-gardens.—The fresh root-stocks of *I. pseudacorus* are very acrid, as are those of many other species. Those of *I. Florentina, I. pallida*, and *I. Germanica* are Orris Root (q. v.). Those of *I. dichotoma* are eaten in Siberia; those of *I. edulis* at the Cape of Good Hope.

1. Yellow Water Flag (*Iris pseudacorus*). 2. Florentine Orris (*Iris Florentina*).

IRISH (GAELIC) LANGUAGE AND LITERATURE. The Irish (Gaelic) is one of the still living Celtic languages (see Celtic Nations). The alphabet consists of the following eighteen letters—*a, b, c, d, e, f, g, h, i, l, m, n, o, p, r, s, t, u*, corresponding in their forms with the Roman characters of the 5th c. after Christ. In Irish, there is no indefinite article; nouns are masculine or feminine, and anciently a neuter gender existed. The nominative and accusative are the same in form, as are also the dative and ablative; the nominative and vocative feminine, and the genitive and vocative masculine, always have similar terminations. Nouns substantive have five, and nouns adjective four declensions. Verbs are active, passive, regular, irregular, impersonal, and defective; their moods are indicative, consuetudinal, past indicative, imperative, infinitive, and conditional; regular active verbs have no subjunctive; the tenses are the present, consuetudinal present, preterite, consuetudinal past, and future; in the tenses of the passive voice there is no distinction of number or person. Prepositions are rarely compounded with verbs or adjectives, instead of which the Irish use prepositions or adverbs placed after the verbs. Adverbial phrases composed of two or more parts of speech are very numerous both in ancient and in modern Irish. The simple conjunctions are few, but there are many conjunctional phrases. Interjections are numerous, and vary throughout the provinces. The regular versification of the Irish consists of four distinct metres, styled Oglachas, Droighneach, Bruilingeacht, and Dan Direach; of the last, there are five species, each distinguished by peculiar features. There are also classes of popular poetry possessing distinct linear and syllabic components. The best authorities on the Irish language are the *Irish Grammar*, by J. O'Donovan (1845); the *Grammatica Celtica* of J. C. Zeuss (1856); and *Irish Glosses* (1860), published by the Irish Archæological and Celtic Society.

The oldest existing specimens of the Irish language are to be found in sepulchral inscriptions in Ireland, and in the glosses or interpretations affixed to Latin words in documents transcribed by Irish ecclesiastics of the 8th and succeeding centuries, now preserved in some continental libraries. The principal ancient vernacular manuscripts in Ireland are *Leabhar na-h-Uidhre*, and the *Book of Leinster* (12th c.); the *Books of Ballymote, Lecan, and Dun Doighre*, or *Leabhar Breac* (14th c.); all compiled from older writings on historical and miscellaneous subjects. The most ancient manuscripts in Ireland containing original matter in the Irish language are the *Book of Armagh* (9th c.) and the *Book of Hymns*, of a somewhat later date, both ecclesiastical in their contents. The writings extant in the Gaelic language of Ireland consist of ecclesiastical documents, laws, bardic or semi-historic tales, historic tracts, genealogies, historic poems, treatises on medicine, translations from foreign authors, proverbs, compilations of the 17th c., popular poetry, political and satirical poems and songs, composed by native Gaelic writers in Ireland within the last century. Of the ecclesiastical documents, the next in importance, after the *Book of Armagh* and the *Book of Hymns*, are the metrical Festologies of Ængus Ceile De (9th c.), the Martyrology of Tallaght (10th c.), and that of Marianus O'Gorman (12th c.). In this department there are also extant many lives of saints, monastic rules, devotional and religious poems. A large body of old Irish jurisprudence, known as the *Brehon Laws*, is preserved in manuscripts of the 14th and 15th centuries. Of the Irish bardic or semi-historic tales, numbers are extant ranging in date from the 12th to the 18th century. The principal Irish historic tracts are those on the tribute styled *Borumha*, the wars of the Danes with the Irish, and the wars of Thomond. Copious genealogies of the principal native families exist in various manuscripts, and from such sources MacFirbis, a learned Irish antiquary of the 17th c., made an elaborate compilation known as *Leabhar Genealach*, or the 'Genealogical Book,' now considered a high authority. The chief composers of poems on the history of Ireland were Eochadh O'Flin (10th c.), Gilla Caemhain, and Flan of Monasterboice (11th century). The most important ancient Irish annals are those of Tighernach, of Ulster, of Inisfallen, and of Connacht.

The Irish manuscripts on medicine contain original treatises by native physicians of the 14th and 15th centuries, with commentaries on the then known medical authors of Europe and the East. The Irish translations from foreign languages are chiefly versions of medieval Latin and continental books—historic, scientific, romantic, and religious. Of original adages and proverbial sentences, great numbers exist, of various ages. The privileges enjoyed by the Irish poets under the clan system enabled them to devote themselves to the production of elaborate metrical compositions, many of which possessed high excellence, and elicited the praises of the poet Spenser. During the wars against Elizabeth, the bards were energetic in stimulating the chiefs to whom they were attached. The merit of the elegiac poem on the deaths of the Earls of Tirone and Tirconnell by their bard Mac an Bhaird, who accompanied them in exile (1608 A.D.), attracted the attention of the critical Lord Jeffrey, who became acquainted with it through Mangan's English version in the metre of the original. Among the native writers in Ireland after the establishment of the English dominion, in the reign of James I., was Dr Geoffrey Keating, compiler of a history of Ireland in the Gaelic language, and author of religious treatises and poems. About the same period, historical and hagiographical compilations were made by the O'Cleighs, the most important of which was that styled the *Annals of the Kingdom by the Four Masters*, extending from the earliest period to 1616 A.D., edited in seven large volumes (Dublin, 1848), with an English version and copious notes, by the late Dr John O'Donovan, the ablest of Irish scholars. The Gaelic continued to be the language of the native rural population of Ireland during the 17th and 18th centuries, and many religious and romantic pieces were composed in it for popular use. Differing from the English settlers in religious and political sentiments, the native Irish found gratification in satirising and ridiculing them in the Gaelic language, in which they composed numerous songs in favour of the Stuarts, and denunciatory of the Hanoverians and their adherents. Members of old Irish families who attained high distinction in military service on the continent, retained with pride the Gaelic tongue; it was also commonly spoken by the soldiers in the Irish Brigades in France, and in the American army during the War of Independence. Various attempts were made since the middle of the last c. to print Gaelic documents, but the critical knowledge of the language in its archaic forms having fallen into abeyance, such publications proved entirely unsatisfactory, until the subject was taken up about 1830 by government, during the progress of the Ordnance Survey of Ireland. From this may be said to date the true Irish school of accurate historic and linguistic learning, which has since produced many valuable volumes, under the superintendence of the Antiquarian section of the Royal Irish Academy and the Irish Archæological and Celtic Society. On the works issued by these two bodies, which for many years have included nearly all the most erudite scholars of Ireland, philological and historic students must now depend, as other publications on these subjects are, with few exceptions, illusory and misleading.

The Irish, in its modern forms, is still spoken commonly by the rural classes and native landowners in Connaught, Munster, the remote parts of Ulster, the south of Leinster, as well as in the islands off the western coast of Ireland. The provincial dialects vary considerably in words, pronunciation, and idioms. The Irish emigrants have carried their language across the Atlantic, and songs and poems in the Irish language and character occasionally appear in American newspapers. Professorships of the Irish language exist in Trinity College, Dublin; in the Queen's Colleges at Belfast, Cork, and Galway; and in the Roman Catholic College at Maynooth. The chief collections of Irish manuscripts are those of the Royal Irish Academy and Trinity College, Dublin; numbers are also preserved in the British Museum, in the Bodleian, and in some private libraries.

IRISH MOSS. See Carrageen.

IRISH SEA, a continuation northward of St George's Channel (q. v.), separates the north of Ireland from the central districts of the United

Kingdom. Between the coasts of Louth and Lancaster, the I. S. has a width of 120 miles; its greatest length between St George's Channel on the south and the North Channel on the north is also about 120 miles.

IRI'TIS is the term applied to inflammation of the Iris. See EYE. The cavity across which the iris is stretched, and the iris itself, which projects into that cavity, and divides it into an anterior and a posterior chamber, are lined or invested by a membrane which resembles the larger serous membranes of the body, such as the pleura, peritoneum, &c., and consequently the inflammation of this membrane is of the adhesive kind. See INFLAMMATION. When it is added that the effusion of lymph may limit or entirely stop the movements of the iris, and may alter the form, or even close up the aperture of the pupil, the serious nature of the disease will be at once perceived.

The *objective* symptoms of iritis (those which can be observed by the physician) are: 1. Redness of the eye, arising from vascularity of the sclerotic; 2. Change in the colour of the iris. When lymph is effused in the texture of the iris, a gray or blue eye is rendered yellowish or greenish, while in a dark eye a reddish tint is produced. The brilliancy of the colour of the iris also disappears. When the inflammation is very violent, or has been unchecked by remedies, suppuration may take place. 3. Irregularity, and sometimes immobility of the pupil, produced by the adhesion of the back of the iris to the crystalline lens. The *subjective* symptoms (those of which the patient alone is conscious) are intolerance of light, dimness of vision, and pain in and around the eye.

The causes of iritis are various. The disease may arise from actual injury in surgical operations performed on the eye; from over-exertion, and too prolonged continuous use of the eye (thus, it is common among needlewomen, engravers, and watchmakers); or from some constitutional taint, especially syphilis, gout, rheumatism, and scrofula.

The treatment of iritis varies to some extent according to the cause which induces it, but the great remedies are three. 1. *Blood-letting*, for the purpose of moderating the febrile disturbance, and of facilitating the operation of the second remedy, which is, 2. *Mercury*, which used to be given in large doses (such as two, three, or four grains, with a little opium, every four or six hours), but which is preferably given in small doses, such as two or three grains of hydrarg. c. cretâ, with a little hyoscyamus, two or three times in the twenty-four hours. This dose should be lessened as soon as the mouth begins to be tender, and by that time the lymph will be found to break up, and leave the pupil clear. 3. *Belladonna.* The pupil should be kept well dilated by the application of the extract of belladonna to the skin round the eye, or, far better, by the instillation into the eye of a weak solution of sulphate of atropine, with the view of preventing adhesion of the iris, or of breaking, or, at all events, of stretching and elongating any adhesive bands that may be formed; and thus of preventing any impairment of the movements of the iris, and any irregularity of the pupil, after the inflammation shall have abated.

IRKU'TSK, capital of the Russian government of that name, is the residence of the governor-general of Eastern Siberia, and the seat of a bishop. It is situated on the right bank of the Angara, near its confluence with the river Irkut, in lat. 52° 17′ N., and long. 104° 26′ E., and is 3842 miles distant from St Petersburg. The town is about 1200 feet above the level of the sea, and enjoys a very healthy climate, though in winter the cold is so severe as to freeze mercury. The streets are straight and wide, but ill-paved, and the houses mostly built of timber. The best buildings are the palace of the governor-general, the schools for boys and girls, and the hall of the American Company. Besides these, the town contains a public library, a museum of natural history, and some other public institutions. The population in 1867 was 27,431, consisting mostly of Russians and Buriats. I. was founded in 1661 by a Cossack chief named Iwan Pochapof, and, owing to its position on the great thoroughfare between Eastern and Western Siberia, between China and Russia, it soon became the commercial centre of Siberia, especially for the tea-trade. The current of the Angara is so rapid that the strongest frosts cover it but seldom with ice. Nevertheless, it is navigable, and constitutes the mainway for the goods bound for Kiachta by means of Lake Baĭkal, as well as for those coming from Eastern Siberia, Russian America, and China to Irkutsk. The former are chiefly furs and metals; the latter, tea, meat, and fish from Lake Baĭkal. The communications between I. and Jakutsk, and the other northern towns of Siberia, are carried on by the river Lena. The manufactures of I. are purely local, and supply the half-nomad Buriats and Tunguses, inhabiting the adjacent country.

IRKUTSK, a government of Eastern Siberia, bounded by the government of Jenisseisk, the province of Jakutsk and the Chinese Empire, occupies an area of 267,555 square miles. The soil is partly fertile, partly hilly and marshy; the climate in general severe. The Baĭkal and Nerchinsk Mountains, with their numerous branches, give the country a high alpine character; besides these, the Saĭán range extends along the southern borders, and the Jáblonovy or Apple range along the eastern. The principal rivers are the Lena, Shilka, Agún; the largest lake is the Baĭkal (q. v.). The productions of the country are rye, wheat, barley, oats, rhubarb, hops; reindeer, sables, ermines, foxes, seals; fish—sturgeon, cod, silure; minerals—gold, silver, lead, jasper, amethysts, topazes, emeralds, yellow amber, rock-salt, and coal. The population of the government is (1867) 372,833, and consists of Buriats, Tunguses, and Russians. The inhabitants are for the most part employed in agriculture, and to some extent in fishing and hunting. As a local industry, the manufacturing of an excellent oil out of stone-pine nuts deserves notice. The foreign commerce consists in the trade with China, carried on through Troitzko-Savsk and Kiachta (q. v.), and has risen to great importance in recent times.

The government of I. is divided into five districts—Irkutsk, Verkholensk, Balagansk, Nijneudinsk, and Kirensk. The capital is Irkutsk; the other towns are Telma, with a cloth-factory, Troitzko-Savsk, Kiachta, Kirensk on the Lena, Nijneudinsk, and Verkholensk.

IRON (sym. Fe [Lat. *ferrum*], eq. 28, sp. gr. 7·844) occurs more abundantly than any other metal. In its native form it is chiefly found in meteoric stones (see AËROLITES), and in certain ores of platinum, and is consequently of comparatively rare occurrence, but the so-called iron ores—the oxides, sulphides, &c.—are very widely distributed. The most important of these ores are mentioned below.

Pure iron may be obtained by the ordinary method described below, and also by reducing the peroxide by means of hydrogen gas and heat, when it is obtained in the form of a fine black powder, or by heating the protochloride in a glass tube through which a current of dry hydrogen is passed. In this case, pure iron is deposited as a glistening mirror on the glass.

This important metal will be most conveniently considered under the three heads of

1. *Chemistry of Iron.*—Chemically pure iron is of so little general interest that we shall confine our remarks on the properties of this metal to those which are exhibited by bar or wrought iron. Its colour is gray or bluish-white; it is hard and lustrous, takes a high polish, is fibrous in texture, and when broken across, exhibits a ragged fracture. It requires a very intense heat for its fusion, but before melting passes into a soft pasty condition, in which state two pieces of iron may, by being hammered together, be united or welded so completely as to form, to all intents and purposes, a single portion. At a red heat, it may be readily forged into any shape; but at ordinary temperatures it possesses very little malleability, as compared with gold and silver. In ductility, it stands very high, being barely exceeded by gold, silver, and platinum; and in tenacity, it is only exceeded by cobalt and nickel. Its susceptibility to magnetism is one of its most remarkable characteristics. See MAGNETISM. At a high temperature, it burns readily, as may be seen at the forge, or (more strikingly) when a glowing wire is introduced into a jar of oxygen. In dry air and at ordinary temperatures, the lustrous surface of the metal remains unchanged; but in a moist atmosphere the surface rapidly becomes oxidised and covered with rust, which consists mainly of the hydrated oxide of iron. At a red heat, iron decomposes water, and liberates hydrogen, the oxygen combining with the iron to form the black or magnetic oxide (Fe_3O_4), which occurs in minute crystals. This is one of the ordinary methods of obtaining hydrogen.

The affinities of iron for most of the non-metallic elements are very powerful. The chief of the iron compounds are—

a. Oxides of Iron.—Iron forms four definite compounds with oxygen—viz. (1), the *protoxide* (FeO), which is the base of the green or ferrous salts of iron; (2), the *sesquioxide* or *peroxide* (Fe_2O_3), which is the base of the red or *ferric salts;* (3), the *black* or *magnetic oxide* (Fe_3O_4), which is regarded by some chemists as a compound of the two preceding oxides; and (4), *ferric acid* (FeO_3). The *protoxide* cannot be obtained in an isolated form, but it forms the base of various ferrous salts, and combines with water to form a hydrate (FeO,HO), which, on the addition of an alkali, falls in white flakes.

The most important protosalts of iron, or ferrous salts, are the carbonate, the sulphate, the phosphate, and the silicate.

Carbonate of iron (FeO,CO_2) exists naturally in various minerals, and may be obtained artificially by precipitating a soluble protosalt of iron with carbonate of potash or soda, when the carbonate falls in white flakes. On exposure to the air, it absorbs oxygen, and gives off carbonic acid, and is thus converted into the hydrated peroxide. *Sulphate of iron* ($FeO,SO_3 + 7HO$) is obtained by the solution of iron, or its sulphide, in dilute sulphuric acid; in the former case, there is an evolution of hydrogen, and in the latter, of sulphuretted hydrogen. The reactions in the two cases are expressed by the equations,

$$Fe + SO_3,HO = FeO,SO_3 + H$$
$$FeS + SO_3,HO = FeO,SO_3 + HS.$$

On evaporation of the solution, the salt is obtained in clear bluish-green rhomboidal crystals, containing seven atoms of water. This salt is commercially known as copperas or green vitriol, and its various applications in technology are noticed in the article VITRIOLS, BLUE AND GREEN.

Phosphate of iron is obtained by precipitating a solution of a protosalt of iron with phosphate of soda, when a white precipitate of phosphate of iron is thrown down.

All these salts, especially the carbonate and sulphate, are extensively used in medicine.

Silicate and phosphate of iron occur naturally in several minerals.

The *peroxide of iron*, termed also sesquioxide, red oxide, or ferric oxide, is obtained in an anhydrous form by igniting the protosulphate, and is known in the arts under the names *Colcothar*, *Crocus of Mars*, or *Rouge*, according to the degree of levigation to which it has been submitted. It is employed for polishing glass, jewellery, &c., and is also used as a pigment. It occurs both in the anhydrous and in the hydrated form in various minerals.

The hydrated peroxide ($2Fe_2O_3,3HO$) is obtained by precipitating a solution of a persalt of iron or of a ferric salt, with an excess of potash, ammonia, or alkaline carbonate. It falls as a yellowish-brown flocculent precipitate, which when dried forms a dense brown mass. This hydrated peroxide of iron, when freshly prepared and suspended in water, is regarded as an antidote in arsenical poisoning. Rust, as has been already mentioned, is a hydrated peroxide, combined with a little ammonia.

The most important of the persalts of iron, or ferric salts, are the neutral and the basic sulphate, whose formulæ are $Fe_2O_3,3SO_3$ and $Fe_2O_3,3SO_3.5Fe_2O_3$ respectively, the nitrate ($Fe_2O_3,3NO_5$), the phosphate, and the silicate. Of these, the neutral sulphate, the phosphate, and the silicate occur in various minerals. The nitrate, which is obtained by the solution of iron in nitric acid, is a useful medicinal agent.

The *black or magnetic oxide* and *ferric acid*, which has not been obtained in a free state, and is only known as a constituent of certain salts, must be passed over without comment.

b. Haloid salts of iron—the chlorides, bromides, and iodides—next require notice. There are two chlorides—viz., a protochloride ($FeCl$) and a perchloride or sesquichloride (Fe_2Cl_3). The latter may be obtained by dissolving peroxide of iron in hydrochloric acid. The tincture of the sesquichloride of iron is perhaps more generally employed in medicine than any other preparation of this metal. The protiodide is an extremely valuable therapeutic agent.

c. There are probably several *sulphides* or *sulphurets of iron.* The ordinary sulphide is a protosulphide (FeS). It occurs in small quantity in meteoric iron. It may be obtained artificially by the direct union of the two elements at a high temperature, or by the precipitation of a protosalt of iron by sulphide of ammonium. It exists in glistening masses, varying in colour from a grayish yellow to a reddish brown. It is insoluble in water, but in moist air becomes rapidly oxidised into protosulphate of iron. With acids, it develops sulphuretted hydrogen. The bisulphide of iron (FeS_2) is the *iron pyrites* of mineralogists, and the *mundic* of commerce. Under the latter name, it is used extensively in the preparation of oil of vitriol. There are also other sulphides of less importance.

The *protosalts* and the *persalts*, or the *ferrous* and the *ferric salts*, give totally different reactions with the ordinary tests. The solutions of the former have a greenish colour and a peculiar metallic taste, while those of the latter are generally of a brownish-yellow colour, and are very acid. Sulphuretted hydrogen gives no precipitate with an acid solution of a ferrous salt, while it gives a milky precipitate of sulphur with a solution of a ferric salt. Potash, soda, and ammonia throw down a white hydrated oxide from the former, and a brown hydrated peroxide from the latter. Ferrocyanide of potassium gives with ferrous salts a white precipitate, which soon becomes blue, while with ferric salts it at once produces a blue precipitate, even in a very dilute solution. Tincture of galls (tannic acid) produces no immediate change of colour with the ferrous, but a deep blackish-blue colour (ink) with the ferric salts. Sulphocyanide of potassium produces no change with the ferrous, but gives a deep blood-red tint with the ferric salts. Succinate and benzoate of ammonia produce no precipitate or change of colour with the former, while with the latter, if the solution is not too acid, they throw down pale reddish-brown precipitates.

2. *Manufacture of Iron.*—The increasing use of iron is a prominent characteristic of the present age, and every day sees some new application of it in the arts of life. Although the most useful of the metals, it was not the first known. The difficulty of reducing it from its ores would naturally make it a later acquisition than Gold, Silver, and Copper (q. v.). See also BRONZE, and BRONZE PERIOD. The reduction of the ore known as the black oxide of iron, however, has been carried on in India from a very early time.

In Europe, the rich specular and other ores of Spain and Elba were much used during the Roman period; in Greece, also, iron was known, though, as among the Romans, its use was subsequent to that of bronze. We are informed, too, by the Roman historians that this metal was employed by the ancient Britons for the manufacture of spears and lances. The Romans, during their occupation of Britain, manufactured iron to a considerable extent, as is evidenced by the cinder-heaps in the Forest of Dean and other places. The rude processes then in use left so much iron in the cinders, that those of Dean Forest furnished the chief supply of ore to twenty furnaces for between 200 and 300 years. In those early times, the iron ores were reduced in a simple conical furnace, called an air-bloomery, erected on the top of a hill, in order to obtain the greatest blast of wind. The furnaces were subsequently enlarged, and supplied with an artificial blast. Charcoal was the only fuel used in smelting till 1618, when Lord Dudley introduced coal for this purpose; but the iron-masters being unanimously opposed to the change, Dudley's improvement died with himself. It was not reintroduced till Abraham Derby, in 1713, employed it in his furnace at Coalbrook Dale. But as this method was not properly understood, the production of English iron declined with the change of fuel, till, in 1740, it was only three-fourths of what it had formerly been. About ten years after this, however, the introduction of coke gave renewed vigour to the iron-trade, and then followed in rapid succession those great improvements in the manufacture which have given to the history of iron the interest of a romance. The introduction of Watt's steam-engine in 1770, the processes of puddling and rolling invented by Henry Cort in 1784, and the employment of the hot-blast by Neilson of Glasgow in 1830, have each been of inestimable service. The greatest improvement introduced into the iron manufacture in recent times is the process of Mr Bessemer for the production of malleable-iron and steel, patented in 1856 (see BESSEMER PROCESS). Though as yet a failure as respects malleable-iron, this process has created a new era in the manufacture of steel.

Iron ores are abundantly distributed over the globe; the chief kinds being—1. Magnetic iron ore; 2. Red hæmatite, specular, or red iron ore; 3. Brown hæmatite or brown iron ore; 4. Carbonate of iron, including spathic ore, clay ironstone, and blackband ironstone.

The ore richest in the metal is the *magnetic* (see MAGNETISM), or *black oxide of iron*. When pure, it contains nothing but oxygen and iron, its chemical formula being Fe_3O_4, which gives 73 per cent. of iron by weight. It occurs in dark heavy masses or black crystals, and is found in the older primary rocks. Sweden is famous for this ore, and for the iron produced from it, which is esteemed the best in Europe. The celebrated mines of Dannemora, in that country, have been constantly worked since the 15th century. Russia, too, has great iron works in the Ural Mountains, which are supplied with this ore. So, also, have Canada and several of the American states, as Virginia, Pennsylvania, New Jersey, &c. The rock formations in which magnetic iron ore occurs contain no coal, hence it is almost always smelted with wood-charcoal, which, as it contains no sulphur, is one great cause of the superiority of the iron produced from it.

Red hæmatite differs from the last only in containing proportionally a little more oxygen, its formula being Fe_2O_3, that is to say, 70 per cent. of iron by weight. There are several varieties of this ore, but only two need be referred to. The first of these, *specular iron*, so called from its bright metallic lustre, occurs in large and beautiful crystalline masses in the island of Elba, where it has been worked for more than 2000 years, and is likewise found in many other parts of the world. It is of a steel-gray colour, assuming a red tint in thin fragments and when scratched. The other variety is *kidney ore*, whose origin is still a curious problem, as its deposits occur sometimes in veins, and sometimes in apparently regular beds. Its characteristic form is in large kidney-shaped nodules, with a fine radiated structure. This shape, however, is only assumed in the cavities of massive deposits. Red hæmatite is sometimes called bloodstone. It is used for polishing metals, and yields a blood-red powder, used as a pigment. This valuable iron ore is found in many countries, but perhaps nowhere in greater abundance than at Whitehaven and Ulverstone, in the north-west of England, where splendid masses of it occur, 15, 30, and even 60 feet in thickness. These two districts produced, in 1872, about 1,767,410 tons of hæmatite.

Brown hæmatite, or brown iron ore, is a hydrated peroxide of iron, and has the same composition as red hæmatite, except that it contains about 14 per cent. of water. It is generally found massive, more rarely crystalline, and a variety occurring in small rounded nodules, is called pea iron ore. When mixed with earth or clay, it forms yellow ochre and brown umber, so largely used as pigments, but the latter also contains manganese. Brown hæmatite is now an important ore in England, about 2,000,000 tons being annually raised. It occurs in different geological formations, chiefly in Devonshire, the Forest of Dean, and in an earthy form in Northamptonshire. It is the ore chiefly smelted in France and Germany.

Bog iron ore is a variety of brown hæmatite, usually containing phosphorus, which occurs in marshy districts of recent formation.

Carbonate of iron, when found in a comparatively pure and crystallised state, is known as *spathic*, *spathose*, or *sparry iron ore*; but when impure and earthy, as *clay ironstone* and *blackband ironstone*. Spathic ore was little worked in England previous to 1851, soon after which it was discovered in Somersetshire. It forms mountain masses in various parts of Prussia and Austria, and is now much in demand to yield the spiegeleisen required in the

Bessemer process. In its purest form it contains 48 per cent. of iron; and in colour it varies from white to buff or dark brown, some specimens of it taking a beautiful polish, and looking like marble. The clay and blackband ironstones are essentially mixtures of carbonate of iron with clay, blackband having also a considerable proportion of coaly or bituminous matter. These dull earthy-looking ores occur abundantly in Great Britain, and form, after coal, the greatest of her mineral treasures. About two-thirds of all the ore mined in the country is obtained from the coal-measures, where fortunately both the fuel and the limestone, indispensable for the reduction of the iron, are also found. The ore occurs as balls or nodules in the shales, or in continuous beds. Some of these seams are full of fossil shells, and the ore is then called 'musselband' ironstone.

About twenty years ago, the three great iron districts of Britain were South Staffordshire, South Wales, and Central Scotland, each producing nearly equal quantities, and together yielding about four-fifths of the total produce of the country. Now, however, the South Staffordshire field is becoming exhausted, its produce being only about a fourth of what it was, while that of the South Wales and Scottish districts has increased, and is now yielding annually, the former a million and a quarter, and the latter more than three million tons of ore. North Staffordshire, Shropshire, Derbyshire, and the West Riding of Yorkshire are the principal remaining districts yielding ores from the carboniferous beds. The iron from the West Riding ore is the best in Britain as regards quality.

There is yet another great iron district, yielding an ore belonging to a more recent formation than the carboniferous—namely, the lias. This deposit, which less than 30 years ago was unknown, is now producing iron to the enormous amount of 1,200,000 tons per annum. It is the ironstone of the Cleveland Hills, in the north-east of Yorkshire, which, from its resemblance to common sandstone, passed unnoticed till 1847. About that time, isolated blocks of it, found on the sea-coast, were discovered to contain about 30 per cent. of iron. On further examination of the district, these were proved to be detached pieces of a massive bed, no less than 15 feet thick, which could be traced for many miles along the sides of the hills. Some idea of the value of this vast deposit of iron ore will be found in the fact, that the ironstone seams of the coal-measures seldom exceed 20, and are worked as low as 8 inches in thickness. Another mass of ironstone of great thickness, also belonging to the lias beds, was more recently discovered in North Lincolnshire. In the oolite, too, beds of brown iron ore have been discovered in several counties, but chiefly in Northamptonshire, where it has been worked with so much spirit, that about a million tons of ore per annum are now raised.

To those remarkable discoveries may be added that by Mr Rogers of Abercarn, who first detected, some years ago, the value of the spathic ore in the Devonian rocks of Somersetshire, now largely worked. We may state, too, that a hæmatite vein which promises to be of some value, has been worked for the past few years in the trap-rock of the Garleton Hills, near Haddington, in Scotland. About 250,000 tons of what is called 'burnt ore,' are now yearly obtained in Great Britain from the residue of iron pyrites (sulphide of iron) which has been burned to yield its sulphur for the manufacture of sulphuric acid.

Before proceeding to describe the manufacture of iron, we give two analyses of British ores: the first is by Mr J. Spiller, taken from a series published in the *Memoirs of the Geological Survey*, and the second is by Dr Murray Thomson.

CLAY IRONSTONE, CHIEFLY A CARBONATE OF IRON, BLACK-BED MINE, LOWMOOR, YORKSHIRE.

Protoxide of iron, ...	36·14
Peroxide of iron, ...	0·61
Protoxide of manganese, ...	1·38
Alumina, ...	0·32
Lime, ...	2·70
Magnesia, ...	2·05
Carbonic acid, ...	26·57
Phosphoric acid, ...	0·34
Sulphuric acid, ...	trace
Bisulphide of iron, ...	0·10
Water, hygroscopic, ...	0·61
„ combined, ...	1·16
Organic matter, ...	2·40
Insoluble residue, chiefly silica and alumina,	25·27
	99·65
Metallic iron per cent.	28·12

SCOTCH BLACKBAND.

Protoxide of iron, ...	36·47
Protoxide of manganese, . . .	4·16
Alumina, ...	3·69
Lime, ...	2·75
Magnesia, ...	·77
Carbonic acid, ...	23·26
Phosphoric acid, ...	trace
Silica, ...	9·26
Organic (coaly) matter, ...	17·92
Water, ...	·93
Sulphur, ...	·66
	99·87
Metallic iron per cent.	28·36

It will be noticed that in the case of these ores the impurities are rather numerous. Nevertheless, the modes of preparing and smelting them are somewhat rude and simple, as the low price of iron will not permit of its ores being treated with the same care as the ores of lead, copper, tin, and some other metals.

Iron ore is still reduced in the south of Europe by the old and imperfect process of the Catalan forge, not unlike a common smith's forge. In Great Britain, however, as well as in all other countries where iron is largely smelted, the blast-furnace is now universally employed, by means of which the metal is obtained in the state of crude or cast iron. For the finer kinds of iron, charcoal is the fuel employed, because, unlike coal or coke, it contains no sulphuret of iron or other injurious ingredients. The Russian and Swedish furnaces smelt with charcoal, and on this, as much as on their pure ores, depends the high reputation of their iron. A solitary charcoal-furnace at Ulverstone in England, and another at Lorn in Scotland, are still working—the only relics of times past, when this was the only fuel employed.

As a preliminary process to the actual smelting in the blast-furnace, clay and blackband ironstones are generally roasted. This is accomplished by breaking the ore into small pieces, spreading it in open heaps on the ground, and mingling it more or less with small coal according to the nature of the ore. Blackband commonly contains enough of carbonaceous matter to burn without the addition of coal. The pile, which may contain from one to several thousand tons of ore, is lighted at the windward end, and burns gradually along, aided by occasional fires in the sides, till the whole heap has undergone calcination, the time required for this purpose being generally about a month. Sometimes the operation of roasting is performed in close kilns, instead of open heaps, a mode by which the ore is considered to be more uniformly roasted, and with considerably less fuel. Of late years, the kilns are often heated by the waste gases of the blast-furnace. By calcination, clay ironstone loses from 25 to 30, and blackband from 40 to 50 per cent. of its weight, the loss consisting chiefly of carbonic acid and water, but sulphur and other volatile substances are also dissipated in the process. The roasting also converts the protoxide and carbonate of iron into peroxide, which prevents the formation of slags of silicate of iron, such slags, owing to the difficulty of reducing them, causing a loss of iron. In this country, rich ores like the magnetic or red hæmatite are not subjected to calcination, but they are so in Sweden.

The older type of blast-furnace consists of a massive tower of stone or brick-work strengthened with iron binders; the newer plan is to build it of comparatively thin brick-work, and surround it entirely with strong iron plates. In either case an inner lining of refractory fire-brick is given to it, which is separated from the outer portion of the wall by a narrow space filled with sand. Internally, they vary much in form, but perhaps the barrel shape is the most prevalent, and most of them contract towards the bottom in the shape of an inverted cone. Recent ones have been built from 80 to 100 feet in height, instead of not more than 60 as formerly. The blast-pipe, with its tuyere-branches, surrounds the hearth, and on one side there is a recess and openings for running off the metal and slag. See BLAST-FURNACE.

Fig. 1 is a sectional view of a hot blast-furnace, with the blowing-engine and other appliances, which is taken, with some modification, from Mr Fairbairn's work on Iron. It may be well to state here that one engine usually supplies the blast to several furnaces. A is the body of furnace; B the hearth, above which are placed the tuyeres, C; D is the bell and cone arrangement, around which there is a gangway to enable the workmen to feed the furnace. The blowing-engine is shewn at F. Air is forced into the furnace by means of the blowing cylinder, G, from which it passes into the receiver, H, and thence along a pipe into the heating-oven, I. Here a large surface of pipe is exposed, in arch-shaped rows, to the fire, which heats the enclosed air to from 600° to 1000° F. At some temperature within this range it enters the lower part of the furnace by means of the tuyeres, C. Some of the larger blowing-engines discharge 60,000 cubic feet of air per minute, under a pressure of 3½ lbs. per square inch. See BLOWING-MACHINES in SUPP., Vol. X.

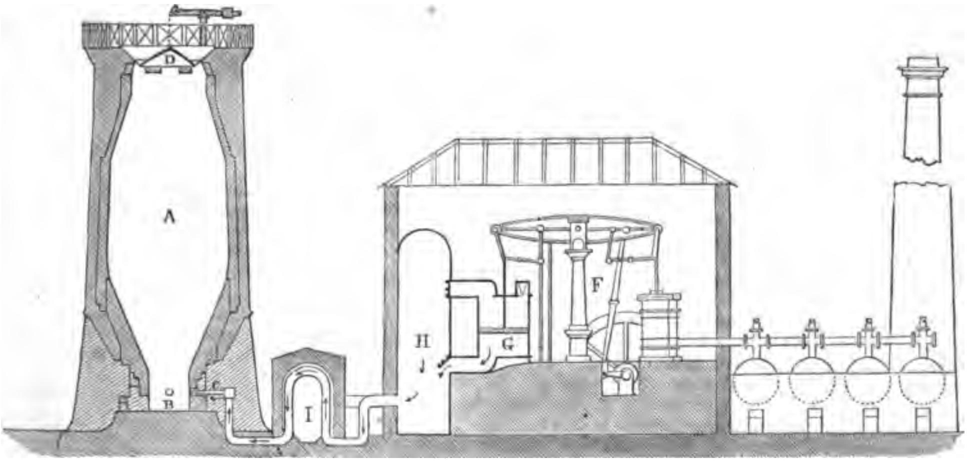


Fig. 1.—Hot Blast-furnace.

The bell and cone at D is for the purpose of closing the mouth of the furnace so as to save the 'waste gases,' chiefly carbonic oxide, which are allowed to escape in open-mouthed furnaces (see BLAST-FURNACE). These are conveyed away by pipes from openings just under the cone at D, and are turned to raise steam, heat the blast, &c.

The operation of smelting is thus performed: the roasted ore, coal, and lime (flux) are either hoisted, or, if the nature of the ground permits, moved along a platform or gangway to the gallery near the top of the furnace, and fed into it at intervals through the openings in the side, when the mouth is open, or by lowering the cone D, when it is closed. We may here state that the furnace is kept continually burning except when under repair. The materials are of course raised to a very high heat, and gradually fuse into a softened mass. The clay of the ironstone then unites with the lime to form a coarse glass, or slag; the oxide of iron at the same time gives up its oxygen to the fuel, and allows the metal itself to collect on the hearth at the bottom of the furnace, united with from 3 to 5 per cent. of carbon, which it takes from the fuel, forming the variety called cast iron. Every twelve, and sometimes every eight hours, the metal is run off from the furnace, by means of a tap-hole at the bottom of the hearth, into rows of parallel moulds, called pigs, which are formed in sand, hence the name 'pig-iron.' The slag which floats on the melted iron is run off by an opening at the top of the hearth. If the furnace is working well, the slag should be of a light-gray colour; a dark-brown or black colour shews that too much iron is passing into it.

The quantity of materials necessary to yield a ton of pig-iron may be taken roundly as follows: 2 tons of calcined ironstone; 2½ tons of coal, of which about 8 cwts. are required for the blowing-engine and hot-air pipes; and from 12 to 16 cwts. of broken limestone. The proportions, however, vary in different districts according to the nature of the fuel and ore. The weekly produce of a single blast-furnace varies extremely—from under 100 to more than 500 tons in some of the larger furnaces.

Different districts classify their pig-irons in slightly different ways, but, as a rule, No. 1 to No. 4 are known as gray iron. No. 1 is largest and brightest in the grain, brings the highest price, and is best adapted for fine castings. Nos. 2, 3, and 4 become successively less in the grain, of a duller lustre, and lighter in colour, but up to No. 3 are known as foundry pigs. After No. 4 the metal ceases to be gray, and though higher numbers are sometimes employed, the other qualities are more usually known as forge, mottled, and white pig-irons. Gray iron has its carbon partly in the chemically combined, but chiefly in the uncombined or graphitic state, and requires a higher temperature to melt it than white iron, though very fluid when melted. White iron has its carbon wholly in the combined state, and is chiefly available for conversion into malleable iron. Hæmatite pig-iron suitable for making Bessemer steel has an exceptionally high value.

The hot-blast process which has been described above, was introduced, in 1830, by Mr James B. Neilson of Glasgow, and has been productive of very remarkable effects on the iron trade. The whole invention consists in simply heating the air blown into the furnace, and yet the saving of fuel by this is about one-half, and the production of iron, since it came into use, has enormously increased. The 'cold blast' is still, however, to a limited extent employed, and produces the strongest iron, though necessarily at a much higher cost. The difference in quality appears to be caused by the greater heat in the case of the hot blast facilitating the passage of impurities into the iron.

Of late years, much attention has been given to plans for saving fuel in the blast-furnace. Previous to the introduction of the hot blast, as much as 8 tons of coal, as coke, were consumed for every ton of pig-iron made. Even when this is reduced to under 3 tons of raw coal per ton of pig-iron, fully three-fourths of all the heat produced is still wasted in open-mouthed furnaces. The method of saving the waste gases by closing the mouth of the furnace, as shewn in fig. 1, now generally adopted when coke is used, is attended with so much economy, that, in the Cleveland district alone, 600,000 tons of coal per annum are saved by adopting it. There being a difficulty in closing the mouth of the furnace when raw coal is used, Mr Ferrie of Monkland, a short time ago, patented a self-coking blast-furnace, by which, among other advantages, the gases can be saved. It has now been in use for some years in Scotland, and produces a ton of pig-iron with 34 instead of 53 cwts. of coal previously required. Raising the temperature of the blast to from 900° to 1000° F. has also been attended with a saving, and so likewise, in some districts, has an addition to the height of the furnace.

We pass now to the consideration of malleable or wrought iron. It differs from cast iron in being almost free of carbon. The great object in the processes adopted for the conversion of cast into malleable iron, accordingly, is to deprive the former of its carbon. But it is also very desirable to get rid of deleterious ingredients, such as silicon, sulphur, and phosphorus, which latter are generally present in minute quantities in the cast iron. The ordinary processes for the manufacture of malleable iron are *refining*, *puddling*, *shingling* or *hammering*, and *rolling*. The refinery is shewn in section in fig. 2. It consists of a flat hearth, A, covered with sand or loam, and surrounded with metal troughs, B, through which a stream of water is constantly flowing, to keep the sides from melting. C are the tuyeres in connection with the blowing-engine. The cast iron is melted with coke on the hearth, and a blast of air kept blowing over it, which causes its carbon to unite with the oxygen of the air, and pass off as carbonic oxide gas. Oxygen also unites with silicon to form silica, and with iron to form the oxide. The silica of the sand uniting with oxide of iron, produces a slag of silicate of iron. The refined metal is finally run out in cakes on a bed of cast iron, kept cool by a stream of water. Being only partially decarbonised by this process, it is next broken up for the puddling furnace. About 10 per cent. of iron is lost in the refinery.

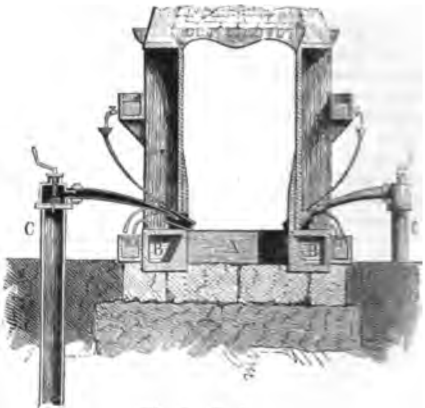


Fig. 2.—Refinery.

Fig. 3 shews a puddling furnace in longitudinal section. B represents the hearth; A, the grate or fireplace; and C, the chimney, which has a damper at the summit, to regulate the draught. The grate is separated from the hearth by means of a bridge, D, which prevents the direct contact of the fuel with the iron. White pig-iron, or at least such kinds as contain carbon in the combined state only, are best suited for puddling, because they become pasty, and so more easily worked than gray iron containing graphitic carbon, which does not soften into this condition previous to fusion. It is only in some districts that the 'refining' process is much used, in others a portion only of the puddling furnace charge is refined; and in making inferior kinds of malleable iron, the pig-iron is not previously refined at all. There are two ways of puddling now practised: the first or older way, best applicable to refined iron, is called *dry puddling*, and in it the decarburisation is produced chiefly by a strong current of air passing through the furnace; the second, or newer process, is called *wet puddling*, or *boiling*, in which case the oxidising of the carbon is effected chiefly by hæmatite, magnetic ore, basic slags, and other easily reduced materials, but to some extent also by the air.

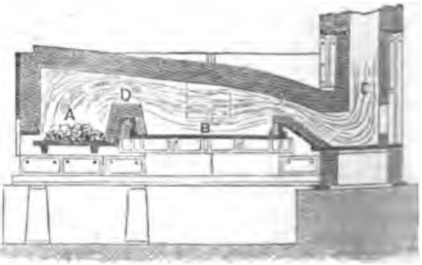


Fig. 3.—Puddling Furnace.

The operation of puddling, though differing in its details according to circumstances, is in a general way conducted as follows: A charge of from 4½ to 5 cwts. of metal, including some hammer slag and iron scale, is placed on the bed of the furnace while still hot from previous working. In about half an hour, when the furnace is in working order, the charge is melted, and is then stirred or 'rabbled' for a considerable time, when it begins to 'boil' by the formation and escape of carbonic oxide, which forms jets of blue flame all over the surface. Gradually, as the carbon of the pig-iron is more and more oxidised, pasty masses of malleable iron separate, and these are removed in balls commonly weighing about 80 lbs., but sometimes larger. About an hour and a half is required to work off a charge, and it takes from 22 to 26 cwts. of pig-iron to produce a ton of malleable iron. Siemen's regenerative gas-furnace, in which inferior fuels can be utilised, is applied to puddling as well as to other metallurgical processes; but our space is too limited to give any of its details, or to describe the more recent revolving puddling furnace of Mr Danks, which is the most promising of any of the attempts yet made to puddle iron by mechanical means.

The process immediately following the puddling or boiling is called 'shingling,' and consists in hammering the puddled balls with either the helve or steam-hammer, or in passing them through a *squeezer* till they are sufficiently consolidated, and the greater part of the cinders forced out. For a description of the steam-hammer, which is much used for heavy forgings as well as for shingling, see that head. Puddled balls which have undergone shingling are called *slabs* or *blooms*. These are next passed through heavy rollers termed 'forge' or 'puddle-bar rolls,' and reduced to the form of a flat bar. For all the better kinds of iron, the bars thus treated are cut into short lengths, piled together, reheated in a furnace, and again passed through the forge rolls. Once more the iron is cut, piled, and heated, and then passed through the 'mill-train,' consisting of what are termed the 'bolting' or 'rough rolls,' and finally through the 'finishing rolls.' Both these sets of rolls in the case of plates and sheets are plain, but in the case of bars are grooved, so as to form them into the required shape, such as flat, square, round, octagonal, or T-shaped iron. Fig. 4 indicates the arrangement and appearance of the 'rough' and 'finishing rolls' of a bar mill-train.

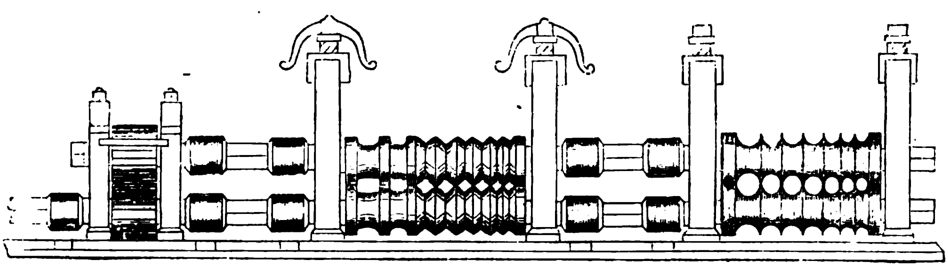


Fig. 4.—Rough and Finishing Rolls.

There is still another important variety of iron, viz., *Steel*, the manufacture of which remains to be described. Steel differs from malleable iron in containing a varying proportion of carbon, usually from ·5 to 1·8 per cent. When rich in carbon, it closely resembles cast iron in composition, except that it is more free from impurities. Steel can be made by adding carbon during the direct reduction of a pure iron ore in a furnace or crucible, but the results of this method are scarcely ever uniform. The finer kinds of steel are still made by the old cementation process—that is, by the roundabout plan of first converting cast into malleable iron, by depriving the former of its carbon, and then adding carbon again by heating the iron with charcoal (see Blister Steel). In making any kind of steel, however, the getting rid of silicon, phosphorus, and sulphur is as important, and a matter of more difficulty than the securing of any required proportion of carbon.

As blistered steel is full of cavities, it is necessary to render it dense and uniform, especially for the finer purposes to which steel is applied. By one method, it is converted into what is called 'shear steel.' This is done by breaking the bars of blister steel into short lengths, heating them in bundles, and partially welding with a forge-hammer. The rod so formed is heated again, and now brought under the action of the tilt-hammer. Here, by a succession of blows, it is formed into bars, which are much more compact and malleable than blister steel, and consequently better fitted for edge-tools and the like. If the single-shear steel is doubled upon itself, and again welded and drawn into bars, it is called double-shear steel. By another method, viz., that of melting the blister steel in fire-clay crucibles, and casting it into ingots, 'Cast Steel' (q. v.) is made. This is the best kind of steel, being finely granular, homogeneous, dense, and well adapted for the finest cutting instruments.

Steel is now largely made directly from pig-iron by puddling, much in the same way as that process is applied to the production of malleable iron (see Krupp's Steel in Supp., Vol. X.). By another plan (Uchitan's process), pig-iron is granulated and heated in a crucible with the oxides of iron, and manganese, and fire-clay, the result being cast steel. The Siemens-Martin process consists in melting pig-iron along with malleable iron and Bessemer steel scrap, about 7 per cent. of spiegeleisen being added towards the end of the process. The operation is conducted in the Siemens regenerative furnace, and the product in this case is also cast steel.

There are also several modes of manufacturing steel direct from the ore, such as by the old way in the Catalan forge, and by Chenot's process, in which hydrocarbons are used.

Bessemer's method of producing malleable iron directly from crude pig-iron is apt to be cellular and unsound, defects which the inventor has never been able to overcome. Steel, however, is successfully made by his process, which consists in blowing air through molten pig-iron till the whole of the carbon and silicon is removed by oxidation, and then introducing into the melted iron a given quantity of spiegeleisen (a peculiar kind of cast iron), containing a known percentage of carbon; and so steel may be produced with any required proportion of carbon (see Bessemer Process). The spiegeleisen dissolves in the iron, rendering the metal more fusible and very liquid.

We will now take a glance at the properties of each of these three kinds of iron, and the purposes to which it is chiefly applied. Cast iron, as the crudest, cheapest, and most fusible, is used for the heavy portions of engineering work, such as bed-plates for machines, cylinders, columns, cisterns, low-pressure boilers, water and gas pipes, rollers, girders, and the like. A large quantity is consumed in the manufacture of 'hollow-ware,' which includes pots, pans, and other cooking-vessels. For ornamental objects, again, it is almost exclusively used, because here its property of being readily cast into moulds gives it a great advantage on the score of cheapness. Thus, fountains, statues, vases, gates, balustrades, garden-seats, candelabra, stoves, fenders, and many smaller decorated articles, even to the minuteness of a watchguard and breastpin, are almost invariably made of *cast* iron.

Malleable iron differs considerably in its properties from cast iron. The latter is practically incompressible, but it can be comparatively easily torn asunder. Malleable iron, on the contrary, possesses great tenacity; it is, moreover, very malleable and ductile, especially at a high temperature, so that it can be rolled into sheets as thin as paper, or drawn into the finest wire. Further, it possesses the valuable property of welding—that is, two pieces can be completely united together by hammering at a white heat. Malleable iron is largely employed for the innumerable variety of articles included under the general term 'hardware,' such as locks, keys, hinges, bolts, nails, screws, wirework, and the so-called tin-plate, which is merely sheet iron dipped in melted tin. It is the mainstay of the railways and the electric telegraph, and has almost displaced timber as a material for steam-ships and sailing-vessels. It is also much used for roofs and bridges of large size. For some years past, great interest has been attached to the manufacture of rolled armour-plates for war-ships. Several were shewn in the late International Exhibition (1862) of large size; one of them measured 21 feet 3 inches long, 6 feet 3 inches wide, and 5¼ inches thick, and weighed about 13 tons. Since then, these plates have been made 13 inches thick for fortifications.

Steel possesses several valuable properties which do not belong to either cast or wrought iron. It is harder, denser, and whiter in colour. It is also more elastic, takes a higher polish, and rusts less easily. Like malleable iron, it is also weldable. But its most characteristic property consists in its admitting of being tempered at will to any degree of hardness. If, for instance, a piece of steel be heated to redness and plunged into water, it is made hard and brittle; but if it be again heated and slowly cooled, its original softness is restored. By gently reheating the steel, it will acquire a gradation of tints indicating various degrees of hardness, beginning with pale straw colour, and passing successively to full yellow, brown, purple, and finally to blue. The straw colour is the result of a temperature of about 440°, and the blue of about 570° F., the former being the hardest, and the latter the softest tempering.

The chief use of steel has hitherto been in the manufacture of files, edge-tools, and cutlery, for which its peculiar properties render it so admirably adapted. A large quantity is also consumed in the manufacture of needles and steel-pens. But the use of steel is no longer confined to the production of these comparatively small articles. By means of improved machinery and processes, steel is at present manufactured on a scale that was little dreamed of twenty years ago, so that such objects as field-guns, railway-axles, tires, boiler-plates, and the like are now being made of this material. The superior tensile strength of steel, which is about double that of malleable iron, gives it a great advantage where lightness is required. Boilers made of steel consume less fuel than iron ones, as thinner plates are used.

Perhaps few things illustrate more strikingly than iron the great difference in value that exists between the same material according to the quality and form in which it is sent into the market. Thus, while we write (1874), the price of ordinary pig-iron is about £5 per ton, but some of it of very superior quality is double that price. Malleable iron in the form of bars may be had as low as £10 per ton, Swedish bars being worth £20 per ton, and Lowmoor bars (the finest English iron) about £24. Bessemer steel costs £20 per ton, blister steel in bars or rods £40 per ton, and superior shear or cast steel £60 per ton, while the finest kinds bring a considerably higher price.

In 1740, the entire quantity of iron made in Great Britain is believed not to have exceeded 25,000 tons; in 1802, the annual make was estimated at 170,000; in 1828, at 702,584; and in 1839, at 1,512,000 tons. In 1854, the first year of the carefully collected statistics now published annually by the Mining Record Office, the produce was 3,069,838, and from that time to the present it has gradually risen to nearly 7,000,000 tons. A very large amount of this pig-iron is converted into malleable iron, as there are now upwards of 7000 puddling furnaces in the country. In the United States, about 2,000,000 tons of pig-iron were made in 1872, being more than double the quantity made 20 years ago. On the continent, the iron manufacture is rapidly extending in France, Belgium, Prussia, Austria, Sweden, and Russia. It is remarkable that as much as 200,000 tons of steel were made in Prussia in 1871 by the Bessemer and the puddling processes, a very large quantity of this material being also made in Sweden and Austria. Notwithstanding the activity of the iron-trade abroad, the produce of Great Britain is still about equal to that of all other countries put together.

3. *Iron in its Physiological and Therapeutic Relations.*—Iron is an essential constituent of the colouring matter of the blood-corpuscles of all vertebrate animals; and according to the best authorities, 1 part by weight of iron is found in 230 parts of blood-corpuscles, and the total quantity of this metal in the blood of a man weighing 140 pounds is about 38 grains. It is the presence of iron in the blood that communicates to the ashes of that fluid their reddish-brown colour, the iron being found in them as the peroxide. The ashes of the hair, of birds' feathers, of the contents of eggs, of the gastric juice, of milk, and indeed of most animal fluids, contain traces of this metal.

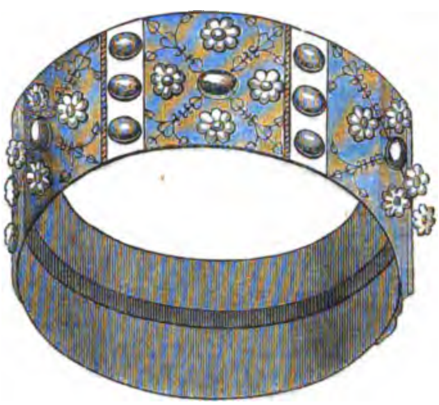
Nothing is known with certainty regarding the chemical condition of the iron in the animal body, that is to say, whether it is present as a protoxide, a peroxide, &c. It is introduced into the system with the food and drink, and any excess beyond what is required is discharged with the excrements. When an insufficient quantity is contained in the nutriment, chalybeate medicines become necessary. The iron that is set free within the system by the constant disintegration of blood-corpuscles is carried out of the system partly by the urine, partly by the colouring matter of the bile, which is highly ferruginous, and probably is in part eliminated by the hair. The exact part which the iron plays in the body is uncertain; but it is most probable that the power which the blood-corpuscles possess as oxygen carriers is mainly due to the presence of this substance.

When from any cause the blood-corpuscles are reduced in number, the state known as *Anæmia* (q. v.) is produced, which is accompanied by general weakness and deranged functions. In this condition of the system the iron compounds are of incomparably more service than any other remedies. In Chlorosis (q. v.), which is closely allied to anæmia, in amenorrhœa, and in certain painful nervous affections, the salts of iron are of especial service. The forms in which iron may be prescribed are very numerous, and vary considerably in their utility, according to the readiness with which they get taken up into the blood. Amongst the most generally used ferruginous medicines may be mentioned the tincture of the sesquichloride, the saccharine carbonate, the compound iron mixture (containing the carbonate), the sulphate, the potassio-tartrate, several citrates (especially the citrate of iron and quinine), &c. A course of Chalybeate Waters (q. v.) may often be prescribed with great advantage, when the patient cannot bear the administration of iron in its ordinary medicinal form.

IRON BARK TREE, a name given in Australia to certain species of *Eucalyptus* (q. v.), and particularly *E. resinifera*, on account of the extreme hardness of the bark. These trees attain a height of 80 or 100 feet, and a circumference near the base of 20 to 25 feet. The timber is very valuable for ship-building, and for other purposes in which hardness and durability are required. It withstands vicissitudes of weather for a great number of years without injury, or even underground remains uninjured for 45 years or more. (Bennett's *Gatherings of a Naturalist in Australasia*, 1860.)

IRON CROSS, a Prussian order of knighthood, instituted, on March 10, 1813, by Frederick William III., and conferred for distinguished services in the war which was then being carried on. The decoration is an iron cross with silver mounting. The grand cross, a cross of double the size, was presented exclusively for the gaining of a decisive battle, or the capture or brave defence of a fortress.

IRON CROWN, the crown of the ancient Longobardian kings, given, according to an unauthenticated tradition, by Pope Gregory the Great to Queen Theodolinda, and preserved till lately in the sacristy of the cathedral of Monza. Henry of Luxemburg, in 1311, is the first German emperor who is known with certainty to have worn it. In 1859, it was removed by the Austrians to Mantua, and is now in Vienna. The outer part of the crown consists of a golden hoop, with enamelled flowers and precious stones, in form like an ancient diadem, within which is a thin plate or fillet of iron, which is declared by a tradition long opposed by the church at Milan, but adopted by the congregation 'dei sacri riti' at Rome, to have been hammered from one of the nails of the true cross; hence the crown is also called *il sacro chiodo*. When Napoleon I. was elected king of Italy in 1805, he took the relic from the *tesoro* of Monza, where it had remained from the time of Charles V., and crowned himself with it, disdaining to receive it from the hands of a bishop; and at the same time, he founded an order of knighthood, taking its name from the iron crown. The reigning kings of Italy were to be grandmasters of the order; and the members of the order, at first 620 in number, and afterwards 985, were either dignitaries, commanders, or knights. The badge was the iron crown, and in the middle, the French eagle with raised wings. Round the ring of the crown was the motto, *Dio me la diede, guai a chi la tocca* ('God gave it to me, woe to him who touches it')—the words used by Napoleon when placing the crown on his head; and the front exhibited the effigy of Napoleon. The order—forgotten after the fall of Napoleon—was restored and re-modelled in 1816 by the Emperor Francis I., who gave it the name of the Austrian Order of the Iron Crown, limited its members of the 1st class to 20, of the 2d to 30, and the 3d to 50, exclusive of the princes of the imperial house. He introduced a new decoration in place of the former one, consisting of a gold crown of the same form with the iron crown, on which is placed the Austrian eagle on both sides, bearing upon the obverse a blue escutcheon upon the breast, with the letter F (Francis) in it; and on the reverse, the year 1816. The knights of the 1st class have, in addition, a silver star embroidered on the left breast, with the iron crown in its centre, and round its blue edge the words *Avita et aucta.* There is also a tricoloured costume, consisting of a yellow under-garment, white stockings and shoes, and a blue velvet cap and mantle.



Iron Crown of Italy.

IRON MASK, The Man with the. The story of the prisoner, so called, confined in the Bastile and other prisons in the reign of Louis XIV., has long kept up a romantic interest. The first notice of him was given in a work entitled *Mémoires Secrets pour servir à l'Histoire de Perse* (Amst. 1745—1746). According to this writer, he was the Duke of Vermandois, a natural son of Louis XIV. and De la Vallière, who, having given a box on the ear to his half-brother, the grand dauphin, had to expiate it with imprisonment for life. The assertion was without foundation, for the Duke of Vermandois died in camp in 1683; but the confidence with which it was made caused a deep sensation, and the romance of Mouhy, *L'Homme au Masque de Fer*, which immediately followed (Hague, 1746), was read with all the more avidity that it was prohibited. Voltaire, in his *Siècle de Louis XIV.*, treats the anecdote historically. According to him, the prisoner was young, and of a noble figure. In journeying from one prison to another, he wore a mask, and was at last transferred to the Bastile, where he was treated with great distinction; and so on.

The first authentic information with regard to the Iron Mask was given by the Jesuit Griffet, who acted for nine years as confessor in the Bastile, in his *Traité des differentes Sortes de Preuves qui servent à établir la Vérité dans l'Histoire* (Liège, 1769). He brought forward the MS. Journal of Dujonca, the lieutenant of the Bastile, according to which Saint-Mars arrived, on the 18th September

1698, from the Isle de Sainte-Marguerite, bringing with him in a litter a prisoner whom he had already had in custody at Pignerol. The prisoner's name was not mentioned, and his face was always kept concealed by a mask of black velvet. The journal mentions his death on the 19th day of November 1703, and that he was buried in the cemetery of St Paul. This is confirmed by the register of burials for the parish of St Paul's, where the prisoner is mentioned under the name of Marchiali.

After long silence, Voltaire returned to the subject in his *Essai sur les Meurs*, but he brought forward nothing new. In the seventh edition of the *Dictionnaire Philosophique*, he related the story anew, under the head *Anna*, corrected his errors as to time from the journal of Dujonca, and concluded with the assurance that he knew more about the matter than Griffet, but chose, as a Frenchman, to be silent. An addition to the article, apparently by the editor of the work, freely states the opinion that the Mask was an elder brother of Louis XIV. The writer makes Anne of Austria to have had this son by a favourite, and being thus undeceived as to her supposed barrenness, to have brought about a meeting with her husband, and in consequence born Louis XIV. Louis is held to have first learned the existence of this brother when he came of age, and to have put him in confinement, to guard against any possible unpleasant consequences. Linguet, in the *Bastille Dévoilée* ('The Bastile Exposed'), ascribes this paternity to the Duke of Buckingham. Saint-Michel published a book in 1790, in which he relates the story of the unfortunate being, and points to a secret marriage between Queen Anne and Cardinal Mazarin. What is remarkable is, that the court continued to manifest an interest in the matter, and took every means to keep the identity of the prisoner in the dark. When the Bastile fell, the prisoner's room was eagerly searched, and also the prison register; but all inquiry was vain. The Abbé Soulavie, who published *Mémoires de Maréchal Richelieu* (Lond. and Par. 1790), tries to make out from a document written by the tutor of that unfortunate prince, that the Iron Mask was a twin-brother of Louis XIV. A prophecy had announced disaster to the royal family from a double birth, and to avoid this, Louis XIII. had caused the last born of the twins to be brought up in secret. Louis XIV. learned of his brother's existence only after the death of Mazarin, and that brother having discovered his relation to the king by means of a portrait, was subjected to perpetual imprisonment. This view of the matter was that almost universally prevalent till the time of the Revolution. It is also followed in Zschokke's German tragedy, and in Fournier's drama, founded on the story.

The first conjecture of what till recently seemed to be the truth is contained in a letter dated 1770, written by a Baron d'Heiss to the *Journal Encyclopédique*. The same is repeated by Louis Dutens in his *Intercepted Correspondence* (1789), who declares that there is no point of history better established than the fact that the prisoner with the Iron Mask was a minister of the Duke of Mantua. This minister, Count Matthioli, had pledged himself to Louis XIV. to urge his master the duke to deliver up to the French the fortress of Casale, which gave access to the whole of Lombardy. Though largely bribed to maintain the French interests, he began to betray them; and Louis XIV., having got conclusive proofs of the treachery, contrived to have Matthioli lured to the French frontier, secretly arrested, 23d April 1679, and conveyed to the fortress of Pignerol, which was his first prison. The conclusion of D'Heiss and Dutens, that Matthioli was the Iron Mask, though acute, was only a conjecture. But the documents since discovered and published by M. Roux-Fazillac in his *Recherches historiques et critiques sur l'Homme au Masque de Fer* (Par. 1800), by M. Delort in his *Histoire de l'Homme au Masque de Fer* (Par. 1825), and M. Marius Topin, in his *Man with the Iron Mask* (1869), seemed to leave little doubt on the subject, and the public had apparently made up its mind that the secret was at last discovered; but a still more recent work by a French officer, M. Th. Iung, *La Vérité sur le Masque de Fer* (*Les Empoisonneurs*) *d'après des Documents inédits des Archives de la Guerre et autres dépôts publics*, 1664—1703 (Par. 1873), has conclusively shewn that Matthioli could not have been the mysterious prisoner, and endeavours to prove—we would almost venture to say, *succeeds* in proving—that the Man in the Iron Mask was the unknown head of a wide-spread and formidable conspiracy, working in secret for the assassination of Louis XIV. and some of his ablest ministers. The severity of M. Iung's labours with reference to this subject will be understood when it is stated that in the course of his researches he had to examine some 1700 volumes of despatches and reports in the bureau of the Ministry of War.

I'RONMONGERY, a term applied to the small manufactures of iron or hardware kept for general sale in shops.

IRONS, otherwise called BILBOES, are shackles of iron into which the ankles of a prisoner are fixed, and which slide on a long iron bar. Refractory sailors and soldiers, who evince violent behaviour, and become unmanageable, are commonly put in irons, several being placed side by side along the same bar. In cases of extreme violence, the wrists may be similarly treated, but instances of this latter punishment are rare. The punishment of 'putting in irons' is more common in the navy than in the army.

IRONWOOD, a name bestowed in different countries on the timber of different trees, on account of its great hardness and heaviness.—*Metrosideros vera* belongs to the natural order *Myrtaceæ*, and is a native of Java and other eastern islands. It has ovato-lanceolate, shortly stalked, smooth, sharp-pointed leaves; and axillary, many-flowered, stalked cymes. Its wood is much valued by the Chinese and Japanese for making rudders, anchors, &c., and is imported into Britain in small quantities under the name of Ironwood. The bark is used in Japan as a remedy for diarrhœa and mucous discharges.—*Mesua ferrea*, a tree of the natural order *Guttiferæ*, is a native of the East Indies, and is planted near Buddhist temples for the sake of its fragrant flowers, with which the images of Buddha are decorated. The flowers resemble small white roses, and contrast singularly with the deep crimson buds and shoots. The timber, known as I., is very hard, as is that of *M. speciosa*, another tree of the same genus and region.—The wood of *Vepris undulata*, of the order *Diosmaceæ*, is called White I. at the Cape of Good Hope. It is very hard and tough, and is chiefly used for axles, ploughs, and other agricultural implements.—The wood of *Olea laurifolia*, a species of olive, is called Black I. in the same country, and is used for the same purposes, and for furniture.

IRONY (Gr. *eirōneia*, from *eirōn*, a dissembler) is the name given to that peculiar style of thought and expression by which words are made to convey a meaning exactly opposed to their literal sense. When skilfully used, irony is one of the most crushing and irresistible figures of rhetoric. Instances will readily occur to every reader of history and literature. One of the most celebrated is that recorded in Scripture, where Elijah taunts the discomfited priests of Baal on Mount Carmel. The great master of irony in ancient times was Socrates, who, as has been happily said, raised it to the dignity of a philosophic method.

IROQUOIS. See INDIANS.

IRRATIONAL NUMBERS, a term applied to those roots of numbers which cannot be accurately expressed by a finite number of figures. For instance, $\sqrt{2}$ is an irrational number. If the diameter of a circle is one foot, the circumference is an irrational number. Irrational numbers have been defined to be numbers which are incommensurable with unity. They are also commonly termed Surds.

IRRAWADI (said to mean, like Mississippi, 'father of waters'), the great river of Farther India, is believed to rise in Tibet, near lat. 28° N., and long. 98° E., terminating in lat. 16° 20′ N., and long. 96° E. Its course is pretty nearly due south, and has been estimated at 1200 miles in length. After receiving the Ning-thee, the Mogonny, the Bhamo, and the Lungtchuen, it begins to form its delta about 17° N., which, between the Rangoon on the east and the Bassein on the west, comprises 10,000 square miles of forest and pasturage, curiously intersected by an inextricable network of the smaller branches of the stream. With regard to facilities of communication, the I. appears to be decidedly superior to the Indus and the Ganges, being navigable even at low water, for vessels of 200 tons, as far as Ava, which is 400 miles from the sea, and for canoes as far as Bhamo, which is 180 miles higher up. The I. successively traverses China, Burmah, and Pegu. As the region last mentioned, forming the lowest part of its basin, is a province of British India, the I., as a whole, may be said to be virtually under the control of England. In both our Burmese wars, it constituted the line of advance for our armies.

IRREDU'CIBLE CASE occurs in the solution of Cubic Equations (q. v.) by Cardan's method when p is negative, and $\frac{p^3}{27}$ greater than $\frac{q^2}{4}$ (abstracting from the sign). These conditions render $\sqrt{\left(\frac{q^2}{4}+\frac{p^3}{27}\right)}$ an imaginary quantity, and thus Cardan's formula fails in its application. The difficulty is got over by the aid of trigonometry.

IRRE'LEVANT, a term used in Scotch law to denote that what is said or put forward by an opponent in an action has no bearing on the subject, even if it were true. The corresponding term, in English law, is that the pleading containing the irrelevant matter is demurrable.

IRRIGA'TION (Lat. watering), a method of producing or increasing fertility in soils by an artificial supply of water, or by inundating them at stated periods. Irrigation was probably first resorted to in countries where much of the land must otherwise have remained barren from drought, as in Egypt, where it was extensively practised nearly 2000 years before Christ, and where great systems of canals and artificial lakes were formed for the purpose. Extensive works, intended for the irrigation of large districts, existed in times of remote antiquity in Mesopotamia, Persia, India, China, and some other parts of the East; and in such of these countries as have not entirely lost their ancient prosperity, such works still exist. In many parts of the world, the necessity of irrigation, at least at certain seasons of the year, is so strongly felt, that the agriculture even of comparatively rude tribes depends on the facility with which it can be accomplished. Some plants also require a very abundant supply of water, and irrigation has become general where their cultivation prevails. This is particularly the case with rice, the principal grain of great part of Asia. Irrigation is supposed to have been introduced into Britain by the Romans, but was very little practised till the beginning of the present century. In Europe, irrigation prevails chiefly in the south, where it was extensively practised by the Romans, from whom it was adopted by the Lombards; and it is most extensively practised in Lombardy, and in some parts of Spain and of the south of France, so that the great plains and valleys of the Po, Adige, Tagus, Douro, and other rivers, are almost entirely subjected to a systematic irrigation, which prodigiously increases their fertility. The extent of irrigated land in the valley of the Po is estimated at 1,600,000 acres, and the increase of rental thus caused at £830,000.

Irrigation in Britain, and in most parts of Europe, except Lombardy, is almost exclusively employed for the purpose of increasing the produce of grass by converting the land into water-meadows. The value of it, even for this one purpose, does not seem to be sufficiently understood. Poor heaths have been converted into luxuriant meadows by means of irrigation alone. But in the countries in which irrigation is most extensively practised, the production of all crops depends on it.

The irrigation of land with the sewage water of towns is, under another name, the application of liquid manure. In no small degree the water of rivers and of springs depends on its organic and mineral constituents for its fertilising properties, so that the application of it is not in principle different from that of liquid manure; but it must be borne in mind that the mere abundance of water itself is of great importance for many of the most valuable plants, as the most nutritious substances brought into contact with their roots are of no use to them unless in a state of solution; whilst it is an additional recommendation of irrigation, that the supply of water most favourable to the growth of many valuable plants, is destructive of some which in many places naturally encumber the soil, as heath, broom, &c. The water which is used for irrigation should be free from mud and such impurities as mechanically clog the pores of leaves, or cover up the *hearts* of plants, and interfere with their growth. Irrigation is far from being so extensively practised in Great Britain as seems desirable. The extent of water-meadows in England is stated to be not more than 100,000 acres. They are mostly confined to the west and south of England. Individual farms, irrigated with sewage water, are to be met with in Nottinghamshire, Staffordshire, Lancashire, Cheshire, and in one or two counties in Wales. The most successful instance, however, of sewage irrigation in Great Britain is to be found near Edinburgh, where an extensive tract of meadows, lying between Portobello and Leith, yields a rent of £20 to £40 an acre; the grass is cut from three to five times a year, and as much as ten tons an acre have been obtained at a cutting. See SEWAGE, MANURE.

The method of forming and laying out water-meadows will be easily gathered from the following sketch of the different species of irrigation as practised in this country.

1. *Bed-work Irrigation.*—This method can only be conveniently applied to ground which is nearly level. It consists in laying out the ground into sloping beds or ridges, from 30 to 40 feet wide, according to the nature of the soil, having their

upper ends lying in a gentle slope from one side to the other of the meadow. Along the upper ends of the beds is drawn the drain or *conductor*, which brings the water from the reservoir or river, as the case may be; and this conductor must be tapered off towards its further end, in order that the diminished supply of water may still overflow. From this conductor, small drains, called *feeders*, are led down along the crown of each ridge. In the lowest part of the meadow, a main-drain, which must be made nearly as large as the conductor, is cut across the lower ends of the beds, and the water, after having served the purpose of irrigation, is led into it, by means of small drains cut in the furrows. The feeders should, like the conductor, taper towards their further extremity, both for the purpose of retarding the velocity of the water, and of preserving a continual overflow along their whole length. On the contrary, the small drains should gradually widen towards their lower extremity, where they meet the main-drain. The dimensions and inclination of the conductor and feeders should be so regulated to the water-supply, that the beds can be wholly laid under water to the depth of about one inch. The expense of bed-work irrigation ranges from £20 to £40 per acre.

2. *Catch-work Irrigation* differs materially from the former; it can be applied to land whether level or not, costs only £4 per acre, and, in the opinion of many, is quite as effective. The conductor formed as before is led along the highest side of the field, then with the aid of a level, a succession of perfectly level gutters (which, of course, must be winding), are drawn across the field in the same direction as the conductor, and not more than ten yards from each other; these are crossed by feeders running from the conductor to the lowest side of the field, thus forming a kind of checkwork. The main-drain is made as before, and the feeders, which taper towards their lower extremity, serve for small drains. This plan is more effective than the former, when the supply of water is limited; and as it can be applied to a hillside as well as to a level field, its application is rapidly extending.

3. *Subterraneous Irrigation* is only applicable to perfectly level fields, and consists, first, of ditches being formed all round the sides. At right angles to these, drains or conduits are drawn across the field in parallel lines. When the land is to be irrigated, water is let into the ditches, and thence to the cross-drains, till it rises to the level of the surface; and when the ground is to be laid dry, the side-ditches are emptied by sluices. The bottom of the ditches is below the level of that of the cross-drains, so that they serve both as conductor and main-drain.

The first two methods of irrigation are only applied to pasture-lands, and the third to fens and drained morasses, which are apt to become parched in summer; the last method would be very valuable for land under green crop in cases of drought.

The management of water-meadows requires great skill and care, but we can only here mention the chief points to be attended to, which are these: the water, if limited in quantity, must be confined to a part which it can effectually irrigate; too much water or too rapid a flow tends to wash away the soil; the meadow may be kept under water for a fortnight at a time, in November, but the time should be diminished till April or May, when regular watering should cease; after the grass is cut or eaten down, the water may be let on for a few days; and it is necessary that between the times of watering the land should be laid perfectly dry. Special precautions are necessary in winter, to guard against any bad effects resulting from frost, &c.

IRRITABI'LITY in Plants, a term employed to designate phenomena very interesting and curious, but than which none connected with vegetable life are more imperfectly understood. Such are the phenomena of what is usually called the *Sleep* (q. v.) *of plants*; the motion of the Spores (q. v.) of many cryptogamic plants by means of cilia; the motions of *Oscillatoriæ*, *Diatomaceæ*, and others of the lowest *Algæ*; the successive approaches of the stamens of *Parnassia palustris* to the pistil; the movements of the leaves of the *Moving Plant* (q. v.) of India; and those caused by agitation or by the touch of a foreign body in the leaves of *Sensitive Plants* (q. v.), of the *Dionæa* or Venus's Fly-trap, &c., in the stamens of the Barberry, *Schizanthus*, &c., and in the stigmas of *Mimulus*, &c. Many explanations have been proposed of these phenomena, but none satisfactory. Of the existence of anything analogous to the nervous system of animals, which has been imagined, there is not the slightest proof, closely as some of the phenomena resemble those of animal life. The explanations which have been proposed are no better than mere guesses. See MUSCLES.

I'RRITANCY (Lat. *irritus*, of no effect), a term in Scotch law to denote something in the nature of neglect or injury which destroys or makes void an existing right; in English law it is called Forfeiture. Thus, there is the irritancy of a feu-right from non-payment of the duty for two years.—IRRITANT CLAUSE, in a Scotch entail, is a clause which makes void certain prohibited acts of the heir of entail, such as selling the property.

IRRITA'TION is the term applied to any morbid excitement of the vital actions not amounting to inflammation; and it is often, but not always a cause of that condition.

In cases of irritation, remarkable sympathetic symptoms are often observed. Thus, irritation of a calculus occasions intense sickness and vomiting. But of all sources of sympathetic morbid affections of this class, irritation of the stomach and intestines is at once the most common and the most important. The ordinary sick headache is the most frequent form of this sympathetic affection; but in certain morbid conditions, and especially in the puerperal state, the symptoms may be such as pretty closely to resemble those of acute inflammation of the peritoneum, the heart, the pleura, or the membranes of the brain. It is to Dr Marshall Hall that the credit is mainly due of pointing out those cases in which irritation so closely resembles inflammation. He has shewn that blood-letting affords a certain means of diagnosis in these cases. In true inflammation, 30 or 40 ounces of blood may be taken before there are any symptoms of faintness; while in irritation, the loss of a very few ounces (nine or ten) of blood will cause the most decided syncope.

IRTI'SH, a river of Siberia, an affluent of the Obi (q. v.).

I'RVINE, a royal and parliamentary burgh, seaport, and market-town of the county of Ayr, Scotland, is situated on both banks, but principally on an eminence on the right bank of the river Irvine, which is here crossed by a handsome stone bridge, about a mile above the embouchure of the river in the Firth of Clyde. It is 11 miles north of Ayr, and 29 miles south-west of Glasgow by railway. The harbour has now become so much sanded up as only to admit vessels of about 100 tons burden. The 'Academy' is one of the most flourishing educational institutions in the west of Scotland. Ship-building, and the manufacture of book-muslins, jaconets and checks, are among the branches of industry. Formerly, many women were employed in sewing muslins. The shipping trade for vessels under 100 tons burden is considerable. I. unites with Ayr, Campbeltown, Oban, and Inveraray in sending a member to parl. Pop. (1871) 6866.

IRVING, Washington, a distinguished American author, was born in the city of New York, April 3, 1783. He was the youngest son of William Irving, who had emigrated from Scotland, and settled in New York as a merchant before the Revolution. Washington I., at the age of 16, entered a law office; but he profited largely by his father's well-stocked library, Chaucer and Spenser being his favourite authors. New York, at this period, was a small town of about 50,000 inhabitants, many of whom were descendants of the original Dutch settlers, having quaint manners and customs, of which I. was a curious observer. In 1804, with the excuse of a tendency to pulmonary disease, he visited, and travelled extensively in Europe; returned to New York in 1807, and contributed a series of genial and humorous essays to a periodical called *Salmagundi*. In 1809, he wrote *A History of New York, from the Beginning of the World to the End of the Dutch Dynasty, by Diedrick Knickerbocker*, a burlesque chronicle written in so quiet a vein of humour, that it has sometimes been taken for a veritable history.

Having no inclination for law, he engaged in commerce with his brothers as a silent partner, but devoted his time to literature, and in 1813, edited the *Analectic Magazine*, in Philadelphia. At the close of the war in 1815, he visited England, where he was warmly welcomed by Campbell, whose biography he had formerly written, and was introduced by him to Walter Scott. While he was enjoying his English visit, his commercial house failed, and he was suddenly reduced to poverty, and the necessity of writing for his bread. The *Sketch-book*, portions of which had appeared in New York, was offered to Murray, and afterwards to Constable, but was refused by both of these celebrated publishers. After an unsuccessful attempt of the author to publish it on his own account, Murray, on Scott's recommendation, took the *Sketch-book*, paying £200 for the copyright, which he afterwards increased to £400. It had a charm in its beauty and freshness, and was a surprise as the work of an American, and was therefore received with great favour. I. went to Paris, and in 1822 wrote *Bracebridge Hall*, and in 1824 the *Tales of a Traveller*. He was then invited by Everett, the American ambassador to Spain, to accompany him to Madrid, to translate documents connected with the life of Columbus. With these materials he wrote his *History of the Life and Voyages of Columbus* (1828); *Voyages of the Companions of Columbus; The Conquest of Granada; The Alhambra* (1832), a portion of which was written in the ancient palace of the Moorish kings; *Legends of the Conquest of Spain* (1835); and *Mahomet and his Successors* (1849). In 1829, I. returned to England as secretary to the American legation. In 1831, he received the honorary degree of LL.D. from the university of Oxford; and next year returned to America, where he was received with great enthusiasm. A visit to the Rocky Mountains produced his *Tour on the Prairies*. He also contributed sketches of Abbotsford and Newstead Abbey to the *Crayon Miscellany*, and from the papers of John Jacob Astor, wrote *Astoria* (1837), and the *Adventures of Captain Bonneville*; also a series of stories and essays in the *Knickerbocker Magazine*, collected under the title of *Wolfert's Roost*. In 1842, he was appointed minister to Spain. In 1846 was published his *Life of Goldsmith*; and his great work, the *Life of Washington*, was published in 1855—1859. An edition of his works in 15 vols. reached a sale of 250,000 vols. He spent the last years of his life at Sunnyside, in his own 'Sleepy Hollow,' on the banks of the Hudson, near Tarrytown, with his nieces, where he died suddenly of disease of the heart, November 28, 1859. He was never married.

IRVING, Rev. Edward, was born in the town of Annan, Dumfriesshire, August 15, 1792; studied at the university of Edinburgh, and, after completing his curriculum for the ministry, became assistant (in 1819) to Dr Chalmers, then a minister in Glasgow. His sermons did not prove very popular. Chalmers himself was not satisfied. In 1822, I. received a call to the Caledonian Church, Hatton Garden, London, which he accepted. His success as a preacher in the metropolis was such as had never previously been witnessed. After some years, however, the world of fashion got tired of I.; but it was not till his more striking singularities of opinion were developed that fashion finally deserted him. At the close of 1825, he began to announce his convictions in regard to the second personal advent of the Lord Jesus, in which he had become a firm believer, and which he declared to be near at hand. This was followed up by the translation of a Spanish work, *The Coming of the Messiah in Majesty and Glory, by Juan Josafat Ben Ezra*, which professed to be written by a Christian Jew, but was, in reality, the composition of a Spanish Jesuit. I.'s introductory preface is regarded as one of his most remarkable literary performances. In 1828, appeared his *Homilies on the Sacraments*. He now began to elaborate his views of the incarnation of Christ, asserting with great emphasis the doctrine of his oneness with us in all the attributes of humanity. The language which he held on this subject drew upon him the accusation of heresy; he was charged with maintaining the sinfulness of Christ's nature, but he paid little heed to the alarm thus created. He was now deep in the study of the prophecies; and when the news came to London in the early part of 1830, of certain extraordinary manifestations of prophetic power in the west of Scotland (see Irvingites), I. was prepared to believe them. Harassed, worn, baffled in his most sacred desires for the regeneration of the great Babylon in which he dwelt, branded by the religious public, and satirised by the press, the great preacher, who strove above all things to be faithful to what seemed to him the truth of God, grasped at the new wonder with a passionate earnestness. Matters soon came to a crisis. I. was arraigned before the presbytery of London in 1830, and convicted of heresy; ejected from his new church in Regent's Square in 1832; and finally deposed in 1833, by the presbytery of Annan, which had licensed him. His defence of himself on this last occasion was one of his most splendid and sublime efforts of oratory. The majority of his congregation adhered to him, and gradually a new form of Christianity was developed, commonly known as Irvingism, though I. had really very little to do with its development. Shortly after, his health failed, and in obedience, as he believed, to the Spirit of God, he went down to Scotland, where he sank a victim to consumption. He died at Glasgow, December 8, 1834, in the 42d year of his age.—See Carlyle's *Miscellaneous Essays*, and Mrs Oliphant's *Life of Edward Irving* (London, 1862).

IRVINGITES, the common but improper designation of a body of Christians who object to any designation which implies sectarianism, and there-

Church. In the winter of 1829—1830, the Rev. Edward Irving (q. v.), then a minister of the Scotch Church, Regent Square, London, delivered a series of lectures on spiritual gifts, in which he maintained that those which we are in the habit of calling 'extraordinary' or 'miraculous' were not meant to be confined to the primitive church, but to be continued through the whole period of the present dispensation. About the same time, as if to confirm the views of the great preacher, there occurred at Port-Glasgow, in the west of Scotland, certain strange phenomena. It was alleged that miraculous acts of healing had happened, and that the gift of tongues had reappeared. After what seemed to be a sufficient investigation on the part of some of the members of Mr Irving's church, it was concluded that the manifestations were genuine. Similar manifestations shortly after occurred in his own church, which were also pronounced to be genuine. They were held to be of two kinds: 1st, speaking in tongues, and 2d, prophesying. As the former bore no resemblance to any language with which men were conversant, it was believed to be strictly an 'unknown tongue,' the Holy Ghost 'using the tongue of man in a manner which neither his own intellect could dictate, nor that of any other man comprehend.' The latter, 'prophesying,' consisted chiefly of 'exhortations to holiness, interpretations of Scripture, openings of prophecy, and explanations of symbols.' After some time, Irving was deposed from his office for heresy by the Church of Scotland, but meanwhile the religious opinions with which his name is associated had been assuming a more definite and ecclesiastical shape. The final result was the *Apostolic Catholic Church*, the constitution of which is briefly as follows:

There are, as in the apostolic times, *four* ministries: 1st, that of 'Apostle;' 2d, that of 'Prophet;' 3d, that of 'Evangelist;' and 4th, that of 'Pastor.' The apostles are invested with spiritual prerogatives; they alone can minister the Holy Ghost by the laying on of hands; to them the mysteries of God are revealed and unfolded to the church; and they decide on matters of order and discipline. Nothing that transpires in any church in the way of 'prophetic utterance' can be authoritatively explained save by them; and the various 'angels of the churches' are bound to bring all such utterances under their cognizance, in order that they may be rightly interpreted. The function of the 'prophet' has been already indicated. The work of an 'evangelist' mainly consists in endeavouring to 'bring in' those who are without. The 'angel' of the Catholic Apostolic Church corresponds with the bishop of other Christian denominations. The ministers of each full congregation comprise an angel, with a fourfold ministry (consisting of elders, prophets, evangelists, and pastors), and a ministry of deacons to take charge of temporal matters. This ministry is supported by tithes, the people giving a tenth of their income for the support of the priesthood. Church affairs are managed by a council of ministers of all classes, whose selection and arrangement are conceived to have been foreshadowed in the structure of the Mosaic Tabernacle.

The Catholic Apostolic Church does not differ from other Christian bodies in regard to the common doctrines of the Christian religion; it only accepts, in what it considers to be a fuller and more real sense, the *phenomena* of Christian life. It believes that the wonder, mystery, and miracle of the apostolic times were not accidental, but are essential to the divinely instituted church of God, and its main function is to prepare a people for the second advent of Christ.

Church is its extensive and elaborate symbolism. In regard to the sacrament of the Lord's Supper, the doctrine of the objective presence is held, but both transubstantiation and consubstantiation are repudiated.

The Catholic Apostolic Church has established itself in England, Scotland, Canada, the United States, Prussia, France, Switzerland, Ireland, Belgium, Russia, Denmark, Sweden, Australia, and India.

ISAAC ('he will laugh'), a Hebrew patriarch and pastoral chief, was the son of Abraham and Sarah, and half-brother of Ishmael. His birth happened when both his parents were advanced in age. The incidents of his life, as recorded in Genesis, are well known. He died at Hebron, aged 180 years, leaving two sons, Jacob and Esau.—I.'s character has always been very differently interpreted. What has been called by some his mild and gentle disposition, simple pastoral piety, others have termed weakness and want of character. His (for the most part) blameless ways, however, call forth our love and esteem. The Midrash ascribes to him, in allusion to Gen. xxiv. 63, the institution of the afternoon prayer.

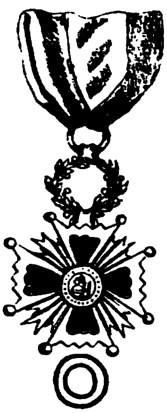
ISAAC I., Comnenus, emperor of Constantinople, was the first of the family of the Comneni who attained to that dignity. His father Manuel, his brother John, and himself were employed in important military and civil capacities by Basil II. (976—1025); but during the reign of the latter's imbecile and tyrannical successors, in whose eyes it was criminal for any one to excel in wisdom and ability, I. was exposed to considerable danger. Such, however, was his prudence, and the affection of the people for him, that the emperors unwillingly suffered him to live unmolested; and on the deposition of Michael VI. (1056—1057), I. was elevated to the vacant throne. On his accession, he found the affairs of the empire in what was by this time their normal condition; rebellion within, aggression without, and the treasury exhausted. He succeeded in establishing a system of great economy in all branches of the administration, and in order still further to lighten the taxes on the people, called upon the clergy to contribute their share. But the clergy, then as now, refused to endure the imposition of any such burdens, and the patriarch Michael is reported to have even threatened him with deposition. But death delivered I. of this formidable opponent, and the clergy were compelled to submit. In 1059, he repelled the Hungarians, who had encroached upon his possessions in the north-west; but soon afterwards, to the great grief of his subjects, he was attacked by a violent fever, and believing his dissolution approaching, appointed his famous general, Constantine Ducas, as his successor. He, however, recovered from his illness, but resigning the crown, retired to a convent, where he lived for two years in the odour of sanctity, and died in 1061. He was one of the most virtuous emperors of the East, and to great learning, wisdom, and prudence, united an administrative ability and energy, that would, had his reign been of longer duration, have gone far to regenerate the effete Byzantine empire. Nor was he deficient in literary attainments. We still possess by him Scholia—hitherto unedited—on Homer, his favourite author; further, a work, *Characteristics*, scil., of the Greek and Trojan chiefs mentioned in the *Iliad;* and finally, a treatise *On the Works of Homer*.

ISABELLA of Castile, queen of Spain, born on 23d April 1451, was the daughter of John II., king of Castile and Leon, and in 1469 married

Ferdinand V., surnamed 'the Catholic,' king of Aragon. On the death of her brother, Henry IV., in 1481, she ascended the throne of Castile and Leon, to the exclusion of her elder sister Joanna. She had won the support of great part of the states of the kingdom during her brother's life, and the victorious arms of her husband compelled the consent of the rest (see FERDINAND). I. was a woman of remarkable energy and talent, and possessed no inconsiderable beauty and much winning grace, although proud, ambitious, and deficient in true womanly gentleness. She was always present in meetings of council, and insisted on the use of her name along with that of Ferdinand in all public documents. She died at Medina del Campo, on 26th Nov. 1504, after having exacted from her husband, of whom she was always jealous, a promise, confirmed by oath, never to marry again.

ISABELLA II., queen of Spain. See SUPP., Vol. X.

ISABELLA THE CATHOLIC, ORDER OF, a Spanish Order of knighthood, founded by Ferdinand VII., in 1815, as a reward of loyalty, and for the defence of the possessions of Spanish America. It is now conferred for all kinds of merit. The sovereign is the head of the order, which is divided into the three classes of Grand Crosses, Commanders, and Knights.



Order of Isabella the Catholic.

ISAI'AH (Heb. *Yeshayahu*, 'Salvation of God'), the most sublime of the Hebrew prophets, was the son of one Amoz. He uttered his oracles in the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah. Regarding his outward life, almost nothing is known. He appears to have resided at Jerusalem, in the vicinity of the temple, was married, and had three sons, given him, he says, 'for signs and for wonders in Israel.' The period of his death is not known, but according to a rabbinical legend, apparently accepted by the writer of the Epistle to the Hebrews (xi. 37), (Sanh. 103 *b*, &c.), he was sawn asunder by order of King Manasseh, who abhorred his oracles (cf. Jos. Ant. x. 31). If this statement is well founded, I. must have been nearly 100 years old when he was thus barbarously murdered.—The prophecies of I., viewed in their literary aspect, do not exhibit a continuous unity of design; they consist, of a series of 'visions' beheld at different times, and arranged neither exactly in chronological nor material order. The compiler or editor of the whole is believed by many not to be I. himself. Verse 38th of chap. xxxvii. is regarded by the majority of scholars of note as conclusive proof of a later hand. The grand controversy, however, is not concerning the arrangement of these prophecies, but concerning their authorship. Did they all proceed from one and the same person, or are different authors discernible? Orthodox critics maintain the unity of authorship, and assert that I., if he did not edit, certainly wrote the whole 66 chapters. The first who doubted this was the German scholar Koppe (1779—1781), who suspected that the last 27 chapters (40—66) were the work of a later hand. He was followed by Döderlein, Eichhorn, and Justi, and the same view has been substantially adopted by Paulus, Bertholdt, De Wette, Gesenius, Hitzig, Knobel, Umbreit, and Ewald. The chief arguments against the Isaiah-authorship are: 1. That the subject-matter of these burdens relates to what happened long after I.'s death, 100 years at least, viz., the redemption of the Jews from captivity, consequent upon the overthrow of the Babylonian monarchy by the Medo-Persian army. 2. That the writer speaks of the exile as something present, and of the desolation of Judah as a thing that had already taken place. 3. That Cyrus is mentioned by name, and an intimate knowledge exhibited of his career. 4. That an extraordinarily minute acquaintance with the condition and habits of the exiles is shewn. 5. That the sentiments are far more spiritual. 6. That the style is totally different, being more smooth, flowing, rhetorical, and clear. To these objections, Hengstenberg, Hävernick, Keil, Henderson, Jahn, Möller, Alexander, and others have replied more or less satisfactorily. Their principal argument is the predictive character of prophecy. In these prophecies, we have the first distinct and vivid announcements of a Messianic deliverer (whence I. has been called the 'Evangelical prophet'). As, however, they are found chiefly in the last 27 chapters (the supposed work of a Deutero-Isaiah), it has been made a question, by those who do not believe in prophecy in the usual sense, whether the 'deliverer,' who redeems the people by his own sufferings, is a literal prediction of Jesus Christ on the part of the prophet, or only a personification of the sanguine hope of deliverance that animates his patriotic and religious soul.

The style of I. possesses an astonishing richness and variety. It reaches the pinnacle of grandeur, and melts into the softest pathos. Ewald, a master of æsthetic as well as of philologic criticism, attributes to him 'the most profound prophetic excitement and the purest sentiment, the most indefatigable and successful practical activity amidst all perplexities and changes of outward life, and that facility and beauty in representing thought which is the prerogative of the genuine poet. . . . In the sentiments which he expresses, in the topics of his discourses, and in the manner of expression, I. uniformly reveals himself as the kingly prophet' (*Propheten des Alten Bundes*, vol. i. p. 166, &c.). Among the chief commentators on I. are Jerome, Aben-Ezra, Abarband, Vitringa, Lowth, Henderson, Calmet, Hitzig, Rosenmüller, Gesenius, Hengstenberg, and Alexander.

I'SAR, or ISER, a river of Germany, rises in the Tyrol, to the north of Innsbruck, and, entering Bavaria, flows generally in a north and north-east direction, and joins the Danube at Deggendorf, after a course of about 180 miles. Munich and Landshut are situated upon its banks. In the first part of its course, it is an impetuous mountain torrent; and even after it leaves the Alps, it has many rapids and islands, but for a great part of its course it is navigable for boats. Much wood is floated down the I. from the mountains.

I'SCHIA (the ancient *Ænaria*), an island situated between the Bay of Naples and that of Gaeta. It is about 24 square miles in extent, and has a population of 28,000 inhabitants. I. is a favourite place of summer resort, and is noted for the excellence of its mineral waters, and numerous springs, the great richness of its soil, the exquisite flavour of its fruits and wines, and the enchanting character of its scenery. Its highest point is the volcanic Monte Epomeo, 2574 feet above the level of the sea, of which the eruptions have been numerous and disastrous; that of 1302 was of two months' duration, and occasioned a serious loss of life and property. The Lake of Ischia appears to occupy an extinct crater of the volcano, and abounds in fish.

rounded on all sides by gardens, is finely situated on the river Traun, amid magnificent Alpine scenery, 28 miles east-south-east of Salzburg. It is the chief town of the district called the Salzkammergut (q. v.). The situation of I., and the salt baths which were established here in 1822, have attracted to it vast numbers of visitors. The emperor and many of the Austrian nobility have built villas here, and the town has also acquired celebrity from having been the scene of various diplomatic conferences. Pop. (1869) 6842.

ISE'O, Lake, or **LACUS SEVINUS**, a lake of Northern Italy, situated between the provinces of Bergamo and Brescia. Its extreme length from north to south is about 20 miles; its average breadth, 6 miles; and its greatest depth, 984 feet. On its banks is situated the town of Iseo. The lake is fed by the rivers Oglio and Borlazzo. The surrounding scenery is highly interesting, broken into picturesque heights, and studded with fine villas, vineyards, and olive-gardens.

ISÈRE, a river of the south-east of France, rises in Savoy, at the western base of Mount Iseran, flows in a general south-west direction through Savoy, and through the departments of Isère and Drome, and joins the Rhone 8 miles above Valence. Its entire length is about 190 miles, for the last 50 of which it is navigable, but not without difficulty, as its channel is interrupted by shoals and islands.

ISÈRE, a department in the south-east of France, is bounded on the N. and W. by the river Rhone, on the E. by the department of Savoie, and on the S. and S. E. by those of Drome and Hautes-Alpes. Area, 2,078,799 acres, of which nearly a half is in arable land, and a fifth in wood. Pop. (1872) 575,386. The surface is level in the north-west, but becomes mountainous as one proceeds south, where the scenery is very imposing. Mount Olau, on the south-eastern border, is 12,664 feet high. The chief rivers, besides the Rhone, are the Isère, from which the department derives its name, and its affluents the Drac and Romanche. The department of I. is one of the richest of France in mineral productions. Mines of iron, lead, copper, and coal are worked, and gold and silver occur. The vine is carefully cultivated in the valleys; 5,324,000 gallons of wine are said to be produced annually. Arrondissements, Grenoble, La Tour-du-Pin, St Marcellin, and Vienne; capital, Grenoble.

ISERLO'HN, an important manufacturing town of Prussian Westphalia, is situated in a picturesque and mountainous district, on the Baar, a tributary of the Ruhr, 18 miles west of Arnsberg. The industry of I. is chiefly directed to the manufacture of hardware of various kinds, especially of brass and bronze articles. Pop. (1871) 15,763.

ISE'RNIA (anc. *Æsernia*, a city of the Samnites), a town of Italy, in the province of Campobasso, is situated in a commanding position on the crest of a hill, 24 miles west of Campobasso, and is surrounded by scenery of romantic beauty. The modern town consists chiefly of one long and narrow street, and is surrounded by walls. Among numerous other antiquities is a subterranean aqueduct, hewn in the solid rock, which still supplies the fountains and manufactories with water, and remains unimpaired throughout its entire course of one mile. I. was much injured by an earthquake in 1805, when some of its finest buildings were ruined. Woollens, paper, and earthenware are here manufactured. Pop. 8584.

I'SHIM, a river of Siberia, an affluent of the Obi (q. v.).

the first-born of Abraham, by Hagar, the Egyptian handmaid of his wife Sarah. His character is found foretold before his birth by an angel, who met Hagar sitting by a well in the wilderness on the way to Shur, whither she had fled to avoid the harsh treatment of her mistress: 'And he will be a wild [literally, 'a wild ass-'] man; his hand against every man, and every man's hand against him; and he shall dwell in the presence of all his brethren' (Gen. xvi. 12). Expelled from his father's house, along with his mother, when he was about the age of 15, he went into the southern wilderness where he grew up to manhood, and became famous as an archer. Scripture represents I. in a not unfavourable light, and it was predicted that he should become a great nation. This 'great nation' is commonly believed to be the Arabian; and there is no good reason for doubting that at least the *northern* Arabs—the wild Bedouins who roam over the great wastes between the peninsula of Sinai and the Persian Gulf—may, to a certain degree, be the descendants of Ishmael. There is, however, not a shadow of reason, as all scholars now admit, for the notion that the founders of the great Joktanite and Cushite monarchies in the south of Arabia were of Ishmaelitic origin; and the description given in Scripture of the character and habits of I. and his descendants does not in the least apply to these monarchies. The Bedouins of Northern and Central Arabia, on the other hand, are full of Ishmaelitic traditions. Mohammed asserted his descent from I., and the Mohammedan doctors declare that Ishmael, and not Isaac, was offered up in sacrifice—transferring the scene of this act from Moriah in Palestine to Mount Arafât near Mecca.

I'SIAC TABLE, a monument much esteemed and quoted by archæologists previous to the discovery of hieroglyphics, being a flat rectangular bronze-plate, inlaid with niello and silver, about 4 feet 8 inches long, by 3 feet in height. It was sold by a soldier of the Constable de Bourbon to a locksmith, and bought of the same by Cardinal Bembo in 1527, passed after his death to Modena, and finally to Turin, where it is now deposited. It consists of three rows of figures of Egyptian deities and emblems. Its object was supposed to have been votive, or even to have been the nativity of the Emperor Trajan; but it is now recognised as a very late or spurious monument.—Winckelmann, Op. iii. 113, v. 450; Wilkinson, Sir G., *Mann. and Cust.*

I'SIDORE OF SEVILLE (Isidorus Hispalensis), one of the most distinguished ecclesiastics of the 6th century. He is particularly remarkable as among the earliest representatives of the church of Spain, and of that great movement in the Western Church by which the doctrinal and moral system of Christianity was brought into harmony with the habits and institutions of those various races and nationalities which, by successive immigrations and wars, were eventually erected into the Hispano-Gothic kingdom, which exercised so powerful an influence on what is called Latin Christianity. He was born about 560 or 570, at Carthagena, where his father, Severianus, was prefect. Two of his brothers, Fulgentius and Leander, were, like himself, bishops, the first of Carthagena, the second succeeding himself in the see of Seville. The episcopate of I. is rendered notable by the two half-ecclesiastical, half-civil councils of Toledo in 619 and in 633, which were held under his presidency, and the canons of which may almost be said to have formed the basis of the constitutional law of the Spanish kingdoms, both for church and for state, down to the great constitutional changes of the 15th century. He also collected with the same object all the decrees of councils and other church laws anterior to his time. His death, which occurred in 636, forms one of the most remarkable scenes in early Christian history. When he became sensible of the approach of death, he summoned his flock to his bedside, exhorted them to mutual forbearance and charity, prayed their forgiveness for all his own shortcomings in his duty, and directed all his property to be distributed among the poor. His works, which are in the most various departments of knowledge—theological, ascetical, liturgical, scriptural, historical, philosophical, and even philological—were first published in 1580; but the most complete edition is that of Arevali, 7 vols. 4to (Rome, 1797—1803). We are indebted to I. for many fragments of Greek and Latin authors, among the number several of whom hardly any other remains have been preserved.

ISIDO'RIAN DECRE'TALS, also called FALSE DECRETALS, a spurious compilation of the 9th c., which, by a singular combination of circumstances, obtained currency in the Western Church, and continued for several centuries to enjoy unquestioned authority. Up to the 9th c., the only authentic collection of decretals, that of Dionysius Exiguus, commenced with the decrees of Pope Siricius in the end of the 4th century. The so-called Isidorian Decretals stretch back through the predecessors of Siricius up to Clement himself, and comprise no fewer than 59 decrees or epistles anterior to the time of Siricius. In a later part of the Isidorian collection, moreover, are interpolated nearly forty similar documents, unknown till the time of that compilation. All these documents are presented not merely as authentic, but as the genuine productions of the particular popes to whom they are attributed. The subject-matter of these decretals is most diversified, comprising the authority and privileges of the pope, the whole system of the hierarchy, with the relations of its several orders to each other and to the common head. In all, there is a strong and systematic assumption of the papal supremacy; but it is at the same time more than doubtful whether the direct object of the author was the exaltation of the papal prerogative. It is much more likely that the object was to protect the rights of bishops against the arbitrary rule of the metropolitans. Dean Milman thinks it probable that the author believed that he 'was not asserting for Rome any prerogative which Rome herself had not claimed' (*Latin Christianity*, ii. 378). Catholic historians, indeed, go further, and while they admit and denounce the clumsy fraud, contend that the easy and universal acceptance which the decretals met, furnishes the strongest presumption that the discipline which they have elaborated and methodised, was already in full possession, although without the formal and written law which the daring adventurer attempted to provide in the decretals of the early pontiffs.

It is curious that the author, the place, and the date of this singular forgery are still matter of uncertainty. It is certain that it did not come from Rome; and the most probable conjecture assigns its origin to Mentz, at some time between the years 840 and 847. It was introduced under the name of Isidore of Seville, as a part of the genuine collection known as his, and was believed to have been brought from Spain by Riculf, the Archbishop of Mentz. It is hardly possible, in an age of discussion like ours, to doubt that, when the decretals first appeared, even the most superficial inquiry, or the slightest critical investigation of the historical sources, would have sufficed to detect the fraud. 'It is impossible,' says Dean Milman, 'to deny that at least by citing without reserve or hesitation, the Roman pontiffs gave their deliberate sanction to this great historic fraud;' and yet it is equally impossible to fix the limit beyond which, in an age so uncritical, literary or historical credulity might not be carried without provoking its susceptibility, or disturbing its peace.

From the first circulation of the false decretals down to the 15th c., no doubts were raised regarding them. Nicholas of Cusa and Cardinal Turrecremata were the first to question their genuineness; but after the Reformation, the question was fully opened. The centuriators of Magdeburg demonstrated their utterly apocryphal character. A reply was attempted by Father de la Torre; but the question may be said to have been finally settled by Blondel.—See Milman's *Latin Christianity*, ii. 370—380; Walther's *Kirchenrecht*, p. 155; Gfrörer's *Kirchengeschichte*.

I'SINGLASS. See GELATINE.

I'SIS, the name of an Egyptian deity, the sister and wife of Osiris, called by that people *Hes*, daughter of *Seb* or Chronos, and Nu or Rhea; according to other versions, of Hermes and Rhea, born on the 4th day of the Epagomenæ, or five days added to the Egyptian year of 360 days. After the murder of Osiris by Typhon, and the throwing of him in a coffin into the Tanitic mouth of the Nile on the 17th Athyr, I. was informed of the deed by the Pans and Satyrs, and went into mourning at Coptos; and hearing from some children where the chest had been thrown, proceeded to seek for it in company with Anubis, and discovered it enclosed in a tamarisk column in the palace of Malcander, at Byblos; and sitting down at a fountain in grief, was discovered by the ambrosial scent of her hair, and invited to the court by the Queen Astarte, to nurse her children. One of these she fed with her finger, and endeavoured to render immortal by placing him in flames, while she herself, under the form of a swallow, flew round the column and bemoaned her fate. Having obtained the column, I. took out the chest of Osiris, wrapped it in linen, and lamented so deeply, that the youngest of the queen's sons died of fright. She then set forth with the chest and eldest son to Egypt, dried up the river Phædrus on her way, and killed with her glances the eldest son, named Maneros, who had spied her secret grief in the desert. Having deposited the chest in a secret place, she proceeded to Buto to Horus; but Typhon discovered the chest, and divided the body into 28 or 26 portions, and scattered it over the country. These the goddess again sought, and found, except the phallus, which had been eaten by fish; and wherever she found any of the limbs, she set up a tablet, or sent an embalmed portion, deposited in a figure of the god, to the principal cities of Egypt, each of which subsequently claimed to be the true birthplace of Osiris. After the battle of Horus and Typhon, I. liberated Typhon, and had her diadem torn off, and replaced by one in the shape of a cow. She was the mother of Haroeris by Osiris before her birth, and of Harpocrates after the death of Osiris. She buried Osiris at Philæ. The monarch Rhampsinitus played at dice with her in Hades. Her soul was supposed to have passed into the star Sothis or Sirius. Her worship was universal throughout Egypt; she was particularly worshipped at Philæ and at Bubastis, where a special festival was celebrated to her; and her tears were supposed to cause the inundation of the Nile. Another festival was celebrated to her at the harvest.

In the monuments, she is called the goddess-mother, of the sun, and regent of the gods. In her terrestrial character, she wears upon her head the throne which represented her name; in her celestial, the disc and horns, or tall plumes. She is often seen suckling Horus; sometimes she has the head of a cow, indicating her identity with the cow Athor, of whom the sun was born. Occasionally, she is identified with other female deities, such as Pasht. On her head, she wears the vulture symbol of maternity. Her attributes were assumed by the queens of Egypt, and Cleopatra sat and gave responses in the character of the youthful Isis.

The worship of I. was introduced into Rome by Sulla (86 B. C.) from Tithorea, and shared the fate of that of other Egyptian deities, being associated with that of Serapis, Anubis, and others, and the temples from time to time destroyed. It flourished under the Flavians and Hadrian. At this time, I. was represented with a sistrum or rattle, a bucket, and a dress with a fringed border, knotted at the chest. On the Alexandrian coins, I. appears as *Pharia*, before the Pharos, holding a full sail. The festivals, seclusion, rules of chastity, attracted many followers, but the worship was not altogether considered reputable by the Romans. It was more extended and respected in Asia Minor and the provinces, but fell before Christianity (391 A. D.). I. was worshipped as the giver of dreams, and in the twofold character of restorer of health and inflicter of diseases.

The myth of I., as given by Plutarch, appears to be a fusion of Egyptian and Phœnician traditions, and the esoterical explanations offered by that writer and others shew the high antiquity and unintelligibility of her name. She was thought to mean the cause, seat, or the earth, to be the same as the Egyptian Neith or Minerva, and Athor or Venus; to be the Greek Demeter or Ceres, Hecate, or even Io. Many monuments have been found of this goddess, and a temple at Pompeii, and a hymn in her honour at Antioch. The representations of her under the Roman empire are most numerous, I. having, in the pantheistic spirit of the age, been compared with and figured as all the principal goddesses of the Pantheon.—Plutarch, *De Iside;* Herod. ii. c. 59; Ovid, *Met.* ix. 776; Bunsen, *Egypt's Place*, i. p. 413; Wilkinson, Sir G., *Mann. and Cust.*, iii. 276, iv. 366; Birch, *Gall. Ant.* p. 31.

ISIS. See THAMES.

ISKANDEROO'N, or ALEXANDRETTA, a seaport of Asiatic Turkey, on the coast of Syria, is situated on a gulf of the same name, 60 miles west-north-west of Aleppo, of which it is the port. Its harbour is the best on the Syrian coast; but the town itself, though much improved within late years, is still poor and miserable. Numerous vessels of large tonnage, and with cargoes the value of which is considerably upwards of a million sterling, annually enter and clear the port. Galls, silk, cotton, and fruits are exported; and the chief imports are rice, corn, salt, and goods of British manufacture. Pop. 1000.

I'SLA DE PI'NOS, an almost circular island, of 800 square miles and 900 inhabitants, is the largest of the numerous satellites of Cuba, lying off the south coast of the Queen of the Antilles, pretty nearly on the meridian of the capital, Havana. It is celebrated for its excellent climate, exuberant fertility, rich mines, and valuable timber.

ISLÂM, or ESLÂM (Arab.), the proper name of the Mohammedan religion; designating complete and entire submission of body and soul to God, his will and his service, as well as to all those articles MEDANISM). Islam, it is held, was once the religion of all men; but whether wickedness and idolatry came into the world after the murder of Abel, or at the time of Noah, or only after Amru Ibn Lohai, one of the first and greatest idolaters of Arabia, are moot-points among Moslim (a word derived from *Islam*) theologians. Every child, it is believed, is born in Islam, or the true faith, and would continue in it till the end were it not for the wickedness of its parents, 'who misguide it early, and lead it astray to Magism (see GUEBRES), Judaism, or Christianity.' See MOHAMMED, KORÂN.

ISLAMABA'D. See CHITTAGONG.

ISLAND (Ang.-Sax. *igland*, 'properly, *eye-land*, a spot of land surrounded by water, as the eye in the face'—Wedgewood; Ice. *ey*, Dan. *öe*, meaning isle, and akin to eye; the *s* in island crept in through the influence of Fr. *isle*, derived from Lat. *insula*), in Geography, land surrounded with water. New Holland is sometimes regarded as a continent, and sometimes as an island; so that the distinction of the terms is somewhat vague; even the great Eastern and Western continents are surrounded with water. In the ocean between New Holland and Asia, and to the eastward, islands are more numerous than anywhere else in the world. There, also, the largest islands are found. Excluding New Holland, the largest islands in the world are Borneo and Greenland; after these, New Guinea, Madagascar, Sumatra, and Great Britain. Islands are often in groups, and when the number is great, the assemblage is called an archipelago. Some islands have the appearance of intimate geological connection with the continents near which they are situated, and some of such connection with each other that they seem as if they were the remaining parts of a former continent; others, generally of a more circular form, have their geological character more complete in itself. In the South Seas, there are two very distinct classes of islands, the one mountainous, and often with active volcanoes; the other low and flat, formed of coral. See CORAL ISLANDS.

ISLANDS OF THE BLESSED were, according to a very old Greek myth, certain happy isles situated towards the edge of the Western Ocean, where the favourites of the gods, rescued from death, dwelt in joy, and possessed everything in abundance that could contribute to it.

I'SLAY, an island on the west coast of Scotland, belonging to the group of the Inner Hebrides, and to the county of Argyle, lies west of the peninsula of Kintyre, from which it is distant about 15 miles, and south-west of the island of Jura, from which it is separated by a strait called the Sound of Islay. Greatest length, 24 miles; greatest breadth, 17 miles; area, about 220 square miles; pop. (1871) 8143. In the north, the island is hilly, and along the eastern shore runs a ridge rising from 800 to upwards of 1500 feet in height. The central and western districts are undulating or flat. Agriculture has of late years been greatly improved; the number of acres under cultivation is about 22,000, and abundant crops, both white and green, are produced. There are eight distilleries on the island, which produce about 400,000 gallons of whisky annually. Chief exports, black-cattle, sheep, and whisky. Lead and copper ores have been worked in mines in the interior, but have not yet been shipped to any considerable extent.

I'SLINGTON, a suburb of London, but so closely connected with it as to form part of it, is situated two miles north of St Paul's. Pop. in 1851, 95,329; in 1861, 155,341; in 1871, 213,778; it is remarkable for the number of its religious, educational, and benevolent institutions.

ISMAI'L, a town and river-port in the principality of Moldavia, on the north bank of the Kilia branch of the Danube, about 40 miles from the mouth of that river. It was taken, destroyed, and its garrison put to the sword by Suwaroff in December 1790; came into possession of Russia after the peace of Bucharest in 1812; reverted to Turkey by the treaty of Paris, 1856; and now belongs to the Danubian principality, Moldavia. It carries on an important trade in corn, as well as a considerable general trade. Pop. above 20,000. Previous to its reversion to Turkey, it was the station of the Russian fleet of the Danube.

ISMU'D, ISMID, or IZMID. See NICOMEDIA.

ISNI'K, or IZNECK. See NICÆA.

ISOBAROME'TRIC LINES (Gr. *isos*, equal) are lines connecting together on a map those places which exhibit the same mean difference between the monthly extremes of the barometer. These oscillations are greater in some countries, as Hindustan and Newfoundland, than in others, as Western Europe and the Antilles.

ISO'CHRONISM (Gr. *isos*, equal, *chronos*, time). A pendulum is isochronous when its vibrations are performed in equal times, whether these vibrations be large or small; but it can only possess this property by being constrained to move in a cycloidal arc. See CYCLOID. This is managed by causing the string to wrap and unwrap itself round two equal cycloidal cheeks, the diameter of whose generating circle is equal to half the length of the pendulum. Isochronism is closely approximated in practice by causing the pendulum to describe a very small circular arc.

ISOC'RATES, a celebrated Grecian orator, was born at Athens, 436 B.C. He had a weak voice, and much natural timidity, which shut him out from a political career; but he taught rhetoric, and wrote orations for others, for which he received large sums; and though he did not mingle in the strife of parties, he was earnestly interested in the cause of his country's independence and honour. The fatal battle of Chæroneia broke his heart: he refused to taste food, and died after an abstinence of several days, 338 B.C., in the 98th year of his age. I. was a friend of Plato. His orations, of which upwards of twenty are extant, are characterised by extreme carefulness and elegance of style, but are not to be compared with those of Demosthenes in fervour, or with those of Lysias in natural beauty and simplicity. The best modern editions are those of Lange (Halle, 1803), Ad. Coraes (Paris, 1807), G. S. Dobson (Lond. 1828), and Baiter and Sauppe (Zürich, 1839).

ISODYNA'MIC, ISOCLI'NIC, and ISOGO'NIC LINES (Gr. *isos*, equal, *dynamis*, force, *klino*, to bend, *gonia*, an angle), or lines of equal force, equal inclination, and equal declination, are three systems of lines, which being laid down on maps, represent the magnetism of the globe as exhibited at the earth's surface in three classes of phenomena, the varying intensity of the force, the varying dip or inclination of the needle, and its varying declination from the true meridian. See MAGNETISM.

ISO'LA BE'LLA. See BORROMEAN ISLANDS.

ISOLA GROSSA, or LUNGA (Great or Long Island), one of the many islands which lie off the western coast of Dalmatia, in the Adriatic Sea, extends between 43° 51′ and 44° 11′ N. lat. Greatest length, 27 miles; greatest breadth, 3 miles; pop. 12,000.

ISOLA MA'DRÉ. See BORROMEAN ISLANDS.

ISO'MERISM (from the Greek word *isomĕrēs*, composed of equal parts), a term applied to those organic compounds which are identical in their ultimate or percentage composition, but present differences in their chemical properties. Isomeric compounds, or *isomerides*, are divisible into metameric compounds, or *metamerides*, and polymeric compounds, or *polymerides*.

In all metameric compounds, the equivalent number is the same, while in all polymeric compounds the equivalent numbers are simple multiples of the equivalent of the lowest number of the group. As an illustration of metamerides, propionic acid, ($HO,C_6H_5O_3$), acetate of methyl ($C_2H_3O,C_4H_3O_3$), and formic ether (C_4H_5O,C_2HO_3) may be taken. Their rational formulæ, which express their probable constitution, are perfectly distinct, yet it will be at once seen that they all have the same empirical formula ($C_6H_6O_4$), and consequently the same percentage composition, and the same equivalent number, viz. 74.

As an illustration of polymerides, the hydrocarbons homologous with olefiant gas may be taken. Olefiant gas is represented by the formula C_4H_4, propylene by C_6H_6, butylene by C_8H_8, amylene by $C_{10}H_{10}$. These substances have the same percentage composition, but different equivalent numbers, all the formulæ being multiples of the more simple formula, C_2H_2, which represents the composition of an alcohol-radical, methylene, which has not yet been isolated.

The carbo-hydrates, which are represented by the general formula, $C_xH_nO_n$, present well-marked examples of isomerism. Thus, cellulose ($C_{12}H_{10}O_{10}$), starch ($C_{12}H_{10}O_{10}$), and gum ($C_{12}H_{10}O_{10}$), are metameric; while grape-sugar ($C_{12}H_{12}O_{12}$) possesses the same percentage composition, but twice as high an equivalent number, as hydrated lactic acid ($C_6H_6O_6$), and the same percentage composition, but three times as high an equivalent number, as hydrated acetic acid ($C_4H_4O_4$); hence the three last-named substances are polymeric.

ISOMO'RPHISM (derived from the Greek words *isos*, equal, and *morphe*, form) strictly signifies similarity of form, but it is now restricted by chemists to those substances which are not only similar in their crystalline form, but are also analogous in their chemical composition. The diamond (C), magnetic oxide of iron (FeO,Fe_2O_3), and alum ($KO,SO_3 + Al_2O_3,3SO_3 + 24aq.$), all crystallise in octohedra, but there is obviously no analogy in the chemical composition of these substances; on the other hand, the spinelle ruby (MgO,Al_2O_3), magnetic oxide of iron (FeO,Fe_2O_3), and chrome ore (FeO,Cr_2O_3), not only crystallise in octohedra, but (as their formulæ shew) are also analogous in their chemical composition. Hence, the members of the latter group are truly isomorphous in the restricted sense, while the members of the former group present only one of the conditions of chemical isomorphism. In most cases, however, as Mitscherlich (to whom we owe most of our knowledge of this subject) has shewn, the chemical composition of substances that correspond in form is analogous; and that chemist has further endeavoured to prove that crystalline form is independent of the chemical nature of the atoms, and that it is determined solely by their grouping and relative position; the same number of atoms combined in the same way form.

Miller, in his *Chemical Physics*, gives fifteen

been distinctly ascertained. From these we select three groups—one of elements, and two of compounds:

Arsenic	Chloride of Potassium,	KCl	Alumina,	Al_2O_3
Antimony	Iodide of Potassium,	KI	Sesquioxide of Iron,	Fe_2O_3
Tellurium	Bromide of Potassium,	KBr	Sesquioxide of Chromium,	Cr_2O_3
	Fluoride of Potassium,	KFl	Sesquioxide of Manganese,	Mn_2O_3

The discovery of the coincidence of similarity in crystalline form where the chemical composition is also similar, is the most important generalisation yet arrived at in the science of crystallography; and in chemistry it has been of essential service in facilitating the classification of compounds, and in determining the combining numbers or atomic weights of the elementary bodies.

ISO'PODA (Gr. equal-footed), an order of Malacostracous Crustaceans of the section *Edriophthalma* (q. v.), mostly aquatic—some marine, some inhabitants of fresh waters—but some terrestrial, inhabiting damp places, as the armadillo, woodlouse, &c. The body is flattened. The thorax consists of seven segments bearing seven pair of feet—six in the young before their first moulting. The females have usually large plates attached to the thoracic segments, meeting to form a pouch for the eggs and young. The interesting fossils called *Trilobites* (q. v.) are supposed to be *Isopoda*, or nearly related to them.

ISOTHE'RMAL LINES (Gr. *isos*, equal, and *thermos*, warm) are lines laid down on maps to connect together places of the same mean temperature.—*Isothĕral Lines* (Gr. *thĕros*, summer) are those which connect places of equal mean summer temperature.—*Isocheimōnal Lines* (Gr. *cheimōn*, winter) connect places of equal mean winter temperature.—Alexander von Humboldt was the first to lay down these systems of lines on maps in 1817. Their importance in reference to climate, meteorology, and the geographic distribution of plants and animals, can hardly be over-estimated.—If the whole surface of the earth were uniform, it is evident that isothermal lines would precisely correspond with the degrees of latitude, and there would be no isotheral and isocheimonal lines, as distinguished from the isothermal; but neither would the earth be habitable for man, or suitable for almost any of the animal or vegetable tribes which actually exist upon it. Isothermal, isotheral, and isocheimonal lines are therefore laid down altogether from observations recorded and compared. In laying them down, care must be taken to make allowance for the elevation of each place of observation above the level of the sea, they being all laid down as for that level. Isothermal lines are named according to the mean temperature which they indicate, the line of 50°, the line of 60°, &c. They are far from corresponding with parallels of latitude, nor are they parallel with one another, but are curved in such a manner as to indicate two northern and two southern poles or centres of greatest cold. It is in the extra-tropical parts of the northern hemisphere that these curvatures are greatest. The northern poles of cold are situated in the arctic regions, one to the north of Siberia, nearly in the meridian of Jakutsk, and the other to the north of America, nearly in the meridian of the most western part of Hudson's Bay; and the isothermal lines throughout the greater part of the northern hemisphere descend to a lower latitude in the east of Asia and in the east of America than elsewhere, ascending, however, to a comparatively high latitude on the western coasts of both the great continents. Thus, the line of 50° F., which passes through the north of England and the north of Ireland, and there reaches its most northern latitude, descends below the latitude of New York, on the eastern coast of America. The distances of the isothermal lines are also remarkably various in different parts of the world. Thus, in the east of North America, from Charleston to Labrador, the mean annual temperature varies more than a degree and a half for every degree of latitude; whilst in Central Europe the variation is only about nine-tenths of a degree, and on the western coasts of Europe still less.

The isotheral and isocheimonal lines are neither parallel among themselves nor with the isothermal lines, and it is in this that a chief difference of continental and of insular climates appears, the summers of the former and the winters of the latter enjoying comparatively large proportions of the heat of the year.

Another interesting system of lines relative to temperature has been laid down by Mr Dove, which he calls *Isabnormal Lines*—the term, however, is objectionable, as formed from words of two languages—lines connecting places which have the same excess above or defect below the normal mean temperature of their latitude. See CLIMATE, METEOROLOGY, and TERRESTRIAL TEMPERATURE.

ISPAHÂ'N, properly **ISFAHÂN**, a famous city of Persia, capital of the province of Irak-Ajemi, and formerly capital of the entire country, is situated on the Zenderud, in an extensive and fertile plain, 226 miles south of Tehran; lat. 32° 40′ N., long. 51° 43′ E. The Zenderud is here 600 feet broad, and is crossed by three noble bridges, one of them 1000 feet in length, and having 34 arches. Groves, orchards, avenues, and cultivated fields surround the city for miles; but the permanent beauty of the vicinity only serves to make the contrast all the more striking between the former splendour of the city and its present ruinous condition. Miles of street are now almost tenantless, and many of the palaces are deserted, and rapidly falling to decay. In the *Chahar Bagh*, an extensive pleasure-ground on the south of the city, is a palace called the *Chehel Sitton*, or 'Forty Columns,' once a favourite royal residence. Along the front of this palace is a double range of columns, each rising from the backs of four lions in white marble. The pillars are inlaid with mirrors, and the walls and roof are profusely decorated with glass and gilding. The suburb Julfa, on the southern bank of the river, once a flourishing Armenian settlement of 30,000 inhabitants, is now little better than a mass of ruins. I., however, is still an important city, and the seat of extensive manufactures, including all sorts of woven fabrics, from rich gold brocades and figured velvets to common calicoes. Trinkets and ornamental goods in great variety, with fire-arms, sword-blades, glass, and earthenware, are also manufactured. Many of its bazaars are still crowded daily, and its merchants are still influential enough to affect prices in India. Of late years, too, I. has shewn considerable signs of improvement; many of its edifices have been rebuilt; rice, an important article of commerce, is now largely cultivated in the neighbourhood. Pop. estimated at 60,000.

I. was a trading town of importance, and the capital of Irak, under the califs of Bagdad. It was taken by Timûr in 1387, when 70,000 of the inhabitants are said to have been massacred. During the 17th c., under Shah-Abbas the Great, it became the capital of Persia, and reached the climax of its prosperity. Its walls were then 24 miles in circuit, and it is said to have had between 600,000 and 1,000,000 inhabitants. It was then the emporium of the Asiatic world; the merchandise of all nations enriched its bazaars, and ambassadors from Europe and the East crowded its court. In 1722, it was devastated by the Afghans, and some time afterwards the seat of government was transferred to Tehran (q. v.).

I'SRAEL, Kingdom of. See Jews.

ISSOIRE (anc. *Issiodurum*), a town of France, in the department of Puy-de-Dôme, at the confluence of the Couze and Allier, 20 miles south-east of Clermont. Pop. (1872) 5531.

ISSOUDUN, a manufacturing town of France, in the department of Indre, is situated on the river Théolle, on the railway from Orleans to Limoges, 18 miles north-east of Châteauroux. The principal manufactures are woollen cloth and yarn. Pop. (1872) 11,090.

ISSUE, in Law, means the point of fact in dispute which is submitted to a jury.

I'SSUS, anciently, a seaport on a gulf of the same name in Cilicia, Asia Minor, celebrated for a victory which Alexander the Great obtained here over Darius (333 B.C.), by which the camp and family of Darius fell into his hands. Its exact site has not been ascertained.

ISTALI'F, a town of Afghanistan, situated 22 miles north-north-west of Cabul, on a tributary of the Cabul river. In 1842, it was partially destroyed by the British. Previous to that event, it had 15,000 inhabitants, who were employed chiefly in spinning, weaving, and dyeing cotton.

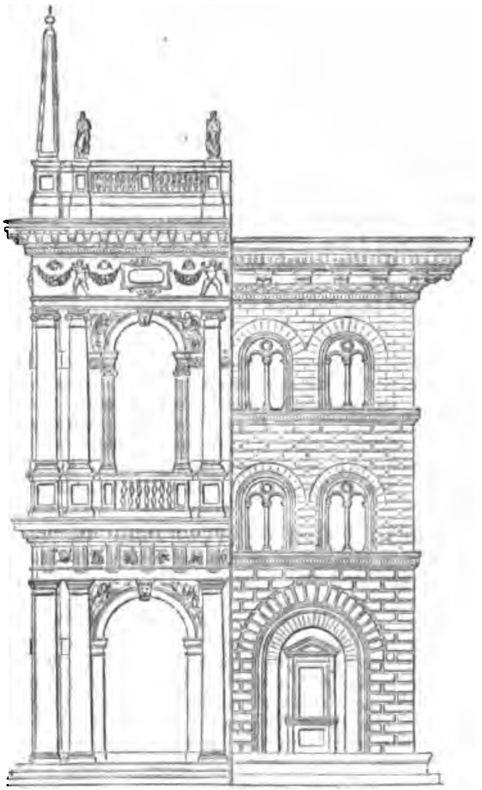
I'STHMUS (Gr.), in Geography, a narrow neck of land joining two portions of land. The name isthmus was by the ancients often employed without any addition to designate the Isthmus of Corinth, joining the Peloponnesus to continental Hellas. Here there was a famous temple of Neptune, and here also were celebrated the Isthmian Games (one of the four great national festivals of Greece), at first every third year, and afterwards every fifth year. They were said to have been originally instituted by Sisyphus, and afterwards restored by Theseus. The games, like those of Olympia, consisted of athletic exercises, with the addition of competitions in music and poetry. The victors were crowned with garlands of fir, and their statues were placed in the temple of Neptune. Down to the destruction of Corinth by the Roman general Mummius (146 B.C.), the management of these games was in the hands of the rulers of that city, though the Athenians always enjoyed the seats of honour. The Romans added the coarser and more brutal amusements of gladiatorial exhibitions and fights with wild beasts. The spread of Christianity was fatal to their popularity, but we still read of them in the reigns of Constantine and Julian.

I'STRIA, an Austrian margraviate, which, with the county of Görz and Gradiska, and the town and territory of Trieste, forms the Austrian crownland of the coast-districts or Küstenland. It consists of a peninsula projecting into the north-east corner of the Adriatic Sea, together with the adjacent Quarnero Islands.

ISVORNI'K. See Zvornik.

ÎSWARA (from the Sanscrit *is'*, to possess power, hence literally, *lord*) is an epithet applied to different Hindu divinities, but in mythological acceptation mostly designates S'iva (q. v.).

ITA'LIAN ARCHITECTURE. This term is usually limited to the style practised by the Italian architects of the 15th, 16th, and 17th centuries, and which has since been adopted in every country in Europe. This style originated in a revival of the ancient architecture of Rome. Although Gothic architecture had been practised in Italy during the 13th and 14th centuries, it had never been thoroughly naturalised. The Italians always shewed a preference for the round arch over the pointed northern form; and even in the buildings they erected in the pointed style, there is a certain simplicity and largeness of parts indicative of a classic feeling. As early as 1350, Giovanni Pisano, in the beautiful sculpture of the pulpit at Pisa, shewed a return to the ancient models. Arnolpho di Lapo built the cathedral of Florence (1290—1300), and in his design, proposed a great dome (a remarkably Roman feature) over the crossing of the nave and transept. This he did not live to complete; but he prepared the way for Brunelleschi, the chief aim of whose life was the accomplishment of the great dome of the cathedral. He went to Rome to study the ancient buildings there, at that time neglected and hardly known to the Italians themselves. After devoting a considerable time to exploring these monuments, he returned to Florence; and, after great opposition, succeeded in carrying out the construction of the dome as it now stands. From this time, the revival of Roman architecture went on rapidly. It was encouraged by the popes and other



Library of St Mark's, Venice, by Sansovino. Ricardi Palace, Florence, by Michelozzo.

press soon spread a knowledge of the works of the Italian architects over Europe. At first, the Roman mouldings and ornaments only were copied and applied to the existing forms. As the ancient style became better understood, its general principles were gradually adopted, until at length the Modern Italian style was formed. This style may be defined as ancient Roman architecture applied to the forms and requirements of modern buildings. It has been admirably applied to domestic, but it has never been so successfully used in ecclesiastical, edifices. The domes of the Italian churches render the interiors of these buildings very impressive, and are a feature, for the introduction of which into the west of Europe, we are indebted to this style; but the façades of the churches are broken up into stories, and want the unity of a Gothic front.

Italian architecture is divided into three styles or schools, according to the places where it was practised—viz., the Florentine, Roman, and Venetian. The Florentine buildings are massive and grand in effect; they are indebted to ancient Roman art chiefly for details, the outlines being the same as those of the older buildings, formed to suit the requirements of the place. Florence being a turbulent city, every man who had anything to lose had literally to make his house his castle. Accordingly, the basement floor is massively built with large blocks of stone, and the windows are small and plain. The Roman school naturally resembles more closely the ancient Roman buildings so numerous in that city—pilasters, arcades, &c., being freely used. In Rome, the plan of including two or more stories in one *order* of columns or pilasters with their entablature, with an attic or low story above, first originated, and was afterwards extensively, but, as already explained, not successfully applied to churches.

The Venetian style is, as might be expected in a city long accustomed to elegant palaces, the most ornate and picturesque of the Italian schools. Venice is crowded with specimens of all kinds from the earliest to the latest renaissance, and retains its individuality of style from first to last. Each story is marked by a separate tier of columns or pilasters with their entablature; the windows are arched and ornamented with columns, and the spandrils commonly filled with figures. The outline is varied in form, and is usually finished with a balustrade, broken by pedestals, and crowned with sculptured figures. It is from this most picturesque of the styles of the Italian renaissance that the other countries of Europe derived their peculiar forms. See Renaissance, Elizabethan, Cinquecento.

ITA'LIC VERSION (*Vetus Itala*), the name given to a translation of the Scriptures into Latin, which preceded the Vulgate. Its origin is commonly supposed to date from the middle of the 2d century. The Italic Version was in general use down to the time of Jerome, who, being dissatisfied with the imperfections which it exhibited, undertook to revise and amend it, but ultimately produced the new translation known as the Vulgate (q. v.). The Italic Version of the Old Testament was made, not from the Hebrew, but from the Septuagint.

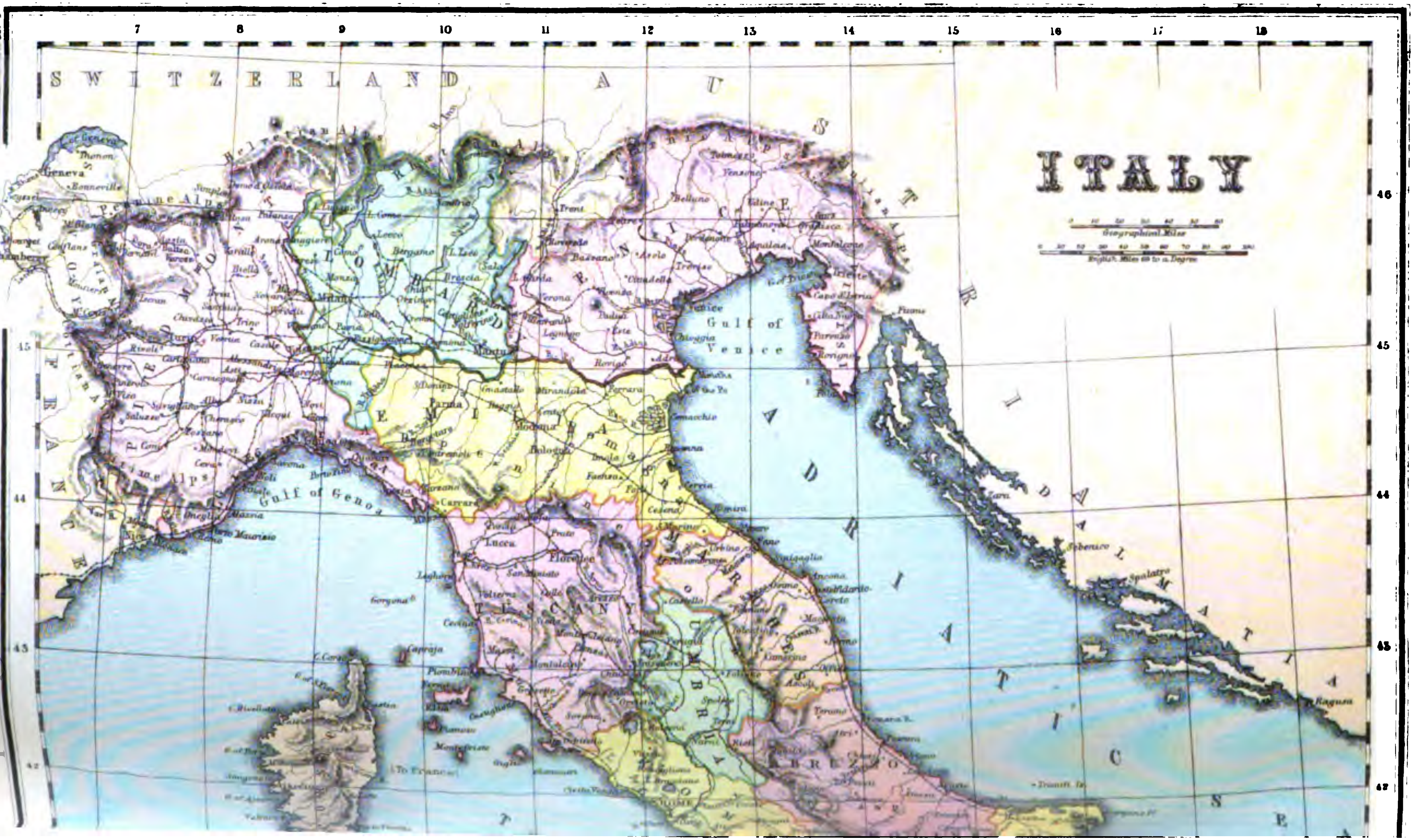
I'TALY. The geographical territory comprised under the name of I. consists of a considerable stretch of peninsular mainland, closely resembling a boot in shape, besides several islands, situated in Southern Europe, between lat. 36° 35' and 47° N., and between long. 6° 35' and 18° 35' E. From the southern extremity of Sicily to the Alps its

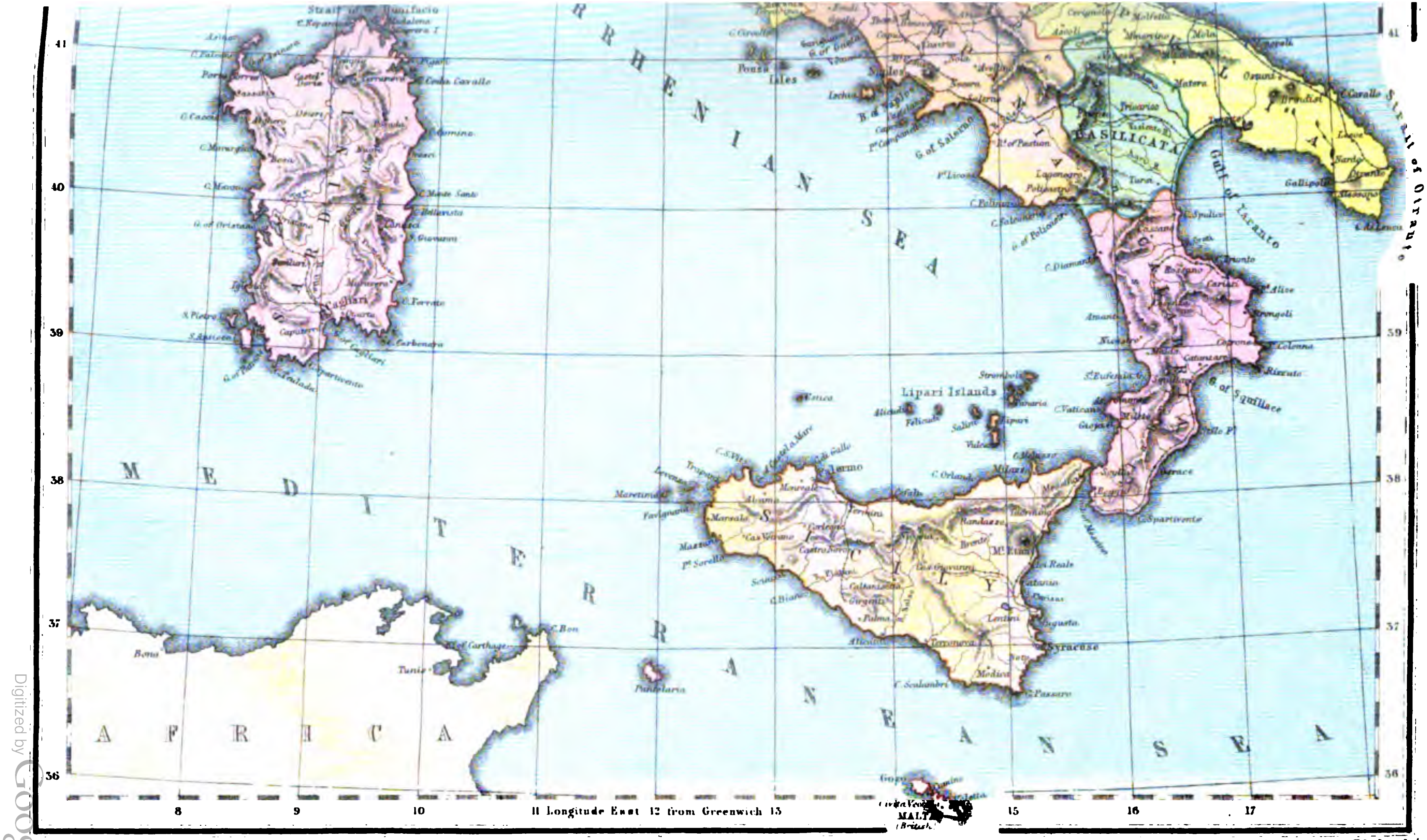
breadth being [illegible] miles.

Boundaries.—Its boundaries on the N. are Austria and Switzerland, on the S. the Mediterranean, on the W. France and the Mediterranean, and on the E. the Ionian and Adriatic Seas; while its natural limits are strongly defined by the Alps and the sea.

Area.—The kingdom of Italy—which comprises the whole peninsula, with the small exception of the republic of San Marino—embraces an area of 114,629 English square miles; and a population, in 1871, of 26,716,809. It is composed of the following provinces:

Provinces.	Area in Eng. Sq. Miles.	Population in 1871.
1. Alexandria, ...	1,951·73	683,473
2. Cuneo, ...	2,755·24	615,930
3. Genoa, ...	1,583·23	716,284
4. Novara, ...	2,526·83	587,212
5. Port Maurice, ...	475·03	126,953
6. Turin, ...	3,965·19	967,540
Piedmont and Liguria, .	13,261·25	3,677,[illegible]
7. Cagliari, ...	5,223·90	392,958
8. Sassari, ...	4,139·09	243,607
Sardinia, ...	9,362·99	636,565
9. Bergamo, ...	1,027·13	368,141
10. Brescia, ...	1,784·06	450,750
11. Como, ...	1,049·70	480,339
12. Cremona, ...	670·31	300,595
13. Mantua, ...	855·62	288,763
14. Milan, ...	1,155·56	1,009,774
15. Pavia, ...	1,285·67	448,357
16. Sondrio, ...	1,274·09	120,722
Lombardy, ...	8,502·14	3,467,447
17. Belluno, ...	1,262·81	175,350
18. Padua, ...	805·51	364,255
19. Rovigo, ...	652·09	200,979
20. Treviso, ...	938·74	352,538
21. Udine, ...	2,482·59	481,786
22. Venice, ...	849·21	335,379
23. Verona, ...	1,101·94	367,701
24. Vicenza, ...	1,040·93	363,022
Venice, ...	9,184·12	2,641,060
25. Bologna, ...	1,391·04	439,166
26. Ferrara, ...	1,010·12	215,369
27. Forli, ...	716·32	233,969
28. Massa and Carrara, . .	679·71	161,944
29. Modena, ...	966·10	272,845
30. Parma, ...	1,250·83	264,509
31. Piacenza, ...	965·16	225,750
32. Ravenna, ...	742·20	219,625
33. Reggio Emilia, ...	883·02	240,635
Emilia, ...	8,604·50	2,273,812
34. Ancona, ...	739·90	262,359
35. Ascoli Piceno, ...	810·72	203,009
36. Macerata, ...	1,056·68	236,719
37. Pesaro and Urbino, . .	1,046·45	213,060
Marches, ...	3,653·75	915,147
38. Umbria (Perugia), . .	3,715·39	549,833
39. Arezzo, ...	1,276·41	239,901
40. Florence, ...	2,263·05	766,326
41. Grosseto, ...	1,712·19	107,449
42. Leghorn, ...	127·28	118,651
43. Lucca, ...	576·69	280,070
44. Pisa, ...	1,179·95	265,295
45. Sienna, ...	1,464·64	205,918
Tuscany, ...	8,600·21	1,983,810
Latium: 46. Rome, . .	4,534·68	835,324
47. Abruzzo Citeriore (Chieti),	1,104·81	339,961
48. " Ultr. I. (Teramo), .	1,283·68	245,617
49. " " II. (Aquila),	2,436·52	333,791
50. Molise (Campobasso), . .	1,777·58	363,943
Abruzzo and Molise, .	6,602·59	1,283,312
51. Benevento, ...	691·85	231,914
52. Naples, ...	429·31	907,714
53. Principato Cit. (Salerno), .	2,115·40	541,738
54. " Ult. (Avellino), .	1,405·09	375,103
55. Terra di Lavoro (Caserta), .	2,851·26	696,328
Campagna, ...	8,492·91	2,752,797
56. Capitanata (Foggia), . .	2,969·95	319,164
57. Terra di Bari, ...	2,292·48	604,365
58. Terra d'Otranto, ...	3,293·39	493,263
Pouilles, ...	8,555·82	1,416,792
59. Basilicata (Potenza), . .	4,123·54	501,880


ITALY
0 10 20 30 40 50 60
Geographical Miles
0 10 20 30 40 50 60 70 80 90 100
English Miles 69 to a Degree
SWITZERLAND
AUSTRIA
FRANCE
ILLYRIA
DALMATIA
ADRIATIC SEA
Gulf of Venice
Gulf of Genoa
LOMBARDY
PIEDMONT
EMILIA
ROMAGNA
TUSCANY
UMBRIA
MARCHES
ABRUZZO
ROME
Pennine Alps
Helvetian Alps
Geneva
Bonneville
Chamberry
Turin
Milan
Como
Lecco
Bergamo
Brescia
Verona
Vicenza
Padua
Venice
Chioggia
Trent
Belluno
Udine
Trieste
Capo d'Istria
Rovigno
Fiume
Parma
Modena
Bologna
Ferrara
Ravenna
Mantua
Genoa
Lucca
Florence
Leghorn
Pisa
Siena
Ancona
Perugia
Spalatro
Sebenico
Zara
Ragusa
Gorgona
Capraja
Tremiti Is.
7
8
9
10
11
12
13
14
15
16
17
18
42
43
44
45
46



Printed in Colours by

W.&A.K.Johnston, Edinburgh.

W & R CHAMBERS LONDON & EDINBURGH

Provinces.	Area in Eng. Sq. Miles.	Population in 1871.
60. Calabria Citra (Cosenza), .	2,856·38	443,483
61. 〃 Ultra I. (Reggio), .	1,129·07	353,606
62. 〃 〃 II. (Catanzaro),	2,308·49	412,226
Calabria, ...	6,293·94	1,209,315
63. Caltanisetta, . . .	1,454·90	230,066
64. Catania, ...	1,969·95	479,850
65. Girgenti, ...	1,490·88	289,018
66. Messina, ...	1,767·88	419,286
67. Palermo, ...	1,964·04	615,905
68. Siracusa (Noto), . . .	1,426·46	294,874
69. Trapani, ...	1,216·18	236,324
Sicily, ...	11,290·39	2,565,323
Total, .	109,738·61	26,716,809

Physical Aspect.—The physical aspect presented by the surface of I. is diversified in the extreme. Northern I. is, for the most part, composed of one great plain—the basin of the Po, comprising all Lombardy and a considerable portion of Piedmont and Venice, bounded on the north-west and partly on the south by different Alpine ranges. Throughout Central I., the great Apennine chain gives a picturesque irregularity to the physical configuration of the country, which in the southern extremity of I. assumes still wilder forms. In the highland districts of Naples, in which the Apennine ridge reaches its maximum elevation (10,000 feet), the scenery exhibits a savage grandeur. Along the extensive coast-plains, as well as in the sub-Apennine valleys, the rural charms of this portion of I. are extreme, while the brilliant flora and vegetation impart to it a novel character of beauty. The chief mountain-system of I. is the frontier ridge of the Alps (q.v), and its noble continuation the Apennines (q.v.).

Volcanic Zone.—I. likewise comprises a considerable stretch of volcanic zone, which traverses the peninsula from the centre to the south parallel with the Apennines, and of which the most remarkable active summits are Vesuvius, near Naples; Etna in Sicily; and Stromboli in the Lipari Isles.

Plains.—The great plains of I. are those of Lombardy, which stretches from the Mincio to the Ticino and the Po; of Piedmont; the Venetian plains; the plain of the Roman legations; the plain of the *Campo Felice*, on which stands Vesuvius; the Apulian plain; the long, narrow Neapolitan plain of the Basilicata, 100 miles in length, and 24 miles in breadth, stretching along the gulf of Tarento.

Rivers.—The great majority of the rivers of I. are only navigable for small coasting boats or barges. By far the most important is the Po (q.v.), which rises on the borders of France, and flows into the Adriatic. It has numerous tributaries. Among the others may be mentioned the Adige, Brenta, Piave, Tagliamento, Aterno, Sangro, Metauro, Ofanto, Bradano, also belonging to the Adriatic basin; the Arno, the Tiber, the Ombrone, the Garigliano, and the Volturno, which belong to the Mediterranean basin. The classical and historical associations of many of the Italian streams, even when mere rivulets, invest them with perennial interest.

Canal System.—The canal system of I. is most extensive in the north. Nine principal canals in Lombardy administer to the irrigation of the plains, and to the purposes of commercial communication, contributing in no small degree to the prosperity of the district. The *Naviglio Grande* or Ticinello is the finest hydraulic construction in I.; it communicates between the Ticino and Milan, and has a course of 28 miles navigable for vessels of large size. It was begun in 1179. The *Naviglio Martesana*, 38 miles long, unites Concesa on the Adda with Milan; the *Naviglio di Pavia* is 18 miles in length; the bifurcated *Naviglio d'Ostiglia* unites the Po with the Adige. 253 canals intersect Piedmont, extending over a length of 1932 kilomètres. Venice comprises 203 navigable, and 40 minor canals. Numerous canals have been constructed for the drainage of the Pontine Marshes. This system of water-communication was early carried to a high degree of efficiency in I., and is of incalculable service in the agricultural districts.

Lakes.—The mountain lakes of I. are famed for their picturesque beauty. They are mostly in the northern provinces of Lombardy and Venetia. The principal are Maggiore, Lugano, Como, Iseo, and Garda. The Roman lakes of Perugia, Bolseno, and Bracciano, that of Castiglione in Tuscany, and Celano in Naples, also deserve mention.

Springs.—The mineral and thermal springs of I. are innumerable, and possess a great variety of curative and sanitary properties.

Climate.—In the northern provinces, the climate is temperate, salubrious, and frequently severe in winter; in the centre, it assumes a more genial and sunny character; while the heat of the southern extremity is almost of a tropical intensity. The singular clearness of the atmosphere sets off the landscape and monumental beauties of I. with brilliant effect. The drawbacks of I.'s climate are the piercing tramontana or mountain winds; the deadly sirocco, which blights all nature at seasons along the western coast; and the malaria or noxious miasmata which issue from the Maremma of Tuscany, the Pontine Marshes, and the Venetian lagoons, generating pestilential fevers and aguish diseases in the summer season. The mean temperature of the leading divisions of the country throughout a whole year was as follows: Milan, 55° 4′ of Fahrenheit's scale; Rome, 59°; Palermo, 62° 5′; and in Sardinia, 60° 5′. The highest temperature at Rome rises to 95°, and in Sicily from 97° to 104°.

Products.—The staple products of I. are corn, wine, oil, raw silk, rice, olives, and fruits, besides hemp, flax, cotton, which are largely grown, and even the sugar-cane is successfully cultivated in the Two Sicilies. Agriculture, however, except in the north, is in a very backward condition. Nevertheless, the annual yield of cereal crops is considerable, and not only suffices for home consumption, but likewise for foreign export. The northern provinces or great plains, Tuscany, and the islands of Sardinia and Sicily, furnish most of the grain of Italy. The minor alimentary products are beans, pease, Indian corn, lupines, and chesnuts, which are largely used. The wines of I. are very numerous, but owing to the defective mode of their manufacture, are unfit for exportation, as they can neither bear transport, nor do they improve by age. The wines of Naples are esteemed the best, small quantities of the famous *Lacrima Christi* and the *Vino d'Asti* being exported, while the Sicilian wines of Marsala form a considerable export trade. The most superior oil and olives are furnished by Tuscany, Lucca, and Naples; the oil of Florence, and that of Gallipoli and Puglia, being unequalled for purity and sweetness. Silk is chiefly manufactured in the northern provinces, the cultivation of the mulberry and the rearing of the silk-worm forming in Lombardy a principal occupation of the population. In Lombardy alone, upwards of 17,000,000 mulberry-trees are required to furnish food for the worms; and the silk exported from the Lombardo-Venetian provinces alone yields an annual revenue estimated at about £5,000,000. The best manufactured silk comes from Piedmont, Tuscany, and the Roman provinces. The cotton-plant is grown extensively in Sicily, and yields

Lombardy, and Rome. The fruits of the Two Sicilies are exquisite in flavour, and embrace several tropical species. Oranges, lemons, almonds, figs, dates, melons, and the pistachio-nut are common to all orchards, and are largely exported. A considerable cheese-trade exists in the northern provinces, that of Lombardy alone yielding a revenue of more than £2,000,000. I. also furnishes various valuable substances, such as sulphur, alum, &c. All the domestic animals of Western Europe are to be found in I., besides buffaloes and camels, which are not uncommon. The fauna of I. includes most of the British species, besides the wolf, lynx, boar, marmot, vulture, ibis, flamingo, and pelican. On the coast of the southern provinces are to be found many species of African water-fowl. The *ortolano* and *beccafico* are small birds, much esteemed for their flavour. The nocturnal fireflies are a remarkable feature of insect life.

Fisheries.—The sea and fresh-water fisheries of I. are considerable; the Mediterranean furnishing immense quantities of tunny, anchovies, sardines, mullet, pilchards, and mackerel. The export of anchovies and sardines is of vast extent. The river-fisheries yield salmon, trout, sturgeon, lampreys, tench, and barbel, &c.; and the lagoons contain excellently flavoured eels. See COMMACCHIO. The crustaceans and shell-fish of the Italian seas are of great variety and delicate flavour, and are a favourite article of Italian consumption.

Exports.—Among the exports of I. may be noted raw silk, rice, fish, fruits of various kinds, marble, alabaster, sulphur, alum, silks, velvets, cloth of gold and silver, perfumes, mosaics in stone and wood, carvings in wood, macaroni and similar culinary pastes, porcelain, majolica, preserved fruits and meats, musical instruments, jewellery, and objects of art.

Army and Navy.—The latest statistics of the military and naval force of the kingdom of I. give the following numbers: On July 1, 1875, the army comprised a total of 409,426, commanded by 13,694 officers, not included in the number given above. The staff numbered 1430; infantry, 220,799; depôts, 25,965; bersaglieri or sharp-shooters, 37,402; cavalry, 34,106; artillery, 48,248; corps of engineers, 9618; carbineers, 20,970; local troops, 1614; sanitary service, 3217; divers establishments, 7487. If we take into account the provincial militia, 277,265 strong, and the army reserve, numbering 182,711, the total war-roll of I. amounts to 867,886 men. In September 1875, the Italian fleet consisted of 40 war-vessels and 25 transports—65 in all, carrying 335 guns, with a force of 13,316 sailors and marines; besides 1075 officers of all grades, from one admiral and one vice-admiral down to those in charge of the commissariat.

Finances.—The revenue of the kingdom of I., for the financial year 1874, was £51,768,000; the expenditure was £55,669,000; deficit, about £4,000,000. The public debt at the end of 1874 was £395,343,569; and the total charges on account of the public debt in the expenditure of that year were £29,288,674—more than a half of the revenue of the kingdom.

Religion.—The dominant form of religion of I. is the Roman Catholic. The native Protestants dwell chiefly in the Waldensian valleys of Piedmont, and number only about 20,000. There are also between 40,000 and 50,000 Jews scattered throughout I., who are chiefly engaged in commerce. Political rather than theological reasons, however, before the abolition of the temporal power, brought the papacy into great disrepute among the progressive and national except Piedmont; but since the late political changes of I., freedom of religious belief is encouraged by the government. The Roman Catholic clergy are estimated at 7 in the 1000 of the entire population. The church revenues of I. have suffered considerable diminution, owing to the suppression of several orders, and the enforced sale of their lands by government.

Education.—The mass of the Italian people are incredibly illiterate; the primary elements of education, reading and writing, are by no means universal even among the better classes. A great educational impulse, however, has been imparted to all the recently united states, in which new public and endowed schools are daily being inaugurated. Normal schools, on the British principle, have been founded for the training of I.'s future teachers. The government has devoted to the cause of education a great part of the confiscated property of religious orders. Besides this, £600,000 is annually voted by parliament for education. The universities of I. are numerous, many of them being of ancient date and European fame. The chief are those of Salerno, Bologna, Naples, Padua, Rome, Perugia, Pisa, Siena, Pavia, Turin, Parma, Florence, Catania, Cagliari (in 1764), Genoa (remodelled and extended, 1783), Modena (recently re-opened).

History.—The ancient history of I. will be more conveniently treated of under ROME; see also ETRURIA, UMBRIA, &c. We proceed to the dawn of modern history. The Western Roman Empire fell before a mixed horde of barbarous mercenaries, chiefly composed of the Heruli, who proclaimed their leader, Odoacer, king of Italy (476 A. D.). After 13 years of military despotism, he was slain, and his followers vanquished by the Ostrogoths, led by their great king Theodoric. The Ostrogoths (see GOTHS), in their turn, were vanquished (552 A. D.); and I. was then governed by an *exarch*, or delegate of the emperor of Constantinople, whose seat of government was Ravenna. Narses, the first exarch, having been disgraced, in revenge invited the Lombards to invade Italy (568); and under their rule the ancient political system of Northern Italy was superseded by the introduction of feudal and Teutonic institutions. The Lombards, in their turn, were conquered by Pepin (754) and Charlemagne (774), the latter of whom was crowned emperor of Italy. The Lombards, however, retained the great duchies of Benevento, Spoleto, &c., till the advent of the Normans. In 842 the Saracens invaded I., and took possession of many important places on the southern coast, which they held till 1016, when they were driven out by the Normans. On the fall of the Carlovingian dynasty (888), the crown of Italy fell to Berengarius I., chief of the Friuli, whose descendant, Berengarius II., did homage to Otho I. of Germany as his lord-paramount (951); and in 961, Otho deposed his vassal, and assumed sovereign rights over the Italian kingdom. From this period, the chief towns of Italy rapidly emerged from their previous insignificance. A foremost object of Otho and his successors was the abasement of the papacy; and for a time these emperors successfully arrogated to themselves the right of nominating to the chair of St Peter the candidate most attached to imperial rule. The accession of Konrad was the signal for various tumultuous risings of the Italians against their German rulers, who had grown the object of general detestation. Important feudal modifications during this reign tended still further to weaken the great feudal lords, and to exalt the inferior vassals and citizens. Under the reign of his successor, Henry III., we find the spirit of association, alike for offence or defence, waxing strong in Italy. The aggrandisement of the great Guelphic House of Este (q.v.), the bloody wars of the Investiture (q.v.), and the establishment of an ameliorated form of municipal government (1100), are the three most notable events that occurred under the Franconian dynasty.

Under the Hohenstaufen dynasty, Italy enjoyed an interregnum from foreign rule of about 60 years, which, however, was wasted in suicidal conflicts between the two factions of the Guelphs and Ghibellines. The most terrible incident of this period was the massacre of the Sicilian Vespers (q.v.). Notwithstanding the inveterate internecine feuds of Italy, it was a period of great splendour and prosperity. The free cities or republics of Italy rivalled kingdoms in the extent and importance of their commerce and manufactures, the advancement of art and science, the magnificence of their public edifices and monuments, and the prodigious individual and national wealth to which they attained. Unhappily, a spirit of rivalry and intolerance grew up during this period of medieval splendour, and in the arbitrary attempt of these states to secure supremacy over each other, they gradually worked their own destruction.

From the Sicilian Vespers (1282) to the reign of Henry VII. (1308), the chief historical incidents are the war between Genoa and Pisa, ending in the abasement and ultimate decline of the latter (1284); the quarrels of the Guelphic factions, the Bianchi and the Neri, in Tuscany; the papal efforts for their reconciliation (1301); the residence of the popes at Avignon (1304—1377); and the rise into importance of the oligarchic republic of Venice (1311). During the first half of the 14th c., the German emperors made several fruitless attempts to regain political supremacy in I.; but in 1355, the Emperor Charles IV. gave up the struggle.

The tyrannical rule of several petty tyrants, of which the foremost were the Visconti or lords of Milan, replaced that of the emperors. From the middle of the 14th c. to the end of the 15th, the collective history of I. ceases, each city being ruled by some powerful local family—as, for example, Verona by the Della Scala, Padua by the Carrara, Ferrara by the Este families, and Mantua by the illustrious princes of Gonzaga; Milan by the Della Torre, Visconti, and Sforza families. See also GENOA, PISA, FLORENCE, VENICE, NAPLES, &c.

From 1495 to 1525, I. was the theatre of the sanguinary struggles between France, the native rulers, and the Hapsburgs, but the battle of Pavia (1525) thoroughly established the ascendency of the German emperor, who appointed over the various states rulers of his own selection. During the 17th c., no events of note mark the history of I.; the country being at peace, the various states pursued commercial traffic and industry, as far as their decreased limits permitted. In the following century, some territorial changes were effected during the war of the Spanish Succession. In 1793, I. partially entered the European coalition formed against France, whose arms, however, proved irresistible. By the treaty of Campo Formio, 17th October 1797, the entire state of Venice was transferred to Austria, while the rest of the country, under various designations, became for the most part a dependency of France. In this anomalous condition it remained during the rule of Napoleon. After the battle of Waterloo, the final reconstitution of I. was decreed as follows by the congress of Vienna: the kingdom of Sardinia reverted to the House of Savoy, to which were added all the provinces of the Genoese republic; the Lombardo-Venetian kingdom fell to Austria; the principalities of Modena, Reggio, and Mirandola, to which was soon annexed Massa and Carrara, were restored to the family of Este; Lucca was created a duchy for the rightful Duke of Parma, whose hereditary state was conferred on Maria Louisa, ex-empress of the French; the duchy of Tuscany was restored to the Austro-Lorraine dynasty; the Papal States to the pope; the kingdom of Naples to the Bourbons; while the petty state of San Marino was allowed to retain its republican form; and Monaco remained an independent principality under the Prince of Valentinois.

By the congress of Vienna, I. was again cast at the feet of the papacy and of Austria, and this at a period when progressive aspirations were strongly re-awakened in the Italian people. The system of resolute oppression adopted by the reinstated rulers speedily produced an irreconcilable hostility between themselves and their subjects, and a network of secret societies for the organisation of national resistance spread throughout the entire land. The first-fruits of their organisation were the risings of 1820 and 1821 in Piedmont and Naples, to demand constitutional rights. Austrian intervention quelled both these movements; and in 1831, when a similar rising occurred in Modena and the Roman States, it was subdued with sanguinary ferocity by an Austrian army. In these movements, no distinct tendency towards national unity is perceptible; and only on the accession of Charles Albert to the throne of Piedmont (1831) was this grand idea of modern I. propounded by Joseph Mazzini, in an address to the king, urging him to assume the rôle of liberator and leader of Italy. The king of Piedmont, by yielding in some degree to the spirit of his time, prepared for Piedmont pre-eminence throughout the country. The accession of Pius IX., in 1846, seemed the inauguration of a new era for I.: a general amnesty was followed by wise, liberal measures, which were also adopted by Tuscany and Piedmont, in emulation of Rome. Naples and the other states resolutely refused every measure of reform, and by a simultaneous outbreak in Sicily and Milan in January, the great revolution of 1848 was inaugurated in Italy. The revolution of France in February imparted a strong impulse to that of I., and speedily Naples, Piedmont, and Rome conceded constitutional rights to the popular demands. The Milanese unanimously revolted against Austrian rule on the 17th of March, and after five days of heroic fighting, the Austrians were expelled from the city, and Radetsky, with 70,000 troops, compelled to retreat from its walls. On the 29th, Charles Albert entered Lombardy, the avowed champion of Italian independence, and the leader of the national struggle. All the sovereigns of I. contributed their best troops for the war, and on the Roman volunteers setting out for Lombardy, the pope himself in public pronounced a solemn benediction on their banners.

But ere a month had elapsed, Pius IX. suddenly halted in his career of liberator of Italy, and abandoning the national cause, launched (19th April) a severe censure against 'this unjust and hurtful war,' which, chiefly by his own benediction, had been consecrated in the eyes of at least the more ignorant of the people. The recall of the Neapolitan troops was the first-fruits of the encyclical letter, which may be considered the tocsin of the subsequent fierce reaction through all Italy. For a time, however, the revolution made way; at the close of the year Rome became agitated; the pope fled to Gaeta; and on the 8th of February, the Roman Republic was proclaimed, under the presidency of Mazzini. On the same day the Grand Duke of Tuscany abandoned his state. Piedmont again assumed

March) finished the national Italian war of 1848. The treacherous French expedition against the Roman republic, and the return of the pope in 1850, are the concluding acts of this great revolution.

The reaction was complete and merciless in every state save Piedmont, the king of which kept faith with his subjects, and observed the constitutional forms conceded in 1848. Austrian troops exercised a crushing tyranny, and from time to time Europe shuddered at the recital of the dark cruelties practised in the dungeons of Naples and Rome. In the Congress of Paris, at the close of the Russian war (1856), Cavour (q. v.) forcibly exposed the unavoidable dangers of a continuance of Austrian and papal misrule. He strongly urged the expediency of a withdrawal of French and Austrian troops from Rome and the legations. In the beginning of 1859, Victor Emmanuel proclaimed from the Sardinian parliament his intention of actively aiding in the deliverance of the oppressed Italian population from the yoke of Austria. Towards the close of the year, Sardinia and France jointly prepared for war with Austria, and in April 1859 the war commenced. The victories of Magenta and Solferino were quickly followed by the abrupt and inconclusive peace of Villafranca, 11th July 1859, by which a confederation of the Italian states with the papal protectorate was proposed as the best solution of I.'s difficulties. The whole of I. energetically rejected the scheme; and early in 1860, the various states whose sovereigns were in flight from the Lombard campaign voluntarily declared in favour of annexation to the kingdom of Piedmont. On the 18th of March, Parma, Modena, and the Emilian provinces were incorporated with Sardinia; and the grand duchy of Tuscany on the 22d. On the 17th March, the law by which Victor Emmanuel assumed the title of King of Italy was promulgated amidst universal rejoicings. On the 24th March, the provinces of Nice and Savoy were ceded to France. On the 6th of the ensuing May, Garibaldi, with about a thousand volunteers, set sail from Genoa for Sicily, where a revolutionary outbreak had taken place. His swift and comparatively bloodless conquest of the Two Sicilies is one of the most extraordinary incidents in modern history. Meanwhile, the Sardinian generals Cialdini and Farini having advanced into the papal provinces, the papal forces under Lamoricière were routed at Castelfidardo, which was followed by the capture of 4000 prisoners at Loretto, and the surrender of Lamoricière at Ancona. Thence the Sardinian forces marched into the Abruzzi, while Victor Emmanuel proceeded in person to Naples. On 7th November, at Teano, Garibaldi unconditionally relinquished to his sovereign the southern provinces liberated by his genius and valour. Umbria and the march of Ancona were next incorporated with the kingdom of I. The kingdom of I. was formally recognised by all the great European powers with the exception of Austria. On the death of Cavour, June 1861, the ministry of Baron Ricasoli was formed, but after a brief term of office was succeeded by that of Ratazzi, 31st March 1862, whose avowed subserviency to the French empire created considerable alarm amongst the liberals of Italy. One of its earliest acts was the incorporation of the southern volunteer forces with the regular army. On the 9th and 10th, a great aggregate meeting of deputies from all the liberal clubs of the kingdom was held under Garibaldi's presidency; and on the 20th, having previously been entertained at a grand banquet by the royal princes, he set out on his almost triumphal tour throughout I., with the view of organising rifle-clubs amidst the youth of all the government that Garibaldi contemplated an armed expedition in aid of Venice, led to stringent and unlooked-for measures of repression. Ministerial orders were next transmitted to Garibaldi, prohibiting any further organisation of the rifle societies. On the 20th of June, Garibaldi arrived in Turin, and on the 28th landed at Palermo, in Sicily, where he met with a warm reception from Prince Humbert, the heir-apparent of the Italian crown. On the 4th of July, the ministry was seriously disturbed by the warmth with which Garibaldi denounced the French occupation of Rome. On the 7th, a grand review at Palermo was held in his presence. Volunteers speedily hastened to join him, with the avowed intention of proceeding to Rome, despite the royal proclamation, which accused them of rebellion against their sovereign. A special message, accompanied by the royal proclamation, was forwarded by the king to Garibaldi, who, under the impression that he possessed the covert approbation of the sovereign, declined to desist in his expedition to Rome, but expressed his unshaken sentiments of loyalty to the king. On the 22d August, Sicily was declared in a state of siege, the liberal clubs were dissolved, and an armed force despatched to pursue and disperse the volunteers. Garibaldi reached Catania on the 18th, and some days later succeeded in effecting a landing on the coast of Calabria with the greater part of his followers. General Cialdini having been appointed commissioner extraordinary in the island of Sicily, with full powers over the civil and military authorities, proceeded to the most stringent measures to effect the capture of Garibaldi. The 'affair of Aspromonte,' in which Garibaldi's small force of volunteers were compelled to surrender, their heroic leader ordering them not to fire on the royal troops, put an end to the semblance of revolution. The wounded chief was conveyed as a prisoner to the fortress of Varignano, at Spezzia. The amnesty granted to him and his followers by the Italian monarch enabled him to proceed to Pisa, whence he returned to his island-home of Caprera.

On the meeting of the houses of parliament, the ministry of Ratazzi had to sustain a formidable attack from the liberal members, who demanded the impeachment of the premier and his colleagues. Ratazzi, finding himself unsupported by any section of the house, after an unavailing defence, resigned his portfolio on the 10th of December, and was succeeded in office by Signor Farini (q. v.)

At the close of the German-Italian war (see GERMANY in SUPP., Vol. X.), Venetia, on 3d October 1866, became part of the kingdom of Italy by treaty with Austria. Turin, the chief town of Piedmont, was the capital from 1859 till 1865; the court was transferred to Florence during the latter year. In 1867, the French army began to be withdrawn from Rome, and the national aspiration to have the Eternal City as capital of the kingdom of Italy seemed now near its realisation. Some of the French troops remained at Rome until the urgent necessities of the Franco-Prussian war compelled the Emperor Napoleon to withdraw them. The last detachment left the pontifical territory on 8th August 1870; and on the 20th of the following month, the Italian troops, under General Cadrona, entered Rome after a short resistance by the Pontifical troops, who ceased firing at the request of the pope. On 2d October 1870, the kingdom of Italy assumed the last of its extensive limits, when the whole of the papal states were absorbed by it, and Rome was its recognised capital; and thus were realised the aspirations of many generations, the dreams of Mazzini, and the policy of Count Cavour.—

In preparing the preceding sketch of the history of Italy, the following authors, along with many others, have been consulted: Sismondi, *Republics of Italy;* Macchiavelli, *Istorie Fiorentine;* Guicciardini, *Storia d'Italia;* Denina, *Rivoluzioni d'Italia;* Botta, *Storia d'Italia;* Balbo, &c.

Italian Language and Literature.—The Italian language, the most musical of all the tongues of Europe, is descended from the Latin, and there have been various opinions as to the way in which the transition took place. In the view, however, of the scientific students of language, there is nothing special in the case; the changes are sufficiently accounted for by that tendency to phonetic decay or corruption which is always at work in a living tongue, and which is especially active in a chaotic and transition state of society like that of I. at the downfall of the Roman empire. The already corrupt dialects of the uneducated become predominant, and being released from the fixing influence of a written literature, depart more and more from the grammatical standard; and in the case of I., the barbarian intruders would, to a still greater degree, mutilate the Latin, and introduce multitudes of words from the northern tongues. For some centuries, this corrupting process went on, in the course of which the Latin gradually divested itself of its original classical peculiarities, and degenerated into the impure or vulgar form known as the *Romana rustica*, or *lingua Romanza*, which became the prevailing language of the various races of South-western Europe, and received from each some of the most salient characteristics of their own native dialects.

This 'rustic Latin' may be termed the direct offspring of Latin, and the parent of Italian: in the compositions of the Provençal poets, we find one form of it elevated to the rank of a polished, or *illustre*, written language as early as the 10th c., while the form which prevailed in Italy continued as late as the 12th c., an uncouth and vulgar dialect, contemptuously excluded from all learned composition. In the Sicilian court of the Hohenstaufen emperor, Frederick II., the Italian dialect was first rescued from this state of degradation; adopted by this monarch as the choice language of his court, it became the medium of his own and his son's literary and poetic creations, while his learned friend and secretary, Pier delle Vigne, may be termed the earliest Italian poet; his odes and canzones, composed a hundred years before Dante, are written in wonderfully pure Italian. The university of Naples, and several of the Sicilian schools, were founded by Frederick, whose cultivated and enlightened court became the centre of the letters and learning of Italy, and the abode of the best intellects of the time. Here, Italian reached a considerable degree of refinement and correctness, and received the name of the Aulic (court) or of the Sicilian language.

Poets have in all ages been the elevators and guardians of language; and we find Italian in the 12th and 13th centuries honourably employed by the poets of the age, especially by those of Tuscany, whose own oral dialect soon took precedence over all the others in polished expression and grammatical accuracy. The chief Italian poets of this age are Guido Guincelli, Guido Ghisilieri, Fabrizio and Onesto of Bologna, Guido Lapo of Mantua; and the Tuscan poets Guittone d'Arezzo, Bonagiunta da Lucca, and Brunetto Latini Fiorentino, the illustrious preceptor of Dante. Fra Guittone, a member of the order of the Cavalieri Gaudenti, has left several compositions of merit, including sonnets and odes, but his most interesting literary legacy consists of forty letters in prose, which are regarded as a valuable specimen of early Italian, being the most ancient epistolary composition in the language. The writings of these early poets possess more linguistic than poetic interest, and are to be found in various collections, chiefly in the *Rime Antiche* (1518), the *Poeti Antichi* by Alacci (1661), and the modern work of Rannucci, *Manuele della Letteratura del Primo Secolo* (Florence, 1837, 3 vols.). Brunetto Latini (1260), the preceptor of Dante, was reputed 'a man of great sense and science.' His work, *Il Tesoro*, is a marvel of heterogeneous knowledge. *Il Tesoretto* is a curious compendium of moral precepts, and *Il Pataffio* a still more curious production, the obscene levity of which earned for him a place in the *Inferno* of his pupil. Guido Cavalcanti, the cherished friend of Dante, was more of a philosopher than a poet. Italian also began to be now adopted as the vehicle of learned and scientific prose. The historical chronicles of Matteo Spinola, a Neapolitan, are the oldest specimen of Italian prose literature (1247—1268); but the Florentine Malespini (died about 1280) is the first historical writer whose style is elevated and polished. In short, contemporary with the appearance of Dante (q. v.), the Italian dialect was rapidly superseding Latin in grave prose composition, as well as in poetry, and soon became the recognised oral and written polite language of the entire country, while various local dialects were preserved in use amongst the illiterate classes of the people. It has been finely observed that Dante found the Italian language in its cradle, and exalted it to a throne; the *Divina Commedia* imprinted on the Italian tongue a grave and majestic character, which at once qualified it to rank with the languages of Greece and Rome. The impetus imparted by Dante to the language and intellectual life of his country, has continued to the present day.

The minor poets, Francesco Stabile, or Cecco d'Ascoli, burned by the church (1327), and author of *L'Acerba*, a critical attack upon Dante, and a wonderful mixture of learning, acuteness, and superstition; Francesco da Barberino (1264—1348); and Cino da Pistoja, the learned jurist and poet, whose work on jurisprudence, *Il Comento sul Codice*, and pleasing amatory verses, won for him the commendations both of Dante and Petrarch (1270—1336), claim mention before the great name of Francesco Petrarca (q. v.) (1304—1374), the creator of Italian lyrical poetry, and the enricher and perfecter of its language. The lustre of Petrarch's fame, however, is not derived from his sonnets alone. Apart from their exquisite beauty and pathos, their classical elegance and simplicity of diction render them an abiding standard of Italian poetry. Italian, which, in its poetical capacities, we have seen created by Dante, polished and refined by Petrarch, was first moulded into a perfect form of prose by the prince of novelists, Boccaccio (q. v.). The *Decamerone* is a series of tales, and Boccaccio's best known work. Boccaccio's style is deeply tinged by his culture of classical literature; and in his straining after the pompous majesty of Latin construction, he frequently exceeds the structural capabilities of his own language, which is naturally direct and simple in the order of its composition. Franco Sacchetti (1335—1400) of Florence, and Ser Giovanni Fiorentino (1348), also composed tales distinguished by the excellence of the language; while Dino Compagni and Giovanni Villani enriched the historical literature of I. with excellent chronicles, written in a spirit of fairness, and with great beauty of style.

The 14th c. was lavishly productive of great original literary creations, the writers of that age, or *I Trecentisti*, according to their Tuscan appellation, being as distinguished for the sublime originality of their genius as those of the 15th c. were famed for their abstruse erudition and philosophy. Italian was the chosen language of the *Trecentisti*, and in their writings attained a high degree of refinement and purity. On the other hand, the scholastic writers of the 15th c. almost entirely excluded Italian from their works, substituting for the language of Dante and Petrarch a faulty form of Greek or Latin. To this circumstance may probably be attributed the languid development of literature during a period in which the most magnificent protection was afforded both by the pontifical and sovereign courts of Italy to the literature and art of the century, and when the discovery of printing imparted an impulse to the intellectual vitality of Christendom. Foremost among the encouragers of literature and art were the Medici at Florence; the Visconti, and, later, the Sforzas, at Milan; the houses of Gonzaga and Este at Mantua and Ferrara; the house of Aragon at Naples; and the Pontiff at Rome. Marsilio Ficino, Pico della Mirandola, Leon Battista Alberti, are some of the most distinguished writers who discarded their mother tongue and adopted Latin; while a host of grammarians, historians, philologists, and theologians openly pronounced the *illustrious* Italian language a vulgar dialect, unfit for philosophical or learned composition. But this debasement of literary taste was happily of brief duration, and to Lorenzo de' Medici, entitled the 'Father of Letters,' is owing the literary revival of the Italian tongue. Under this princely patron of letters, arts, and sciences, public libraries were founded or replenished, learned societies inaugurated, rich antiquarian treasures collected, universities opened, and a true standard of literary truth and beauty once more set up. His friend and protégé, Angelo Poliziano, wrote elegantly both in Italian and Latin, and composed the first regular dramatic work in the former language, under the title of *L'Orfeo*. Towards the close of the 15th c. and the opening of the 16th, a taste for the romantic and heroic in poetry began to shew itself. This taste was cultivated by Durante da Gualdo, by Luigi Pulci (q. v.) in his *Morgante Maggiore*, and by the still more famous Matteo Boiardo (q.v.), whose *Orlando Innamorato* evidently suggested the greatest of all the works of this kind, the *Orlando Furioso* of Ariosto. But by far the most important historical works of the time were written in Latin—for example, those of Silvio Piccolomini, Marc Antonio Sabellicus (died 1506), Bernardo Giustinianus (died 1489), and Georgius Stella (died 1480). During the century of scholastic erudition, the spring of Italian eloquence flowed with sluggish course until the impassioned and unstudied oratory of Jerome Savonarola (burned 1498) revived the traditions of ancient Rome, and reminded his hearers that Cicero too was an Italian.

The 15th c., though not marked by much creative genius in literature, unquestionably exercised an immense influence on the Italian mind. The revival of letters, the invention of printing, the discovery of a new world, and the opening up of a maritime channel to the wealth and traffic of the Indies, co-operated, one may say, in producing that wonderful development of art and enterprise which the succeeding age exhibited; while the advancement of learning and science was promoted and systematised by the founding of numerous universities and literary institutions, the aim of these latter being the diffusion of general knowledge and sound practical science. Many of the magnificent typographical treasures with which the great public libraries of Italy abound, belong to this golden age, and are due to the artistic taste of Aldo Manuzio. See ALDINE EDITIONS.

The 16th c. is confessedly the Augustan age of Italian letters, art, and science. In a galaxy of splendid names, the brightest are those of Ariosto (q. v.), Tasso (q. v.), Macchiavelli (q. v.), Guicciardini (q. v.), Raphael (q. v.), Michael Angelo (q. v.), Palladio, and Vignola. Pope Leo X. and his successors vied with the other sovereigns of Italy in their munificent patronage of those men of genius, who, under the title of Cinquecentisti, are considered models of pure and noble Italian composition. The *Orlando Furioso* of Ariosto, held to be the first genuine epic of chivalry and romance, celebrates the deeds of the legendary ancestors of the house of Este. It exercised immense influence, even amongst the most illiterate classes, by whom its choicest beauties were committed to memory, in order to be sung as the solace of labour in the field or city. The next great work of the century was *La Gerusalemme Liberata*, by Torquato Tasso (q. v.), whose father was also an excellent poet and scholar. Tasso's prose writings and epistles are noble in style, and grave and philosophical in matter (1544—1595). Their best imitators are L'Alamanni, *Il Giron Cortese* and *L'Avarchide;* Rucellai; and Erasmo da Valvasone, in his *La Caccia* and *L'Angeleida* (or The Wars of the Angels), from which Milton probably borrowed some valuable hints (1593). Giangiorgio Trissino wrote the first notable Italian drama, *Sofonisba*. Besides this, the *Tullia* of Ludovico Martelli, the *Canace* of Sperone Speroni (1500—1588), the *Torrismondo* of Tasso, and the *Edipo* of Andrea dell' Anguillara, deserve mention—the last is considered the best Italian tragedy of the time. The comedies of Bentivoglio, Salviati, Cecchi, Firenzuola, and others, are stamped with that prevailing spirit of licentiousness which disfigures many of the finest productions of the age. The popular dramatic pieces, or *Commedie dell' Arte*, enjoyed as high repute among the lower classes as the higher drama did in courtly and patrician circles. Some of the chief composers of these pantomimic comedies are Flaminio Scala, Angelo Beolco, Andrea Colmo. The writers of pastoral dramas inundate this epoch, but none can compete with Guarini (q. v.) in his sweet idyllic work, *Il Pastor Fido*. Poetry was first combined, during this century, with music—one of the earliest operatic compositions being the *Dafne* of Rinuccini (died 1621). The sonnets of Michael Angelo excel in a certain dignity and originality of thought. Vittoria Colonna, celebrated in the verse of Ariosto, was the most illustrious poetess of her time; which produced numerous other female writers, whose works have been collected and published by Domenichi.

Foremost among the prose-writers stands Macchiavelli; his *Arte della Guerra* (Art of War), *Istorie Fiorentine* (History of Florence), and political treatise, *Il Principe* (The Prince), all excel in their various styles. Giovanni Botero, Giannotti, and Paruta, are also political writers of high merit. Greater than either is Francesco Guicciardini, whose *History of Italy* has only one blemish, viz., want of brevity. The works of Bembo (q. v.), historian and poet, exhibit the Italian language subjected to a regular grammatical system. Literature was historically treated by Barbieri and Doni; art, by Vasari, Campi, and Lomazzi; and architecture, by Vignola and Palladio.

The progress of the age is equally perceptible in philosophy, which, bursting the fetters of scholastic formalism, displays the utmost freedom of speculation in the works of Cardan (q. v.), Bruno (q. v.), and Vanini. Many celebrated institutions or academies for the discussion and diffusion of knowledge date from the 16th c., one of the most noted being the academy Della Crusca, founded at Florence for the preservation and perfecting of the Italian language.

The 17th c., if less prolific in great literary names than its predecessor, is nevertheless the golden age of Italian science; it produced a host of illustrious discoverers in philosophy, mathematics, and physic. Such was the fame of Italian science at this period, that the universities of Florence, Naples, Pisa, and Venice were thronged with foreign students. Learned societies for the cultivation and practical demonstration of the physical sciences were opened throughout Italy (see ACADEMY). Libraries were collected and enriched, to afford every facility to learned research. The most celebrated savants are the world-famous Galileo (q. v.), Torricelli (q. v.), Borelli, the astronomer Cassini (q. v.), and Viviani, the pupil and biographer of Galileo; Malpighi and Bellini, anatomists and physicians. Contemporary with these, we find Gian Vincenzo Gravina, whose lectures on civil law attracted audiences from all Europe. In historical composition, the best known works are Sarpi's famous *History of the Council of Trent;* its equally famous refutation by Pallavicino; *The History of the Wars of the Netherlands,* by Bentivoglio; and of *The Civil Wars of France,* by Davila (q. v.). A few of the great names of literature are—Bianchi, an acute thinker on political and social science; Monte-Cuccoli, author of the *Aphorisms of the Art of War,* written with Spartan brevity of style; Bartoli, the Jesuit historian; and Segneri, the Jesuit orator.

The poets of the 17th c., at least Marini (q. v.) and his school, display a degenerate taste. Fondness for trivial conceits, false glitter, and artificiality, are their characteristics; but several of his contemporaries—Chiabrera, Guidi, Tassoni, author of the admirable mock-heroic poem, *La Secchia Rapita* (The Stolen Pail), Filicaja (q. v.), and others, have written with a grave energy of style and a warmth of sentiment elevating to any age. The theatrical and operatic representations at the various sovereign courts were of exceeding splendour, as if in compensation for the paucity of dramatic compositions.

In the 18th c., a vigorous revival of poetry and letters took place. Giannone, in history; Capasso, in literature; Cirillo, in physic; Mazzochi, in archæology; Il Genovesi, in political economy; the brothers Galiani, in their respective sciences of architecture, political economy, and philology; Filangieri (q. v.) and Beccaria (q. v.) in the philosophy of jurisprudence; Mario Pagano, in the science of civil law; Poli (1746—1825), Volta (1745—1826), Galvani (1737—1798), Scarpa (1748—1832), and Spallanzani (1729—1799), in physical science; Maffei and Calsabigi, in poetry, are some of the names by which this period was ennobled. The 18th c. can also boast of the greatest names in Italian dramatic literature, Metastasio (q. v.) (1698—1782), who is considered the master of the pastoral drama: flowing, sweet, and silvery, the language of his gentle muse presents a strange contrast to the brevity, sternness, and classical plainness of Italy's greatest tragedian, Vittorio Alfieri (q. v.) (1749—1803), by whom a thorough revolution was effected in the drama of his country. A no less marked reformer of comedy is his contemporary, Carlo Goldoni (q. v.) (1707—1793).

During the present (19th) century, the genius of Italy has revived anew in science and literature. By the best writers of the day, a sound Italian style, untainted either by Gallicisms or by the false glitter of the *Seicentisti* school, has been adopted. One of the best modern poets of the classical school, Vincenzo Monti, has materially assisted this literary reform: the resolute combatant of the school of Marini, his fine works are rigidly moulded on the pure *Trecentisti* style; and in his great poem, *Basvilliana,* the language is impregnated with a Dantesque grandeur, which has caused it to be said that the spirit of Dante has inspired the works of Monti. His translation of the *Iliad* and that of the *Odyssey* by Pindemonte, are the best classical translations in Italian. In the wayward and fervid genius of Ugo Foscolo (q. v.), we find the reflection of the vicissitudes and political chaos of his times; his lyrical work, *I Sepolcri,* is written with extreme polish and faultless taste, which may also be said of the lyrics of Leopardi. Botta, Ricci, Bagnoli, Arici Sestini, Pananti, and Lorenzi, deserve mention among the modern poets. Grossi is a spirited poet, who has written chiefly in the Milanese dialect. In the poignant and imbittered verses of Berchet, we recognise the double inspiration of his country's and his own political sufferings; and the gentler poet, Silvio Pellico, was already famous for his poetic tragedy, *Francesca da Rimini,* previous to his incarceration in an Austrian dungeon.

Rossetti, the exile and poet, and the most distinguished commentator on Dante's *Divina Commedia;* Giov. Battista Niccolini, whose drama, *Arnoldo da Brescia,* is one of the finest works of modern Italian genius; Leopardi, poet, philologist, and philosopher; Giusti (q. v.), the first Italian satirical lyrist of the 19th c.; Mameli, the patriot poet, who fell in 1848 at Rome; Prati, Aleardi, Dall' Ongaro, Carcano, and Montanelli, are some of the most conspicuous worshippers of the Italian muse in the 19th century. Among the most successful novelists are Manzoni, whose *Promessi Sposi* has created a new school of fiction; Rosini (*Monaca di Monza, Luisa Strozzi, Il Conte Ugolino*), Cantù (*Margherita di Pusteria*), Grossi (*Marco Visconti*), and D'Azeglio, whose patriotic novels have exercised a wide influence on the youth of the country. *Ettore Fieramosca* and *Nicolo dei Lapi* are models of classical romances. Guerrazzi has written novels full of the noblest poetry. Bersezio and Ruffini are also worthy of notice. And among authoresses, we may mention Teresa Bandinella, Cecilia de Luna Folliero, Guistina Michiel, Isabella Albrizzi (whose biography of Canova is a graceful and accurate delineation), and Signora Ferrucci, whose educational works possess high merit. The modern historians of Italy are very numerous. Balbo's *Summary of Italian History,* Botta's *History of Italy,* Coletta's *Naples,* Amari's *Sicilian Vespers,* Cantù's colossal work on *Universal History,* Zeni's *Compendium of Italy's History,* and Scopoli's *History of Italian Legislation,* are among the best works; while interesting historical monographs of various periods or states have been published by Canetti, Canale, Brofferio, Anelli, Cattaneo, the graphic recorder of the rising at Milan in 1848, and the learned compiler of the *Archivio Triennale,* or series of documents bearing on Italian modern history from 1848 to 1850. Political economy and philosophy have found in Mazzini, Gioja, and Romagnosi able exponents. The political writings of Joseph Mazzini (q. v.), apart from their political tendencies, have exercised immense influence on the youth of Italy by their high moral tone and beauty of language. The various schools of philosophy have found adherents and expounders in Borelli, Galuppi (1770—1846), Mamiani, Rosmini, Gioberti, and Tommaseo, mostly all exponents of ecclesiastical philosophy; while Testa, Franchi, Mastriani, and Cattaneo are the exponents of speculative and independent philosophy. Antiquarian and archæological science has been ably illustrated by Inghirami, Fannucci, Manno, Litta, Visconti, and Sestini. Bossi, Fumigalli, Ferrario, neglected by Italian writers, has found in Professor Villari a successful cultivator; his *Life of Savonarola* is written with liberality, grace, and eloquence. The most complete histories of Italian literature are Crescimbeni, *Storia della Volgar Poesia*, 6 vols. (Rome, 1698; Venice, 1731); Quadrio, *Storia e Regione d'ogni Poesia*, 7 vols. (Bologna, 1739); Tiraboschi, *Storia della Letteratura Italiana*, 14 vols. (Modena, 1772—1783; 16 vols. 1787—1794; 12 vols. Rome, 1785; 16 vols. Milan, 1822—1826); Corniani, *Secoli della Letteratura Italiana*, 9 vols. (Brescia, 1818—1819); Maffei, *Storia della Letteratura Italiana*, 2d ed., 4 vols. (Milan, 1834); Cimorelli (Milan, 1845); Giudici (Florence, 1847); Levati (1831).

ITA'SCA, LAKE. See MISSISSIPPI.

ITCH (known also as SCABIES and PSORA) is a contagious vesicular disease of the skin. All parts of the body, unless perhaps the head, are liable to be affected, but the most common seats of the disease are the wrists and hands, and especially between the fingers. The first sign of this affection is an itching sensation, which, upon minute examination, is found to proceed from a minute conical vesicle, while the adjacent portions of epidermis present a more scaly appearance than is natural. This condition of the skin is due to the presence of a minute acarus, the ITCH-MITE (q. v.), which burrows within the epidermis, and excites the cutaneous irritation. The affected parts itch with increased intensity when the patient is warm in bed, or after the use of stimulating drinks or exciting condiments; and as he cannot refrain from scratching himself, the vesicles get more or less broken, and become interspersed with numerous little bloody points.

The itch being popularly regarded as a somewhat disreputable affection, and being highly contagious, it is very important that it should be distinguished from other cutaneous disorders. Eczema, prurigo, and lichen, are the affections most likely to be confounded with it; but eczema, though a vesicular disease, presents rounded and not conical vesicles, and at most only a pricking sensation, and nothing like the irritation of itch; while prurigo and lichen are papular disorders, and are not accompanied by the presence of vesicles; moreover, none of these diseases are contagious.

The itch is always communicated by contact, either immediately, as by the act of shaking hands, or through the medium of articles of clothing or bedding which have been used by a person suffering from the disorder. In some cases, the proximate cause of the disease, the itch-insect, is conveyed to the sound person in its perfect form; while in other cases, the ova or embryos suspended in the fluid of the vesicles may be the mode of transmission.

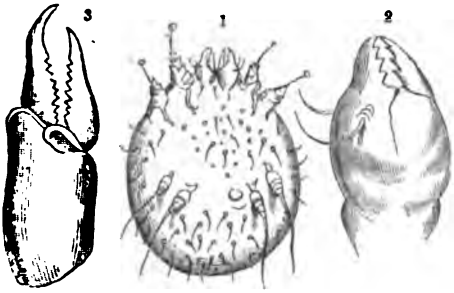
The disease, if not cured, will go on for an indefinite period, probably for life; but in cold and temperate climates, never gives rise to serious injury to the health. Numerous external remedies have at different times been employed for the cure of this disease, but the great remedy is sulphur, which may be regarded as a specific. In the case of an adult, Mr. Erasmus Wilson, our highest English authority on skin-diseases, recommends that 'four ounces of sulphur ointment should be well rubbed into the entire skin before the fire, and particularly into the affected portions, morning and evening, for two days. It is desirable also that the patient should wear a flannel shirt, and retain the same during the whole of the treatment. On the morning of the third day, the patient should take a found to be effected.'

When patients strongly object to the smell of sulphur, which is not unfrequently the case, an ointment made by digesting over a vapour-bath, for 24 hours, three parts of stavesacre in powder, with five parts of lard, and then straining, may be used. According to M. Bourguignon (who has made numerous experiments on the deleterious action of medicines on the living itch-mite), this ointment will cure the disease in four days.

ITCH-MITE (*Acarus scabiei* or *Sarcoptes scabiei*) is supposed by some naturalists to have been referred to by Aristotle in the 5th book of his *Historia Animalium*, cap. 31. But although the itch was undoubtedly known both to the Greeks and Romans, there is no certain evidence that a mite was recognised as the cause of the disease earlier than by Avenzoar, an Arabian physician of the 12th century. Throughout the whole of the middle ages, and till the present century, the necessary connection between the disease and the mite was universally recognised, as is obvious from the writings of Scaliger (1557) and others; and a paper read by Adams before the Royal Society in 1805, contains two very good figures of the mite. During the first ten years of this century, many practitioners, not succeeding in finding the animal, expressed doubts concerning its existence, and in 1812 there occurred a remarkable incident in the history of this mite. M. Gales, the chief apothecary to the Hospital of St Louis, tempted by a prize offered by one of the unbelievers, published in that year a treatise on the itch, in which he declared that he had seen more than 300 of the mites, and in which he gave a drawing of the animal, which, although it differed materially from the delineations of earlier observers, was at once accepted as an exact representation of the true parasite, and was copied for several years into all works treating the itch, until Raspail discovered that M. Gales's Memoir was a tissue of deceptions, and that the animal which he had figured was *the cheese-mite!* The existence of the itch-mite was now more distrusted than ever, until, in 1834, Renucci, a Corsican student, demonstrated the presence of the creature. Many points regarding the structure and habits of this curious animal have been since revealed by the investigations of Gras, Raspail, Hebra, Gudden, and especially De la Foad and Bourguignon, who have presented to the French Institute *A Practical Treatise on the Entomology and Comparative Pathology of the Itch as it occurs in Man and the Domestic Animals*, which has been published in the last volume (1862) of the *Memoires présentés par divers Savants à l'Académie des Sciences.*

The adult female mite is considerably larger than the male; it is visible to the naked eye, and forms a roundish grayish-white corpuscle, not unlike a starch granule; it is about $\frac{1}{5}$th of a line in length, and $\frac{1}{7}$th in breadth. When seen under the microscope, it presents a truncated tortoise-like shape, and is seen to be studded with hairs and bristles. The head terminates in two pairs of mandibles, and as these mandibles afford good characteristic distinctions of the species, representations are given in fig. 2 of the mandible in the female itch-mite and in fig. 3 of the mandible in the sugar-mite.

In order to penetrate the horny layer of the epidermis, the mite assumes, according to Gudden, a nearly perpendicular position; and to avoid as much trouble as possible, it usually selects such spots as give least resistance, such as the space between the fingers, the inside of the wrist, &c. Once fairly buried, it does not again come out, but burrows, and forms tortuous galleries within the skin. These galleries resemble the mark which is formed when a pen is drawn lightly over the skin without causing a scratch. In young children, and in persons with a delicate skin, they appear of a grayish-white colour; while in persons with a coarse dirty skin they are of a blackish tint. At certain intervals, the galleries are pierced by small openings, for the admission of air; it is through these openings, which sometimes appear like very minute black dots, that the young escape. The vesicles characteristic of the itch-disease are attributed to a poison ejected by the mite. The males are smaller and much scarcer than the females.



Itch-Mite:
1, abdominal view of female itch-mite, magnified 65 diameters; 2, one of its mandibles, magnified 65 diameters; 3, mandible of male sugar-mite, magnified 390 diameters.

There are numerous species of itch-mite (*Sarcoptes*) which infest the lower animals. One of them (*S. canis*) produces *Mange* (q. v.) in dogs; another (*S. equi*), a comparatively large species, sometimes occurs in horses; another (*S. bovis*) in oxen in some parts of Europe; another (*S. ovis*) in sheep. Some of these are occasionally transferred to human beings, and cause irritation and annoyance, which, however, seems to be limited to the life of the individual mites transferred, the situation not being congenial enough for their increase.

For further information on the structure and habits of this animal, the reader is referred to the second volume of Küchenmeister's work on Parasites (translated for the Sydenham Society), and to Bourguignon's treatise.

ITH'ACA (now **THIAKI**), one of the Ionian Islands (q. v.), and the smallest of them except Paro. It lies 17 miles west of the mainland of Greece, and 2 miles north of Cephalonia. The surface is mountainous, but there are many pleasant valleys. Length, 15 miles; breadth, 4; area, about 44 square miles. It was celebrated among the ancients as the principality and home of Ulysses; and some Cyclopean ruins near Porto Molo are called by the islanders the ruins of the Castle of Ulysses. In 1871, the population of the island was about 13,000, of whom about 2500 were in the town of Vathi, its seaport and capital.

I'THACA, a village in the state of New York, America, at the southern extremity of Cayuga Lake, 162 miles west-by-south from Albany. It has a large trade in coal, and 30 mills and manufactories. Pop. (1870) 10,107.

ITI'NERARY (Lat. *itinerarium*, derived from *iter*, a journey), the name given by the Romans to a table of the stages between two places of importance, with the distances from one to another. The itineraries of the ancients contribute much to our acquaintance with ancient geography. Of these, the most important are the *Itineraria Antonini* and the *Itinerarium Hierosolymitanum*. The *Itineraria Antonini* are two in number, the *Itinerarium provinciarum* and the *Itinerarium marinum*, the former containing the routes through the Roman provinces in Europe, Asia, and Africa; and the latter the principal routes of navigators, who then sailed only along the coasts. They take their name from Antoninus Caracalla, by whom they were published, as corrected up to his time, but they seem to have been originally prepared at an earlier date.—The *Itinerarium Hierosolymitanum* was drawn up 333 A. D., for the use of pilgrims from Burdigala (Bordeaux) to Jerusalem. Of these itineraries, various editions have been published.

ITINERATING LIBRARIES are small collections of books for popular reading contained in boxes, one of which, after being stationed in a village for a certain length of time, is transferred to another village, when another takes its place; and so on with any assigned number of boxes, each with its special assortment. The principle of shifting about boxes of books in this way in rural districts is referred to in the memoirs of Oberlin (q. v.), and has been long known in Wales, as well as the Highlands; but it met with no significant approval, until it was improved upon and carried practically into effect on a broad scale by Samuel Brown, a merchant in Haddington (died 1839), who, taking a deep interest in popular instruction, set on foot itinerating libraries in several villages of East Lothian, 1817. The books were assorted to the extent of 50 volumes in a box. At first, there were four boxes; and as the time allowed for each was two years at a village, the inhabitants of four villages had the perusal of 200 volumes in the space of eight years, at one-fourth the expense of the whole. The undertaking was begun and locally superintended from motives of benevolence, and the books were supplied gratuitously. The success attending this economic method of establishing libraries in a country district, led to its extension over a wider sphere, on the principle of readers paying a small sum per annum, also of forming the assortments of books from the used new works in a central subscription library. There are several itinerating divisions in use in East Lothian and other parts of Scotland, as also in England, and 12 divisions were some time ago transmitted to Jamaica, where they were to be under the charge of missionaries. From all that can be gathered, the establishment of libraries of this simple class proves a valuable auxiliary to schools, churches, and other agencies of social improvement. For a variety of particulars on the subject, see a small volume, *Some Account of Itinerating Libraries and their Founder* (Edin. 1856).

I'TZEHOE, a town of Denmark, in the duchy of Holstein, and the oldest in the duchy, is situated on the Stör, in a valley backed by finely wooded hills, about 50 miles by water north-west of Hamburg. Tobacco, chicory, sugar, and brandy, are manufactured, and important horse and cattle markets are held here. I. also carries on a considerable general trade by water with Altona and Hamburg. Pop. 6691.

The original castle around which I. gradually arose was built by Charlemagne in 809. I. was twice taken by Tilly in the Thirty Years' War, and in 1657 a great portion of it was burned down by the Swedes.

I'VAN, or I'WAN (the Russian form of John), the name of a number of Russian czars.—IVAN I. (1462—1505) may be regarded as the founder of the Russian empire. He was at first only Grand Duke of the Russian principalities to his own sway. In 1472, he married Zoë, a niece of the last Byzantine emperor, and thus brought the two-headed Byzantine eagle into the Russian arms, an emblem with which are connected pretensions not likely to be forgotten by the Russian emperors, although they may not be openly urged. This marriage opened up a way also for the entrance of European civilisation into Russia.—IVAN II. (1533—1584) did much for the advancement of his country in arts and commerce, as well as for its extension by arms. He concluded a commercial treaty with Queen Elizabeth, after the English had discovered the way to Archangel by sea. He bore, however, the surname of the Cruel, and merited it by his deeds, amongst which was the slaughter of 60,000 persons—other accounts make the number only 25,000—at Novogorod in six weeks, on account of a supposed plot to deliver up the city and surrounding territory to the king of Poland. —IVAN III., born 23d August 1740, was the son of the Duke Anthony Ulric of Brunswick-Wolfenbüttel, and the Russian Grand Duchess, Anna Carlowna. The Empress Anna Ivanowna adopted him as her son and heir, but she dying soon after, and Elizabeth, the daughter of Peter I., seizing the throne, he was imprisoned during the remainder of his life; and by the orders either of the Empress Catharine II. or of her counsellors, was put to death by the officers of the garrison at Schlüsselburg, where he was confined, on 5th December 1764. Those Russian Ivans are sometimes differently numbered, the reckoning being made to begin further back, with those who were only Grand Dukes of Moscow.

IVES, ST, a municipal and parliamentary borough of England, in the county of Cornwall, beautifully situated on the north-east shore of the bay of the same name, with an outlook on the Bristol Channel, about 10 miles north-north-east of Penzance. It is a very old and picturesque town; its church, a granite building of the early part of the 15th c., stands on the beach, and is reached by the spray in rough weather. Its harbour admits vessels of 200 tons. I. is the head-quarters of the pilchard-fishery. In the vicinity are several important tin and copper mines. Pop. (1871) of parliamentary borough, which returns one member to parliament, 10,034.

IVES, ST, a small market-town of England, in Huntingdonshire, is situated on the left bank of the Ouse, 6 miles east of Huntingdon. A very large weekly cattle and corn market is held here. Brewing and malting are the chief branches of industry. Pop. (1871) 3248.

IVI'ZA (anc. *Ebusus*), one of the Balearic Isles (q. v.), lies about 50 miles south-west of Majorca. It is 23 miles long, and 12 miles broad; pop. 11,000. Iviza, the chief town, has a pop. of 5970. Salt, the principal article of export, is extensively manufactured on the shore.

I'VORY was the name formerly given to the main substance of the teeth of all animals, but it is now restricted to that modification of *dentine* or tooth-substance which in transverse sections shews lines of different colours running in circular arcs, and forming by their decussation minute lozenge-shaped spaces. By this character, which is presented by every portion of any transverse section of an elephant's tusk, true ivory may be distinguished from every other kind of tooth-substance, and from every counterfeit, whether derived from tooth or bone. Although no other teeth, except those of the elephant, present this characteristic, many other animals, such as the walrus, narwhal, hippopotamus,

the same purposes in the arts as those for which true ivory is employed. The ivory of the tusks of the African elephant is held in the highest estimation by the manufacturer, on account of its greater density and whiteness. The tusks are of all sizes, from a few ounces in weight to more than 170 lbs. each. Holtzapffel states that he has seen fossil tusks from the banks of the rivers of Northern Siberia which weighed 186 lbs. each. There are various chemical processes by which it may be dyed of various colours, as black, blue, green, yellow, red, and violet.

Ivory articles can be made flexible and semi-transparent by immersion in a solution of phosphoric acid of sp. gr. 1·130, till they become translucent. They are then to be taken out, washed with water, and dried with a soft cloth, when they are found to be as flexible as leather. They harden on exposure to dry air, but resume their pliancy when immersed in hot water.

Much important information on the subject of ivory generally will be found in Holtzapffel's *Mechanical Manipulation.*

The tusks of the elephant have from very early periods constituted an important article of trade, in consequence of their great beauty as a material for ornamental manufactures, and even works in fine art. I. is frequently mentioned in the Old Testament. With the Greeks it became a most important material, and by the hands of the sculptor Phidias a statue was produced of the Olympian Jupiter, of such marvellous beauty and imposing majesty that it was considered a misfortune to die without having seen it. By the Romans, who were supplied from Africa, it was also extensively used, and by them its use was diffused over the whole of Europe. The art of working in ivory doubtless had its origin in India, where it has always been a much valued material, and formerly supplied indirectly much of the ivory sent to Europe. The value of ivory is in proportion to the size and soundness of the teeth. Below the weight of five pounds, they are called *scrivelloes*, and are of the least value, rarely reaching five shillings per pound; but double that price has been given for teeth of unusually large size. The quantity imported into Great Britain from all parts rather exceeds 500 tons per annum, the value of which is nearly £400,000.

The so-called ivory obtained from the hippopotamus is in especial favour with dentists for making false teeth, on account of its pure white colour and freedom from grain. The fossil ivory, which is found in considerable quantity in Siberia and the arctic regions, is uncommonly hard and brittle; it is also whiter, and wants its waxy softness. At present, the demand for ivory is rapidly increasing, owing to the great taste and skill of some of the artists who work in this material, and as the supply increases but very slowly, it is likely to become very dear. The works in ivory exhibited in the International Exhibition (1862) shewed a very extraordinary advance in the beautiful art of ivory-carving, and single specimens were shewn of the value of £500.

IVORY, VEGETABLE. This curious material is furnished by one of the most beautiful of all the palm tribe. It grows on the Andean plains of Peru, and on the banks of the river Magdalena, and other parts of South America. The stem of this palm (the *Phytelephas macrocarpa*) is short and procumbent, but it has, proceeding from its crown, a magnificent tuft of light-green pinnated leaves of extraordinary size and beauty; they are like immense ostrich-feathers rising from 30 to 40 feet in height. The flowers are on a crowded spadix, and have neither calyx nor corolla. The fruit, which is as large as a man's head, consists of many 4-celled leathery drupes aggregated together, and contains numerous nuts of a somewhat triangular form, each nut being nearly as large as a hen's egg; they are called *Corrozzo nuts* in commerce. The kernels of these nuts when ripe are exceedingly hard and white, in fact they resemble ivory so completely that few names have ever been better applied than that of vegetable ivory. They have of late come into extensive use by turners in the manufacture of buttons, umbrella-handles, and small trinkets, and so closely resemble true ivory as frequently to deceive competent judges. Two or three millions of these nuts are now imported annually, and are chiefly used by the London and Birmingham turners.

IVORY-BLACK. See BONE-BLACK.

IVRE'A, a town of Piedmont, and capital of a province of the same name, has a population of 10,519, and is situated on the left bank of the Dora Baltea, partly on level ground and partly on an eminence exposed to the sirocco winds. The cathedral is supposed to have been a temple of Apollo, and contains an ancient sepulchral monument of the age of Augustus. The carnival of I. is famed for its picturesque allegorical pageants.

IVRY-SUR-SEINE, a manufacturing town of France, in the department of Seine, is situated on the left bank of the river of that name, three miles above Paris. Glass, earthenware, and chemical products are the chief manufactures. Pop. (1872) 11,176.

IVY (*Hedera*), a genus of plants of the natural order *Araliaceæ*, consisting of shrubs and trees, mostly natives of tropical countries. The flowers have five or ten petals, and five or ten converging or consolidated styles. The fruit is a berry with five or ten cells.—The COMMON IVY (*H. helix*) is a well-known native of Britain, and of most parts of Europe, although it is more rare in the northern countries. Its long, creeping, branched stem, climbing on trees and walls to a great height, and closely adhering even to very hard substances by means of rootlets which it throws out in great abundance along its whole length, acquires in very aged plants almost the thickness of a small tree. Its 5-lobed, shining, stalked, evergreen leaves, clothing bare walls with green luxuriance, serve to throw off rain, whilst the rootlets of the stem suck out the moisture, so as to render damp walls dry, contrary to a common prejudice, that ivy tends to produce dampness in walls. It injures trees, however, both by abstracting their sap and by constriction. The flowering branches of ivy have ovate, entire leaves, very different from the others. Its small greenish flowers are produced in the beginning of winter, and the small black berries are ripened in the following year. The berries are eagerly eaten by many birds, although they have a pungent taste, and contain a peculiar bitter principle called *hederine*, and an acid called *hederic acid;* which are also found in a gummy exudation obtained by incisions from the stem, and occasionally used in medicine as a depilatory and a stimulant, and in varnish-making. An ointment made from the leaves is used in the Highlands of Scotland to cure burns. In Egypt, the ivy was sacred to Osiris, in Greece to Bacchus (Dionysos), whose thyrsus was represented as surrounded with ivy; the Romans mingled it in the laurel crowns of their poets.

Ivy, showing the Rootlets.

There are several varieties of ivy often planted for ornamental purposes, of which that generally known in Britain as *Irish Ivy*, and on the continent as *English Ivy*, is particularly esteemed for its large leaves and luxuriant growth. It is said to be a native of the Canary Isles. Ivy grows readily from cuttings.—*H. umbellifera*, a native of Amboyna, is said to produce a finely aromatic wood; and *H. terebinthacea*, a Ceylonese species, yields a resinous substance which smells like turpentine.

J

J THE tenth letter in our alphabet, has in Eng. the power of *dzh;* in Fr., of *zh;* and in Ger. of *y*. Both the sound and the character have sprung out of the original vowel *i*. When such a word as *Iulius* is pronounced rapidly, it naturally slides into *Yulius*. The Romans, though they had but one character for both, recognised this distinction between the vowel and the semi-vowel; and in the case of such words as *cuius, maius*, some writers doubled the *i*, and wrote one or both long, as cuIIus or cuiIus. There is little doubt that the original Roman sound of this semi-vowel was that of Eng. *y* (youth), still given to it in German. But as this sound has a tendency to convert the consonant preceding it into a sibilant (see letter C), so it has a tendency to become itself sibilant, and *Yul-* slides into Fr. *zhul-*, Eng. *dzhul-*. This transition had already taken place in the later ages of the Latin, at all events, in the popular pronunciation, as appears from such inscriptions as *congiunta*, for *conjuncta; Zesu*, for *Jesu*.

It was the Dutch scholars of the 16th and 17th centuries that first introduced a regular distinction between the consonantal and vowel powers of *i*, and marked the former by the distinct character *j* (a long *i*, projecting below the line). The character has been adopted in the modern Teutonic and Romanic languages, with the exception of Italian, which represents the sound by *gi* or *ggi*, as *Giovanni*, from Lat. *Johannes; maggiore*, from Lat. *maior*. In Span., it has a guttural power, and is interchangeable with *x*, as *Xeres*, or *Jeres*.

Australian Jabiru.

JA'BIRU (*Mycteria*), a genus of birds of the same family with storks and adjutants; the chief distinction from the storks being that the bill is a little curved upwards. The species are few, but are widely distributed in South America, Africa, and Australia.

JABUTICABA. See EUGENIA.

Common Jacana (*Parra Jacana*).

JA'CANA (*Parra*), a genus of birds of the order *Grallæ*, commonly ranked in the family *Rallidæ*, natives of the warm parts of Asia and the Asiatic islands, Africa, and South America. In general appearance, they much resemble gallinules and coots. The feet, though not webbed, are adapted, by the great length of the toes and claws, for walking on the surface of weed-covered lakes and swamps, the native haunts of these birds, where they never fail to attract the attention of the traveller. The COMMON J. (*P. Jacana*) is a South American species, abundant in Guiana and Brazil. It is about ten inches long; black, except the back and part of the wings, which are of a bright chesnut colour. The INDIAN J. (*P. Indica*) and the CHINESE J. (*P. Sinensis*) are also among the best known species. Both are found in India and other parts of the East.

JACARA'NDA WOOD, a very hard, heavy, brown wood, also called *Rosewood*, from its faint agreeable smell of roses. It is brought from South America, and is produced by several trees of the genus *Jacaranda*, of the natural order *Bignoniaceæ*. Several species of this genus are called *Caroba* in Brazil, and are there accounted anti-syphilitic.—Several species of the nearly allied genus *Tecoma* also have an extremely hard wood, as *T. pentaphylla*, a native of the Caribbean Islands. The Brazilian Indians make their bows of the wood of *T. toxiphora* or *Pao d'arco*.

JACK. 'The Jewish *Jacobus* was corrupted through Jacquemes to *Jaques* in France, and *James* in England; and *Jaques* being the commonest Christian name in the former country, was used as pile ten feet high in the staircase of the bell-tower of Eton College. The J. is a social bird. It is easily domesticated, and becomes very pert and familiar. It has considerable powers of mimicry, and even imitates the human voice.

JA'CKSON, a town of North America, capital of the state of Mississippi, is situated on a plain on the right bank of the Pearl River, which becomes navigable here, forty miles east of Vicksburg, and about 180 miles north of New Orleans by railway. Being the capital, it is the seat of several important state institutions, as the lunatic asylum, institutions for the deaf and dumb, and the prison. Here, in average years, from 30,000 to 40,000 bales of cotton are shipped annually. Pop. (1870) 4234.

JACKSON, a flourishing city of North America, in the state of Michigan, is situated on the left bank of the Grand River, 76 miles west of Detroit, and 35 miles south of Lansing, with both of which it is connected by railway. In the vicinity, are numerous factories and mills of various kinds. Agricultural implements are extensively manufactured here, and there is a flourishing general trade. Within the city limits, there is a mine of bituminous coal—that material occurs also in the vicinity. Pop. (1870) 11,447.

JACKSON, ANDREW, General, and seventh President of the United States of America, was born at Waxhaw settlement, South Carolina, March 15, 1767. His father, who was a Scotchman by birth, emigrated to America in 1765, and soon afterwards died, leaving to his widow a half-cleared farm in a new settlement, with no negroes to assist in its cultivation. When J. grew up, he was sent to study for the church, but on the breaking out of the American revolution, he and his brothers were summoned to the field, and the elder lost his life at Stono Ferry. Andrew, though but thirteen years old, fought with his remaining brother under Sumter, and remained with the army until the end of the war. The life of the camp had ruined him for the clerical office, so in 1784 he commenced the study of the law, and in 1787 was appointed solicitor for the western district of South Carolina, now the state of Tennessee. This frontier settlement had for its neighbours several powerful tribes of Indians, against whom J. fought with such success as to get from them the complimentary titles of 'Sharp Knife' and 'Pointed Arrow.' In 1796, he was a member of the convention which modelled the constitution and organised the state of Tennessee, and was elected to the legislature as representative, and then as senator, and appointed judge of the supreme court (an office he soon resigned), and major-general of the state militia. In 1813, at an outbreak of hostilities with the Creek Indians, he raised a volunteer force of two or three thousand men, and defeated them. When destitute of supplies, he is said to have set an example of endurance by feeding on hickory-nuts, and hence, according to some, to have acquired the popular sobriquet of 'Old Hickory.' J.'s final victory (March 27, 1814) at the Horseshoe peninsula, in the Tallahoosa, completely broke the power of the Indian race in North America. In consequence of his skill and energy in Indian warfare, he was appointed a major-general of the army of the United States; and in the contemporaneous war with England had command of the forces which captured Pensacola, and defended New Orleans (q. v.) against the attack of the British under General Packenham, December 1814. The result of this action, so flattering to the pride of Americans, gave General

made governor of the territory, and subsequently was chosen United States senator from Tennessee. In 1824, he received the highest vote of four candidates for the presidency of the United States, but by the influence of Mr Clay, John Quincy Adams was elected by the House of Representatives. He was, however, in spite of bitter and violent opposition, elected by the democratic party in 1828, and in 1832 re-elected by a still more overwhelming majority. His administration was marked by singular firmness. He vetoed important measures against large majorities, and after a long struggle, destroyed the Bank of the United States, and took the first steps towards a specie currency and independent treasury. But he manifested too much, perhaps, of a partisan spirit in removing nearly all his political opponents from office, and appointing his supporters—an example followed by his successors of both parties, and which has led to wide corruption. His administration, as a whole, was successful, and he retired with undiminished popularity, after witnessing the election of his favourite, President Van Buren. He died at his farm of the Hermitage, near Nashville, June 8, 1845.

JACKSON, THOMAS, an American Confederate general, better known as 'Stonewall Jackson,' was born in Virginia in 1826. In 1842, he entered the military academy at Westpoint as a cadet, and was breveted second lieutenant in the 1st corps of United States artillery in 1846. He was attached to Magruder's battery in the Mexican war, and was breveted captain for his gallant conduct in the battles of Contreras and Cherubusco. He retired from the army in 1852, and became Professor of Mathematics and Military Science in the university of Virginia. At the outbreak of the War of Secession, he was appointed a brigadier-general in the Confederate army. His *nom de guerre* of 'Stonewall' was occasioned by the firmness of his brigade at the battle of Bull Run, July 21, 1861. He defeated the Northern forces at Ball's Bluff, and outgeneraled and defeated the Federal commanders in the Virginia campaign of 1862, after which he led the invasion of Maryland, and captured Harper's Ferry. He died of wounds received from his own men at Chancellorville, May 9, 1863.

JA'COB (Heb. *Yaakob*, derived variously from 'heel,' Gen. xxv. 26, or from 'to deceive,' Gen. xxvii. 36), one of the three chief Hebrew patriarchs. He was the second son of Isaac and Rebekah, and on account of his docile, domestic character was the favourite of his mother. His conduct towards his brother in regard to the birthright (Gen. xxvii.) does not greatly redound to his credit. After an exile of 21 years in Padanaram, whither he had fled to escape the vengeance of Esau, he returned to Canaan with two wives (Rachel and Leah), two concubines (Bilhah and Zilpah), twelve sons (the fathers of the subsequent Hebrew tribes), and a daughter named Dinah, who was the unintentional cause of a vindictive massacre of the Shechemites by her brothers Simeon and Levi. In his 130th year, he and his family went down to Egypt, where his favourite son Joseph had become a great man under Pharaoh. Here he lived for 17 years longer in the land of Goshen, and died in his 147th year. His body was embalmed, carried back to Canaan with great pomp by his sons, and there buried near Hebron. Mention is frequently made of J. both in the Old and New Testaments, and there are also many legends about him in Rabbinical and Patristic, as well as in the Mohammedan literature.

incessant till the middle of the 18th century. Their hostility to the House of Hanover broke out in rebellions in 1715 and 1745, in consequence of which not a few of them lost their lives upon the scaffold, titles were attainted, and estates confiscated. After 1745, their cause became so obviously hopeless, that their activity in a great measure ceased; and it was not long till it ceased altogether, and those who still retained their attachment to the exiled family acquiesced in the order of things established by the Revolution. In Scotland, the hopes and wishes of the Jacobite party were expressed in many spirited songs, which form an interesting part of the national literature. See the *Culloden Papers* (Lond. 1815); Hogg's *Jacobite Relics* (2 vols. Edin. 1819); and Chambers's *Jacobite Memoirs* (Edin. 1824).—The J. of England were also called *Tories*. They were generally distinguished by warm attachment to the Church of England, as opposed to all dissent, if they were not members of the Church of Rome, and held very strongly the doctrine of *non-resistance*, or the duty of absolute submission to the king. The J. of Scotland were also generally Episcopalians and Roman Catholics. Macaulay, however, points out that the Highland clans which espoused the Jacobite cause did so on other grounds than the English J., and were far from having previously received the doctrine of non-resistance. In Ireland, the Jacobite cause was that also of the Celts as opposed to the Saxons, or the native race against the English *colonists*, and of the Roman Catholics against the Protestants. These diversities prevented a complete union, and greatly weakened the Jacobites.—See *History of the Rebellion in* 1745, by R. Chambers.

JACOB'S LADDER, on shipboard, is a short rope-ladder with wooden steps, to give easy access to the shrouds and tops. It is also the name of an apparatus for raising light weights a considerable height. One form, much used in breweries and distilleries, is an endless revolving chain of buckets, filling themselves at the bottom of the chain, and emptying themselves at the top.

JACOB'S LADDER (*Polemonium cœruleum*), a herbaceous perennial plant of the natural order *Polemoniaceæ*, a rare native of Britain, but more common in the centre and south of Europe, found also in the temperate parts of Asia and of North America. It is common in flower-gardens in Britain. It has pinnate leaves, with ovato-lanceolate leaflets, a smooth stem 1—2½ feet high, and a terminal raceme of bright blue (sometimes white) flowers, with wheel-shaped 5-lobed corolla. Great medicinal virtues were once ascribed to it, but the only quality which it seems to possess is a slight astringency.

JACOTOT, JEAN JOSEPH, the inventor of the 'Universal Method' of education, was born at Dijon, in France, in 1770. He served for some time in the army, but in 1790 was appointed by Napoleon, first to the chair of mathematics in the Normal School, afterwards secretary to the Minister at War, and a director of the Polytechnic. He retired to Belgium in 1815, where he was appointed lecturer on French literature in the university of Louvain, and afterwards director of the military Normal School. He returned to Paris in 1838, and died there 30th July 1840. His system, propounded in general rules, which, however, without his own explanation, would have been quite unintelligible, appears to consist in directing the student's exertions to particular *subjects*, encouraging and inciting him in every possible manner to make use of his mental powers, and there leaving him; the teacher

leave him to explain away his own difficulties. J.'s method very much resembled that of Hamilton (see HAMILTONIAN SYSTEM), and, like it, was crude and one-sided. The valuable elements of it have been incorporated in the more rational and catholic methods of recent times. The wonderful results said to have been produced by J. are, so far as real, to be attributed to the exceptional zeal and energy that always characterise the apostle of a new system, as much as to the system itself.

JACQUA'RD LOOM, a loom fitted with the Jacquard apparatus for the purpose of pattern-weaving. This apparatus was the invention of M. Joseph Marie Jacquard, an ingenious Frenchman, a native of Lyon, who, being necessitated to carry on the weaving business of his father, for which he had a distaste, and, according to some accounts, still further stimulated by reading an account in an English newspaper of the offer of a premium for any person who should invent a machine for weaving nets, set his wits to work to improve the existing machinery for weaving. By his invention, he enabled an ordinary workman, with comparative ease, to produce the most beautiful patterns in a style which had only previously been accomplished with almost incredible patience, skill, and labour. Nevertheless, the reception of his great invention by the public was most dispiriting, for although rewarded with a small pension by Napoleon, the silk-weavers themselves offered such violent opposition to its introduction, that on one occasion he narrowly escaped with his life, and his machine was broken up by the body of men who, under the title of the Conseil des Prud'hommes, were appointed to watch over the interests of the Lyonnese traders, and it was destroyed in the public square of Lyon. To use Jacquard's own language: 'The iron was sold for iron, the wood for wood, and he himself was delivered over to universal ignominy;' nevertheless, on that same spot where the machine was publicly destroyed, a statue now stands, to shew the gratitude of a more enlightened generation.

Even after the partial adoption of his machine, which was patented, Jacquard had numberless annoyances to contend with; the workmen, as usual, opposed ignorant prejudice to its progress, and their masters, little better, took it up so lukewarmly, that it failed in many instances, and actions were entered against the patentee for injury done to material, &c. The value of the invention was, however, too great to admit of its being long suppressed, and when its value was once fairly recognised, it effected a complete revolution in the art of weaving, especially in the finer kinds of figured silk fabrics.

The Jacquard apparatus can be adjusted to almost every kind of loom, its office being merely to direct those movements of the warp threads which are required to produce the pattern, and which previously were effected by the weaver's fingers; its arrangements generally are very complicated, but its principles are remarkable for their extreme simplicity and certainty.

In ordinary weaving, the alternate threads of the warp, or longitudinal arrangement, are raised so as to enable the weaver to throw the shuttle containing the weft thread transversely across from his right to his left hand between the warp threads so raised and those left at rest. When the weft is so passed through, the raised warp threads are lowered, and the other set raised, the shuttle being then passed through from left to right. This is the most simple idea of plaiting or weaving. If, however, a pattern has to be produced either in plain materials or varied colours, it is necessary, instead of raising and depressing the whole threads of the warp, in two sets, as above described, to raise only such as are required to develop the various parts of the figure, and this, of course, must be done with great exactness, as the position of every thread tells upon the formation of the pattern. The apparatus of Jacquard is for the purpose of regulating these movements, and its mode of action is as follows:

The warp threads are each (as in the common weaving process) passed through a small loop in the lifting thread, so as to be raised by means of the treadles, which act directly upon the lifting bars; these lifting threads (fig. 1, *i*, *i*, *i*, *i*, *i*) are attached to certain wires in the Jacquard apparatus, which form a rigid continuation ending in a hook, which, when nothing interferes, is caught and raised by each upward motion of the lifting bar; thus, A is the lifting bar, and it has five projections (*k*, *k*, *k*, *k*, *k*), upon which the hooks of the wires catch when in a straight position, as at B, B, but which miss them if they be thrown out of the perpendicular, as at C, C, C. There are only five of these wires given, to prevent confusion, but practically there must be one for every thread of the warp—that is, one for every thread in the width of the cloth to be woven. Each of the lifting wires passes through a horizontal needle placed at right angles, D, D, D, D, D, which has a loop formed for the purpose, thus, at *f* (fig. 2). This needle passes freely through an opening in the frame at *h*, and is so looped on to another rod, *g*, on the spring-box F, that it moves freely without fear of displacement, and if pushed back into the spring-box, is made to press upon one of the spiral springs E, which restores it to its place as soon as it is freed from pressure. In the diagram (fig. 1), this pressure is supposed to be exerted upon three of the lifting wires, C, C, C; consequently, if the lifting bar A is simultaneously raised, those three wires are missed, whilst the other two, B, B, being in position, catch the projections *k*, *k* on the bar, are drawn up with it, and thus raise the threads of the warp to which they are attached.

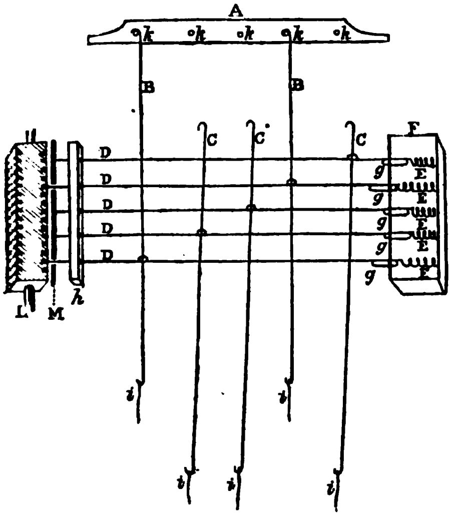


Fig. 1.

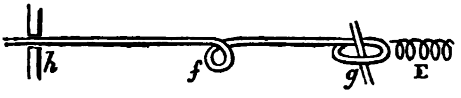


Fig. 2.

Now, the regulation of this pressure upon the horizontal needles is effected by a revolving square roller, which has each of its four sides perforated with rows of holes, which, like the needles and lifting wires, correspond in number to the threads of the warp. This roller, when in its place, receives into one row of perforations the whole row of needles where they project through the frame at *h*, and it has a motion given by the machinery which brings each row on its four surfaces in regular order into the same position, and if no impediment is offered, all the needles are undisturbed, and the upright wires lift the entire set of warp threads to which they are attached. But in order to produce the necessary variations of motion required by the pattern, a set of cards are made each of the width of the square roller; these also are so perforated that when placed on the surface of the roller their perforations correspond exactly with those on the roller immediately beneath them; but the cards are perforated in exact accordance with the pattern, so that intervals occur in which there are no perforations to correspond with those on the roller; hence, when the roller L (fig. 1) is brought up to the frame *h*, some of the needles will find entrance into the holes of the roller through the corresponding perforations in the covering card, seen in section M, fig. 1; but others will be prevented entering by the absence of such perforations, and the card, by the resistance it offers, will force the needles thus opposed back upon the springs E, E, E, removing thereby the hooks of the lifting wires from the action of the lifting bar. The cards are looped together at the corners, and move as an endless chain on the rollers, and the entire set of perforations on the whole chain of cards exactly represents the pattern to be produced; the same as the notes represent the air in a piece of music. Of course, the simple operations here described require mechanical arrangements of great nicety to regulate them, and these are so complicated that mere verbal description would hardly help much to explain them; indeed, even with the loom and its apparatus, and its cumbrous arrangement of hundreds, and even thousands of cards before us, the unpractised eye finds great difficulty in comprehending its movements.

A very wonderful simplification of the Jacquard apparatus was shewn in the International Exhibition (1862), by Eugenio Vincenzi of Modena, by which a saving of bulk alone is effected to the extent of two-thirds, and the toil of the artisan is lessened greatly by the corresponding lightness of the parts of the machine which he has to move. The most remarkable part of this new invention is the extreme delicacy of the needle action, so that there is no shock when the card offers resistance, hence the inventor has been enabled to substitute paper for thick cardboard, and can consequently perforate a dozen with the same ease as one, hence the pattern may be repeated without extra labour. This beautiful little loom will certainly displace the ordinary Jacquard, if it is not itself superseded by the wonderful invention of the electric loom by Signior Bonelli, for a description of which see Electric Loom in Supp., Vol. X.

JACQUERIE (see Jack), the name given to the insurgent peasants in France in the middle of the 14th c., in the reign of John. The insurrection of the J. broke out in the year 1358, when the French king was a prisoner in England, and France in a state of the greatest disorder and anarchy. The immediate occasion of it was the enormities continued oppression on the part of the nobles. Suddenly rising against their lords, the peasants laid hundreds of castles in ruins, murdered the nobles, and violated their wives and daughters, practising every enormity, and acting, as they said, on the principle of doing as had been done to them. The insurrection broke out in the neighbourhood of Paris, but extended to the banks of the Marne and the Oise. For some weeks this part of France was entirely at their mercy; but the magnitude of the danger induced the quarrelsome nobles to make common cause against them, and on the 9th of June the peasants were defeated with great slaughter near Meaux by Captal de Buch and Gaston Phébus, Count of Foix. This put an end to the insurrection.

JACTITA'TION OF MARRIAGE is a suit which was formerly competent in the English ecclesiastical courts, and now is competent in the English Divorce Court, to settle a question of disputed marriage. If a party boast or profess that he or she is married to another, the latter may institute the suit, and call upon the former to produce proof of the marriage. If this is not done, then a decree passes which enjoins the party to perpetual silence on the subject. This remedy is now scarcely ever resorted to, for, in general, since Lord Hardwick's Act (1766), there is sufficient certainty in the forms of legal marriage in England to prevent any one being in ignorance whether he or she is really married or not—a reproach which, however, is often made against the law of Scotland. The Scotch suit of a declarator of putting to silence, which is equivalent to jactitation of marriage, is often resorted to, the latest and most notorious instance of its use being that in the Yelverton marriage case.

JADE, a name somewhat vaguely applied to a number of minerals, not very dissimilar—nephrite, axestone, serpentine, &c. Nephrite and axestone appear to be the minerals of which *Jade* ornaments are generally made. But YU, or Chinese J., of which very beautiful vases and other articles are made in China, is supposed to be Prehnite (q. v.). J. of all kinds has a greenish colour, and when polished, has a rather dull and greasy aspect.

JAEN, formerly an independent Moorish kingdom, is now a province of Spain, forming a portion of the old province or kingdom of Andalusia (q. v.). It lies wholly within the basin of the Guadalquiver. Area, 5184 square miles; pop. (1870) 392,100. Conquered by the Moors on their entrance into Spain, J. maintained its independence as a Moorish state till 1234, when it fell into the hands of Ferdinand III., and was added to the kingdom of Castile.

JAEN, a city of Spain, capital of the province of the same name, is most picturesquely situated in a mountainous district, at the foot of a rugged castle-crowned hill, on the Rio de Jaen, a tributary of the Guadalquiver, about 50 miles north of Granada. It is surrounded by old Moorish walls, surmounted by numberless towers and pinnacles. Though situated in the midst of plenty, in a fertile neighbourhood, the town is poor. The principal buildings are two cathedrals and several hospitals. Outside the walls are charming well-watered fruit-gardens. Pop. 18,054. In former times, the town was called *Jayyenu-l-harir*, 'Jaen of the Silk,' on account of its silk manufactures, for which it was, but is no longer, famous.

JA'FFA. See JOPPA.

JAFFNAPATA'M, a seaport in Ceylon, on a

and a large proportion of the population of Dutch descent.

JAGE'LLONS, THE, the name of an illustrious dynasty which reigned in Lithuania, Poland, Hungary, and Bohemia. The name is derived from Jagellon, the last of a long line of hereditary grand dukes of Lithuania, who succeeded to his patrimonial possession in 1381, and was (1386) appointed successor to his father-in-law, Lewis the Great, king of Poland and Hungary, in the former of these kingdoms, after having embraced Christianity, and changed his name to Wladislas IV. He was engaged during the whole of his reign in repelling the attacks of the Teutonic Knights, whom he finally overthrew by the help of the Hussites of Bohemia. He made an unsuccessful attempt to wrest Hungary from the Emperor Sigismund, founded the university of Cracow in 1400, and died in 1434 at Grodek. His son, Wladislas V., king of Poland (1434—1444), was also elected king of Hungary on the death of Albert of Austria in 1439, mainly through the assistance of John Hunyady (q. v.), vaivode of Transylvania. After a war of two years' duration with the Emperor Frederick III., Wladislas turned his sword against the Turks, drove them repeatedly from Moldavia, Wallachia, and Bulgaria, and returned to his capital of Buda loaded with spoils. In 1444, Amurath II. sued for peace, which the warlike Wladislas granted, swearing a solemn oath by the Holy Evangelists; but the pope having, in defiance of all truth and equity, sent Cardinal Julian to cause a rupture of the treaty, and absolve Wladislas from perjury, that gallant prince summoned to his side John Hunyady, and being joined by Scanderbeg, at the head of an auxiliary force of Epirotes, invaded Turkey, but was totally defeated and slain at Varna (November 10, 1444); Cardinal Julian being also left dead on the field. He was succeeded in Poland by his brother Casimir IV. (1444—1492), whose three sons, John Albert (1492—1501), Alexander (1501—1506), and Sigismund (1506—1548), reigned in succession. Sigismund August (1548—1570), the son of this last, and one of the wisest of the Polish monarchs, added Livonia to his kingdom, and passed an edict of universal toleration. His sisters, Anne and Catherine, married respectively Stephen Bathori of Transylvania, and John III. of Sweden, and the Jagellon dynasty was continued on the Polish throne till 1668.

Wladislas, the fourth son of Casimir IV. of Poland, was elected king of Bohemia in 1471, on the death of George Podiebrad, and also succeeded Mathias Corvinus in Hungary in 1490. Wladislas died in 1516, and was succeeded in both kingdoms by his son, Lewis II., who was defeated and slain by the Turks at Mohacs (29th August 1526), and with whom terminated the Jagellons of Bohemia and Hungary.

JA'GER. See SKUA.

JA'GERNDORF, a small town of Austrian Silesia, is situated on the Oppa, 14 miles north-north-west of Troppau, has manufactures of cloth, hosiery, and linen. Pop. (1869) 8442.

JAGGERNAU'T, or JAGGERNAUT PURI, or PURI, is the name of a town in Orissa (85° 54′ long., and 19° 45′ lat.), celebrated as one of the chief places of pilgrimage in India. It owes its reputation to a temple erected there in honour of Vishnu, and containing an idol of this Hindu god, called *Jaggernaut* (commonly *Juggernaut*), a corruption of the Sanscrit word *Jagannâtha*, i. e., lord of the world. According to a legend related in the Ayeen Akbery, a king desirous of founding a city sent a learned Brahman to pitch upon a proper spot. The Brahman, after a long search, arrived upon the banks of the sea, and there saw a crow diving into the water, and, having washed its body, making obeisance to the sea. Understanding the language of the birds, he learned from the crow that if he remained there a short time, he would comprehend the wonders of this land. The king, apprised of this occurrence, built on the spot where the crow had appeared a large city and a place of worship. The Rajah one night heard in a dream a voice saying: 'On a certain day, cast thine eyes on the seashore, when there will arise out of the water a piece of wood 52 inches long, and 1½ cubits broad; this is the true form of the deity; take it up, and keep it hidden in thine house seven days; and in whatever shape it shall then appear, place it in the temple, and worship it.' It happened as the Rajah had dreamed, and the image called by him Jagannâtha became the object of worship of all ranks of people, and performed many miracles. According to another legend, the image arising from the water was an avatâra or incarnation of Vishnu; it was fashioned by Vis'wakarman, the architect of the gods, into a fourfold idol, which represented the supreme deity, and the temple itself was erected over it, and inaugurated by the god Brahmâ and his divine court. The present temple was finished in 1198 A.D., under the government of the celebrated Rajah of Orissa, Anang Bhim Deo. Whether the worship of Jaggernaut was originally one in honour of Vishnu or not, may be doubtful. The notoriety it has gained is due especially to the fanaticism which induced, and still induces, thousands of Hindu believers to sacrifice their lives, in the hope of attaining eternal bliss, by throwing themselves under the wheels of the chariot which carries in procession the idol of the god. It is just, however, to state that this practice, which in former times prevailed to a fearful extent, is greatly abating in our days.

JA'GGERY, the name given in the East Indies to the sugar obtained by inspissation from the sap (*nera* or *toddy*) of palms. The sap of many species of palm yields jaggery, and probably that of almost all species might be made to yield it. The cocoa-nut yields much of the jaggery of some parts of the East. It is, as generally sold and used in the East Indies, a coarse kind of sugar; chemically, it is the same with cane-sugar. The sap, which by inspissation yields jaggery, becomes also, by fermentation, palm-wine, and from it by distillation arrack is made.

JAGUAR (*Felis onça*), one of the largest of the cat tribe, and by far the most powerful and dangerous of the American beasts of prey. It is sometimes called the American Tiger. It is nearly equal to the tiger in size; the head is large, the body thick, and the limbs robust; the tail is long, and of equal thickness throughout. The colour varies considerably, but is usually a rich yellow, with large black spots and rings, small black spots generally appearing within the rings, a mark by which the skin of the J. may be readily distinguished from that of the other large spotted or ringed *Felidæ*. A black or very dark-brown variety occurs, but the characteristic markings may be seen in certain lights, deeper in colour than the rest of the fur. The J. is strong enough to drag away a horse, and swift enough to capture horses on the open pampas. It is chiefly, however, an inhabitant of forests. It abounds so much in some districts, that settlements have been deserted on account of the destruction of domestic animals. It climbs trees, however smooth the stem, and moves about with great agility among the branches, making even monkeys its prey. Instances of its attacking man, although they sometimes occur, are not frequent, but it is bold enough to approach enclosures, and even to enter villages in broad daylight, in quest of prey. The J. is often taken in traps; and it is sometimes hunted with dogs, when it generally at last takes refuge in a tree, and is there shot. The skins of jaguars are exported from South America in great numbers. The J. is found in almost all parts of South America, but its range does not extend north of the Isthmus of Darien. It is called Ounce (*Onça*) in some parts of South America.

Jaguar (*Felis onça*).

JAHN, Johann, a distinguished Roman Catholic orientalist and biblical critic, was born at Tasswitz, in Moravia, June 18, 1750, received his early education at Znaim and Olmütz, and in 1772 entered the Premonstratensian convent of Bruck, where he took his vows in 1774, and was appointed Professor of Oriental Languages and Biblical Criticism. On the suppression of this convent, in 1784, J. was transferred to the same professorship in Olmütz, and finally to the university of Vienna, where he also undertook the chair of Dogmatic Theology. So far as regards the Roman Catholic literature of Germany, J. may be regarded as the father of biblical criticism. But the boldness of some of his opinions having aroused the alarm of the ecclesiastical authorities, he was honourably removed from his chair in the university, by being promoted to a canonry of St Stephen's at Vienna, in 1803. He continued, however, to pursue the same studies with great reputation till his death in 1816, and published many works in both departments, the most important of which, passing over his grammars, lexicons, and elementary books of the Hebrew, Syriac, Chaldaic, and Arabic languages, are his *Introduction to the Old Testament*, 2 vols. 1792, and again in 4 vols. 1802—1803; *Biblical Archæology*, 5 vols. 1797—1805, of both which works a compendium appeared in 1804, and again in 1814; a *Manual of General Hermeneutics*, 1812; an Appendix of Dissertations to this work, 2 vols., in 1813—1815; and an edition of the Hebrew Bible, 4 vols. 1806. Five years after his death, a collection of posthumous *Remains* was published at Tübingen, 1821, the genuineness of which, although seemingly without reason, has been called in question. His works have gone through many editions in Germany, and have been translated into several languages.

JAIL FEVER (known also as Putrid or Pestilential Fever) is now considered to be merely a severe form of Typhus Fever (q. v.), and not a distinct disease. At the present time, owing to improved sanitary regulations, this form of disease is almost unknown; but we learn from Howard's

England, although unknown in those of the continental countries. In the celebrated Black Assize (q. v.), held at Oxford in 1577, there is no evidence that the disease prevailed amongst the prisoners, and yet it broke out among the persons present at the trial. It is little more than a century and a quarter ago (May 1750) that the lord mayor, an alderman, two judges, most of the jury, and a large number of spectators, caught this disease from attending the assizes at the Old Bailey; and many of those who were infected died.

JAI'NAS is the name of a heterodox sect of the Hindus, numerous adherents of which are found in every province of Upper Hindustan, in the cities along the Ganges, and in Calcutta, but more especially to the westward; the provinces of Mewar and Marwar being apparently the cradle of the sect. They are also numerous in Guzerat, in the upper part of the Malabar coast, and are scattered throughout the peninsula. They form a large, and, from their wealth and influence, an important division of the population of India. The name of the sect means a follower of *Jina*, the latter being one of the denominations of their deified saints; and as another name of these saints is *Arhat*, their followers are also called *Arhatas*.

The tenets of the J. or Arhatas are in several respects analogous to those of the Buddhists (see BUDDHA), but they resemble in others those of the Brahmanical Hindus. With the Buddhists, they share in the denial of the divine origin and authority of the Veda, and in the worship of certain saints, whom they consider superior to the other beings of their pantheon. They differ, indeed, from them in regard to the history of these personages, but the original notion which prevails in this worship is the same. With the Brahmanical Hindus, on the other hand, they agree in admitting the institution of caste, in performing the essential ceremonies called *Sanskâras* (q. v.), and in recognising some of the subordinate deities of the Hindu pantheon, at least apparently, as they do not pay especial homage to them, and as they disregard completely all those Brahmanical rites which involve the destruction of animal life. It deserves notice, too, that though rejecting in general the authority of the Vedas, they admit it, and quote the Vedic texts, if the doctrines of the latter are conformable to the Jaina tenets.

According to their doctrine, all objects, material or abstract, are arranged under nine categories, called *Tattwas*, truths or principles, of which we need notice only the ninth and last, called *Moksha*, or liberation of the vital spirit from the bonds of action—i. e., final emancipation. In reference to it, the J. not only affirm that there is such a state, but they define the size of the emancipated souls, the place where they live, their tangible qualities, the duration of their existence, the distance at which they are from one another, their parts, natures, and numbers. Final emancipation is only obtained 'in the state of manhood (not in that of a good demon or brute), while in possession of five senses, while possessing a body capable of voluntary motion, in a condition of possibility, while possessing a mind, through the sacrament of the highest asceticism, in that path of rectitude, in which there is no retrogression, through the possession of perfect knowledge and vision, and in the practice of abstinence.' Those who attain to final liberation do not return to a worldly state, and there is no interruption to their bliss. They have perfect vision and knowledge, and do not depend on works. See J. Stevenson, *The Kalpa Sûtra, and Nava Tattwa.*

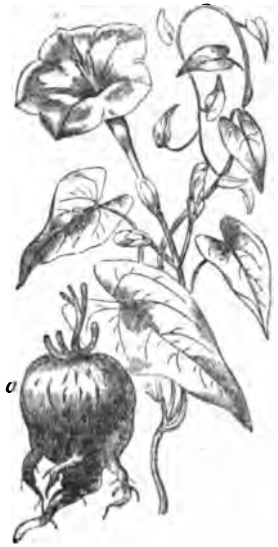
The principles of faith, as mentioned before, are divided into religious and lay orders, *Yatis* and *S'râvakas*. Both, of course, must place implicit belief in the doctrines of their saints; but the *Yati* has to lead a life of abstinence, taciturnity, and continence; he should wear a thin cloth over his mouth, to prevent insects from flying into it, and he should carry a brush to sweep the place on which he is about to sit, to remove any living creature out of the way of danger; but, in turn, he may dispense with all acts of worship; whilst the *S'râvaka* has to add to the observance of the religious and moral duties the practical worship of the saints, and a profound reverence for his more pious brethren. The secular Jaina must, like the ascetic, practise the four virtues—liberality, gentleness, piety, and penance; he must govern his mind, tongue, and acts; abstain, at certain seasons, from salt, flowers, green fruits, roots, honey, grapes, tobacco; drink water thrice strained, and never leave a liquid uncovered, lest an insect should be drowned in it; it is his duty also to visit daily a temple where some of the images of the Jaina saints are placed, walk round it three times, make an obeisance to the image, and make some offerings of fruits or flowers, while pronouncing some such formula as 'Salutation to the Saints, to the Pure Existences, to the Sages, to the Teachers, to all the Devout in the world.' The reader in a Jaina temple is a Yati, but the ministrant priest is not seldom a Brahman, since the J. have no priests of their own, and the presence of such Brahmanical ministrants seems to have introduced several innovations in their worship. In Upper India, the ritual in use is often intermixed with formulas belonging more properly to the S'aiva and S'âkta worship (see Hindu Sects under INDIA), and images of S'iva and his consort take their place in Jaina temples. In the south of India, they appear, as mentioned before, to observe also all the essential rites or Sanskâras of the Brahmanical Hindu. The festivals of the J. are especially those relating to events in the life of their deified saints; but they observe also several common to other Hindus, as the spring festival, the S'rîpanchamî, and others.

The J. are divided into two principal divisions, *Digambaras* and *S'wetâmbaras*. The former word means 'sky-clad,' or naked, but in the present day, ascetics of this division wear coloured garments, and confine the disuse of clothes to the period of their meals. *S'wetâmbara* means 'one who wears white garments;' but the points of difference between these two divisions are far from being restricted to that of dress: it is said to comprehend a list of 700 topics, of which 84 are considered to be of paramount importance. Amongst the latter are mentioned the practice of the S'wetâmbaras to decorate the images of their saints with earrings, necklaces, armlets, and tiaras of gold and jewels; whereas the Digambaras leave their images without ornaments. Again, the S'wetâmbaras assert that there are twelve heavens and sixty-four Indras; whereas the Digambaras maintain that there are sixteen heavens and one hundred Indras. In the south of India, the J. are divided into two castes; in Upper Hindustan, they are all of one caste. It is remarkable, however, that amongst themselves they recognise a number of families between which no intermarriage can take place, and that they resemble, in this respect also, the ancient Brahmanical Hindus, who established similar restrictions in their religious codes.

As regards the pantheon of the Jaina creed, it is still more fantastical than that of the Brahmanical sects, whence it is borrowed to a great extent, but without any of the poetical and philosophical interest which inheres in the gods of the Vedic time. The highest rank amongst their numberless hosts of divine beings—divided by them into four classes, with various subdivisions—they assign to the deified saints, which they call *Jina*, or *Arhat*, or *Tîrthakara*, besides a variety of other generic names. The J. enumerate twenty-four Tîrthakaras of their past age, twenty-four of the present, and twenty-four of the age to come; and they invest these holy personages with thirty-six superhuman attributes of the most extravagant character. Notwithstanding the sameness of these attributes, they distinguish the twenty-four Jinas of the present age from each other in colour, stature, and longevity. Two of them are red, two white, two blue, two black; the rest are of a golden hue, or a yellowish brown. The other two peculiarities are regulated by them with equal precision, and according to a system of decrement, from *Rishabha*, the first Jina, who was 500 poles in stature, and lived 8,400,000 great years, down to *Mahâvîra*, the 24th, who had degenerated to the size of a man, and was no more than 40 years on earth; the age of his predecessor, *Pârśwanâtha*, not exceeding one hundred years. The present worship is almost restricted to the two last Tîrthakaras; and as the stature and years of these personages have a reasonable possibility, H. T. Colebrooke inferred that they alone are to be considered as historical personages. As, moreover, amongst the disciples of Mahâvîra there is one, Indrabhûti, who is called *Gautama*, and as Gautama is also a name of the founder of the Buddha faith, the same distinguished scholar concluded that, if the identity between these names could be assumed, it would lead to the further surmise that both these sects are branches of the same stock. But against this view, which would assign to the Jaina religion an antiquity even higher than 543 before Christ—the date which is commonly ascribed to the apotheosis of Gautama Buddha—several reasons are alleged by Professor Wilson. As to the real date, however, of the origin of the Jaina faith, as the same scholar justly observes, it is immersed in the same obscurity which invests all remote history amongst the Hindus. We can only infer from the existing Jaina literature, and from the doctrines it inculcates, that it came later into existence than the Buddhist sect.—The best essays on the tenets, mythology, observances, and literature of this sect are those by Colebrooke in his *Miscellaneous Essays*, and by Wilson in the first volume of his works (London, 1862).

JAKU'TSK (*Yakootsk*), chief town of the territory of that name in Eastern Siberia (see SIBERIA). It is situated on the left bank of the river Lena, lat. 62° 1′ N., long. 119° 44′ E.; distance from St Petersburg, 5751 miles; pop. in 1867, 4982 inhabitants. The whole industry of the town consists in candle-works, but it is, notwithstanding, the principal market of Eastern Siberia for traffic with the native hunting tribes of the Jakuts and Buriats. The former, mostly nomadic tribes, possessing large herds of cattle and horses, bring butter to the market, which is despatched on horseback to the port of Okhotsk. The latter, also a nomadic tribe, bring to Jakutsk great quantities of fur-skins, of sables, foxes, martens, squirrels, bears, hares, &c. The most animated periods of the year are the months of May and June; in the former, the goods are despatched to the seaports; in the latter, an important fair takes place annually, during which the quantity of merchandise sold, chiefly furs and mammoth tusks, amounts to £50,000 in value. Manufactured goods, hardware, &c., are brought from Irkutsk by the Lena, and the passage, about 2200 miles, requires a whole month of navigation.

JA'LAP, a well-known purgative medicine, is the root of *Exogonium Purga*, a plant of the natural order *Convolvulaceæ*. It is found in Mexico, at an elevation of about 6000 feet above the level of the sea, in the neighbourhood of the town of Jalapa or Xalapa, from which the name jalap is derived. It is a perennial twining plant, with large flowers and a turnip-like root, varying from the size of a hazel-nut to that of a man's fist. The roots when fresh are white and fleshy, and abound in a milky juice. They are prepared for the market by drying. —Jalap was long erroneously referred to other plants, amongst others to *Mirabilis Jalapa*, known in our flower-gardens as *Marvel of Peru*.—The root known as *Male Jalap* or *He Jalap*, with which the true jalap of commerce is often adulterated, was recently declared by Mr Hartweg to be *Ipomœa batatoides*. Its properties are somewhat similar to those of true jalap, but it is very inferior.



Jalap (*Exogonium Purga*):
a, the root.

Jalap seems to have been first introduced into this country as a medicine about 1609.

The dried roots are brown and wrinkled externally, and of a deep yellowish-gray colour internally; their odour is faint and disagreeable, and their taste is nauseous. The active ingredient is the resinous portion, which varies from about 10 to nearly 20 per cent., and which is composed of two distinct substances, *Jalapine* ($C_{42}H_{35}O_{20}$) and *Jalapic acid*. Jalap resin may be distinguished from common resin by its insolubility in volatile oils. Jalap is a valuable cathartic, but is seldom given alone. Its purgative action is increased by the addition of a little calomel, and its hydragogue action by bitartrate of potash, while its tendency to produce griping is obviated by the addition of a little ginger. It is extremely useful in those febrile affections of children which are associated with constipation; and in diseases of the brain it is a good purgative to select, in consequence of its derivative action. In the form of *Compound Jalap Powder*, which consists of one part of powdered jalap, two parts of bitartrate of potash, and a little ginger, it is of great service in some kinds of dropsy, in consequence of its hydragogue action.

varies from ten to thirty grains, a scruple generally acting smartly and safely; for children under a year old the dose is from two to five grains. The dose of the compound powder is double that of the ordinary powder. The *Tincture of Jalap*, in the dose of one or two drachms, is a useful addition to the ordinary black-draught when it is desired to increase its activity.

JALA'PA, a city in the Mexican confederation, is second in importance among the towns of the state of Vera Cruz. It is on the grand route between the capital of the country and the seaport of Vera Cruz, and is about 60 miles west-north-west from the latter. Situated at an elevation of 4335 feet above the level of the sea, its climate may be said to be that of the temperate region, and it is a favourite resort of the invalids of the coast. Pop. about 10,000.

JAMAI'CA, aboriginally *Xaymaca*, or *Land of Wood and Water*, one of the West India Islands, and by far the most important of those belonging to Great Britain, is about 90 miles to the south of Cuba, and stretches in N. lat. between 17° 40′ and 18° 30′, and in W. long. between 76° 15′ and 78° 25′. Area, 6400 square miles (rather more than that of Yorkshire); greatest length, 150 miles; greatest breadth, 50 miles. It is traversed from east to west by a heavily-timbered ridge, called the Blue Mountains, which rises to about 7000 feet. From this range, at least 70 streams descend to the north and south shores, but owing to the shortness and declivity of their courses they are not navigable, with the exception of one, the Black River, which affords, for small craft, a passage into the interior for 30 miles. Excellent harbours are everywhere to be found. But incomparably the best of these is formed by a deep and capacious basin in the south-east quarter of the island, which washes the most spacious and fertile of the plains between the hill-country and the coast. Around this inlet, and within a few miles of each other, are all the considerable centres of population, Port Royal, Kingston, and Spanish Town.

The climate varies considerably—the torrid belt of the coast gradually passing into the temperate region of the central heights. The latter is said to be remarkably favourable to longevity; and, after having long been a retreat for the residents themselves, it has lately begun to attract invalids from the United States. To contrast two positions—the one near Kingston Harbour, and the other at the intermediate elevation of 4000 feet—their annual means are stated to be respectively 81° F. and 68° F. Earthquakes have occasionally occurred, one of them, in 1692, having almost overwhelmed Port Royal.

In 1861, the total population amounted to 378,433, of whom 13,816 were whites, and the remainder half-breeds or blacks. At the last census, that of 1871, the total population was 506,154, of whom only 13,101 were whites. It thus appears that in the preceding ten years there had been a falling off in the white population; while the blacks, or coloured men, had rapidly increased. On the productiveness and trade of the island, the emancipation of the slaves in 1834 had an unfavourable effect. But, even previously to the new order of things, the commercial crops had been steadily decreasing. To take by itself the grand staple of sugar, the last 3 years of the slave-trade, 1805—1807, had averaged fully 144,000 hogsheads; the 4 years before the commencement of the abolition of slavery, 1831—1834, under 91,000; the 4 years of gradual abolition, 1835—1838, nearly 70,000; the first 4 years of per-

revival of trade has set in appears from the last returns, according to which the values of sugar exported were, in 1869, £443,078; in 1870, £491,616; and in 1871, £592,163. In 1871, the chief exports were in value as follows: sugar, £592,163; rum, £271,267; coffee, £147,562; logwood, £115,423; while the chief imports were flour, £135,500, and salt-fish, £92,801. In the same year, the imports from the United Kingdom amounted to £1,331,185; the exports, to £1,248,685. In 1860, the revenue amounted to £262,239, and the expenditure to £255,239. In 1871, the revenue amounted to £434,564; the expenditure, to £430,154.

J. was discovered by Columbus during his second voyage in 1494, and was taken possession of by the Spaniards in 1509. So great was the inhumanity of the conquerors, that 50 years after the Spanish invasion of the island the native population is said to have entirely disappeared. On May 3, 1655, a British expedition, sent out by Oliver Cromwell, under Admirals Penn and Venables, assailed and captured the island, which was formally ceded to England by the treaty of Madrid in 1670. Under English rule, the chief events in the history of the island were, in 1795, the rebellion of the Maroons, a community of runaway slaves, who had obtained a tract of land on the north side of the island; in 1831, a negro insurrection; and on August 1, 1834, the emancipation of the slaves. The last event was followed by ill-judged concessions of representative and constitutional rights to the newly liberated blacks. The experiment proved a failure. The blacks considered it a grievance that offices in the magistracy were not more frequently conferred on them. They wished to suppress coolie immigration, which tended to keep down wages. They sought to obtain land without rent, and the more violent even suggested the expulsion of the whole white population of the island.

In 1865, the discontent was at its height. In October of that year, a decision of the local court at Morant Bay against a black squatter, led to a negro rising, and the massacre of 23 whites. Martial law was proclaimed by Governor Eyre, 1000 houses were burned, some rebels were hanged, others were flogged; but the rebellion was most effectually suppressed. For the course he had taken, Governor Eyre was thanked by the Jamaica Assembly; but in England a different view was taken of his conduct. (See EYRE in SUPP.) He was recalled, and the representative constitution was suspended. Sir P. J. Grant was appointed governor, with entire authority to manage the affairs of J., with the aid of advisers nominated as in the other West India Islands. A special correspondent of the *Times*, sent to the island in 1873, to report on its recent condition, in a letter published on 1st May, gives a very favourable account of its recent progress. He says that from the catastrophe of 1865, which proved so nearly fatal to the island, a new life has sprung. Crime has diminished; education has everywhere advanced among the black population, the sum devoted to the support of the schools having increased from £4622 in 1866, to £19,403 in 1872. New roads have been formed, harbours are being constructed, and an irrigation canal is in progress which will give fertility to 50,000 acres of the beautiful plain between Spanish Town and Kingston. Thanks to the Cuban refugees who have taken several of the long-forsaken sugar estates, property is looking up, and the official statements shew that the export trade is increasing. Although J. has not recovered its former commercial prosperity, the negroes cannot now be described as idle. They cultivate their provision grounds with care, and produce for sale enough sugar and coffee to obtain a considerable supply of imported and manufactured articles. Extreme poverty is unknown among them, and under their present government they are described as a law-abiding and inoffensive community. The special correspondent, in concluding his article, strongly recommends energetic young Englishmen of the wealthier class, who contemplate emigration, to take their capital to the highlands of J., and to settle there rather than in the United States or in South America.

JAMAICA BARK. See CARIBBEE BARK.

JAMAICA PEPPER. See PIMENTO.

JAMB, in Architecture, the side of the apertures in walls, such as doors, windows, fireplaces, &c.

JAMBOS. See EUGENIA.

JAMES (Gr. *Jacōbos*, and really the same word as Jacob) is the name borne by two or three persons in the New Testament. These are James the son of Zebedee, and James the 'brother' or 'cousin' of our Lord, who is considered by many to be the same as James the son of Alpheus. JAMES the son of Zebedee, surnamed the *Elder*, was the brother of the apostle John, and before his call to the apostleship was a fisherman. After the ascension of Christ, he seems to have remained at Jerusalem, and was the first of the apostles to suffer martyrdom, being slain by Herod in the year 44 A. D. There is an incredible legend of his having planted the gospel in Spain, and he is the patron saint of that country.—JAMES the 'brother' or 'cousin' of our Lord, surnamed the *Less*, the other apostle of this name, appears to have resided, like James the *Elder*, chiefly in Jerusalem. From the glimpses of him which are obtained in the Acts of the Apostles and the Epistle to the Galatians, it is clear that he presided over the mother-church of Jerusalem. According to the tradition recorded by Hegesippus (who flourished about the middle of the 2d c.), he was considered a miracle of 'righteousness,' even by the unbelieving Jews, who gave him the name of the *Just*. The enmity of the more bigoted Jews, however, procured his condemnation, and the high-priest Ananus gave order that he should be stoned to death. According to Josephus, the execution of the sentence excited great dissatisfaction among the people of Jerusalem. The date of his death cannot be precisely fixed, but it was probably about 62 or 63 A. D. THE EPISTLE GENERAL OF JAMES is regarded by most theologians as a composition of his. The primitive church, however, placed it sometimes among the *antilegomena* (or scriptures of doubtful genuineness), and sometimes even among the *notha* (or spurious scriptures). In the 4th c., its authority increased; and the Council of Carthage (397 A. D.) pronounced it 'canonical.' This, of course, did not settle the question of its authenticity; and at the period of the Reformation, both its authenticity and religious teaching were attacked by Erasmus and Cajetan (in the Roman Catholic Church), by Lucar (in the Greek Church), and by Luther, who called it 'a downright strawy epistle,' the work of some unknown James, who misunderstood the doctrines of the Apostle Paul. Modern divines, generally, profess to see no discrepancy between the teaching of the two apostles, and imagine that they are looking at the same great verity from different but not contradictory stand-points (see JUSTIFICATION). The style is clear, polished, and poetical, very little disfigured with Hebraisms, and indicating that its possessor was a man of superior culture. Compare Alford's *Greek Test.* vol. 4 (Lond. 1859).

JAMES I., king of Scotland (1406—1437), was the second son of Robert III., by Annabella Drummond, daughter of Sir John Drummond of Stobhall. His elder brother, the Duke of Rothesay, having been murdered by his uncle, the Duke of Albany, J. became heir to the throne. Fearing that he also might be sacrificed to the unscrupulous ambition of Albany, his father resolved to send him to France. Accordingly, in 1405, he set sail for that country, but he never reached it; the vessel in which he was embarked having been taken by the English. J. himself was carried to London, and sent to the Tower. In 1407, he was removed to Nottingham Castle. In 1417, he accompanied Henry V. in his expedition to France. On the death of Robert III., in 1406, the government devolved on the Duke of Albany. On his death, in 1419, his son Murdoch succeeded to the regency. In 1424, J.'s long captivity came to an end: on giving hostages for payment of £40,000, he was allowed to return to his kingdom. Previous to leaving England, he married Joanna, daughter of the Earl of Somerset, fourth son of John of Gaunt. To the excellent education which he had received in England, J. was indebted for the development of his very considerable powers of mind. His poems, *Christ's Kirk on the Green* (the authorship of which, however, is disputed), and *King's Quhair*, shew him to have been possessed of high poetic talent. With the acts of his first parliament, in 1424, the regular series of Scotch statutes may be said to begin. Many excellent laws were passed for the regulation of trade, and for the internal economy of the kingdom; while these were followed up by an executive vigour which Scotland had never known before. No sooner did J. feel himself firmly seated on the throne, than he resolved to execute vengeance on the Albany family. By a parliament held at Perth in 1425, the two sons of the late Regent Murdoch, and his father-in-law, the Earl of Lennox, were found guilty of certain crimes laid to their charge, and immediately beheaded. The next few years of J.'s reign are among the most really peaceful in the history of Scotland previous to the union of the crowns; the whole efforts of the king being directed to the repression of the internal disorders of the kingdom; especially of the Highlands, where scarcely any law except that of the strongest had hitherto been known. In 1436, J.'s eldest daughter, Margaret, was married to the Dauphin of France, afterwards Louis XI. Amongst those whom the wisely severe policy of the king had offended was Sir Robert Graham, uncle of the Earl of Strathearn. He had been imprisoned in 1425, on the impeachment of the Albany family. Owing to this cause, or to some real or imaginary injury done to his family, Graham was so irritated, that in 1435 he actually used treasonable language to the king himself when presiding in parliament. For this he was banished, and his possessions declared forfeited. He retired to the Highlands, to brood over a plan of revenge, which circumstances soon put it into his power to execute. In 1437, the court held the Christmas festival at Perth. The king was about to retire for the night, when the sound of men in armour was heard outside the gates. It was Graham, accompanied by 300 armed men. The locks of the chamber-door having been purposely spoiled, Catherine Douglas, with a spirit worthy of her name, thrust her arm into the staple, to make it serve the purpose of a bar; but her arm was broken, and the ruffians entered the chamber. The king, who had hidden himself in an aperture under the floor, was discovered, dragged out, and cruelly murdered, in the 44th year of his age. Graham and the other ringleaders were afterwards seized, tortured, and put to death. J. was unquestionably the most able of the Stuart family. Both high order.

JAMES II., king of Scotland (1437—1460), was the son of James I. and Queen Joanna, and was born in 1430. He was crowned at Edinburgh when only in the sixth year of his age. Sir William Crichton, the Chancellor, and Sir Alexander Livingston, contrived to keep possession of the person of the young king, and consequently to wield the royal authority until he had reached his fourteenth year. The power of the House of Douglas had now risen to so great a height as almost to overshadow that of the crown. In the hope of curbing it, Crichton had treacherously caused William, the young earl, and his brother to be put to death. The policy of the act proved to be as bad as its spirit, for by the marriage of the heiress of the murdered youth with her cousin, the family was restored to more than its former power. The young king, tired of the rule of Crichton, put himself under the control of Douglas. A parliament was held, by which Crichton and Livingston were declared rebels, and their estates forfeited. Under the rule of the earl, the kingdom fell into complete anarchy, and became one scene of violence and disorder. Douglas, however, maintained the warlike renown of his House; in 1448, the English having invaded Scotland, he gave them battle on the banks of the little river Sark, in Annandale, and defeated them with very considerable slaughter. In 1449, J. married Mary, daughter of Arnold, Duke of Gelderland. The character of the king appears to have been much strengthened after his marriage. Like most of the Stuarts, he possessed great animal courage; he seems also to have possessed much of his father's clearness of perception in framing laws, and of his energy in enforcing their observation. Chafing under the sway of Douglas, he resolved to assert his independence. Crichton, who had previously contrived to make terms for himself, was constituted the royal adviser. Douglas, driven from power, formed an alliance with the Earl of Crawford. By the union of these two powerful nobles, it seemed that the royal authority in Scotland had virtually become extinct. J. had recourse to treachery: he invited Douglas to visit him at Stirling Castle, where, picking a quarrel with him, he murdered the earl with his own hand. But the power of the Douglas family was not yet broken. Through the aid of the House of York, then dominant in England, and by the martial influence of his name, the heir of the murdered earl was enabled to raise the standard of rebellion at the head of an army of 40,000 men. But J., listening to the wise advice of his councillor Kennedy, soon succeeded in quelling this insurrection. Douglas was compelled to flee; and his lands were granted to the Earl of Angus. In 1460, from causes not clearly known, J. infringed an existing truce with England, by laying siege to the castle of Roxburgh, then in the hands of the English. While he was standing beside one of the rudely made cannons of that time, the gun burst, and a fragment striking him, produced almost immediate death. He died in the 29th year of his age, and 24th of his reign.

JAMES III., king of Scotland (1460—1488), was the son of James II. and Mary of Gelderland, and was born in 1453. On the death of his father, the government appears to have been conducted by his mother, guided by the wisdom of Bishop Kennedy. On the death of the latter in 1465, the young king fell into the hands of Lord Boyd and his family. In 1467, so great influence had they acquired, that J. gave his sister in marriage

Thomas being at the same time created Earl of Arran. On the king's marriage, however, in 1469, with Margaret of Denmark, power changed hands: Lord Boyd was obliged to flee, and even Arran was driven into exile; in which condition he died. In 1474, his widow married Lord Hamilton; of which marriage were born James, created Earl of Arran in 1503, and Elizabeth, who married Matthew, Earl of Lennox. J. was all his life under the influence of favourites. Conspicuous among these was a man named Cochran, originally a mason. Through his means, the Duke of Albany, brother of J., was forced to flee from the kingdom, having been charged with witchcraft; while the Earl of Mar, also a brother of the king's, was actually put to death on the same absurd accusation. The rule of Cochran and other low-born favourites became intolerable to the haughty Scotch nobility. Disputes having arisen with England, and an English force having advanced on Berwick, J. put himself at the head of an army to oppose the invaders. Angus, Crawford, Argyle, and others resolved to profit by this opportunity to rid themselves of the obnoxious favourite. They met in council to deliberate upon their plans. It was on this occasion that Angus acquired his well-known sobriquet of 'Bell the Cat.' The result was, that Cochran and five other of the leading favourites were seized and summarily hanged. The king himself was imprisoned within the castle of Edinburgh. The banished Duke of Albany had joined the English army. On a treaty being made, he was, by some unknown means, restored to his brother's favour. He did not long hold it, however. In 1487, Margaret of Denmark died. J.'s love of pursuits which, for the age in which he lived, were intellectual, brought upon him the contempt of a warlike and illiterate nobility—a contempt on which the weakness of his moral character imposed no check. A conspiracy, whose origin is obscure, ended in a rebellion, having for its avowed object the dethronement of the king. Many of the peers, however, remained loyal, so that J. was enabled to put himself at the head of a considerable force. But, mainly through the cowardice of the king, the royal army was defeated at Sauchie, 18th June 1488. J. escaped from the field; but he was afterwards discovered by one of the rebels, and murdered. He died at the age of 36.

JAMES IV., king of Scotland (1488—1513), was the son of James III. and Margaret of Denmark, and was born March 17, 1472. A movement, headed by the Earl of Lennox, having for its object the subversion of the new government, was soon quelled; and the rule of the young king gave promise of being both vigorous and popular. The avarice of the preceding reign was followed by a profusion which conciliated the nobles; while the king's personal beauty and open manner won the hearts of the people. The naval exploits of Sir Andrew Wood of Largo, in the beginning of this reign, are worthy of note. With a greatly inferior force, he twice defeated the English; on one occasion, capturing as many as five of their ships of war. Instead of avenging this defeat by force of arms, Henry VII., then reigning in England, wisely resolved to endeavour to win Scotland by conciliation and policy. He proposed a marriage between J. and his daughter Margaret; but his wise schemes were for a long time frustrated by the gold and intrigue of the king of France. But at length the prudence of Henry prevailed, and in 1503, J. married Margaret of England. By a treaty then entered into between England and Scotland, the first peace since 1332 was established between the two countries.

The king of England saw what none of his predecessors had been able to see—that he could easily gain by policy what it was hopeless to attempt to seize by force. Had he lived longer, a lasting amity might have been established between the two countries; but his son and successor was even hotter and more headstrong than J. himself. The English treaty was followed by a period of almost unexampled peace and prosperity; but by the death of Henry VII., in 1509, all this fair prospect was destroyed. It was not, however, until Henry VIII. had been two years on the throne that a rupture took place between the two kings. J. had demanded reparation for an alleged outrage on the Scottish flag; Henry had returned a contemptuous answer. He had further irritated the Scotch king by countenancing certain English border chieftains who had been accessory to the murder of Sir Robert Ker; he had also declined to deliver a legacy of jewels bequeathed to Queen Margaret by her father. Long and angry negotiations followed, which ended in James's rash and fatal invasion of England in the summer of 1513. The disastrous battle of Flodden (q. v.) was fought on the 9th September of that year. The body of James was found on the field after the battle. He died in the 41st year of his age, and 26th of his reign.

JAMES V., king of Scotland (1513—1542), was the son of James IV. and Margaret of England. He was born at Linlithgow, 10th April 1512. The period of his long minority is one of the gloomiest in Scottish history. Such was the lawless state of the country, that it was impossible to pass from one place to another except in armed companies. The Duke of Albany was chosen regent by the parliament, but his government was almost powerless, owing chiefly to the jealousy and enmity of the Earl of Angus, who had married the queen-mother. Ultimately, Angus prevailed, and the duke retired to France. For a while, the Angus branch of the Douglas family ruled Scotland in the same manner as the elder branch had ruled it in the beginning of the reign of James II. When in his seventeenth year, the king, resolved no longer to brook the authority of the earl, escaped from his custody. Angus and his family were banished, and their estates declared forfeited. In 1536, J. visited the court of France; and on the 1st January 1537, he was married to Magdalen, daughter of Francis I. This amiable queen lived for but a few weeks; and in the same year, J. was again married. His second wife was Mary of Lorraine, daughter of the Duke of Guise. Henry VIII. having declared his independence of the pope, became desirous that his nephew should follow his example; but J. remained true to his ancestral faith. The king had two sons by Mary of Guise, but they both died in infancy, within a few days of each other—an event which seems to have greatly affected the mind of James. With the view of gaining his nephew over to his ecclesiastical views, Henry proposed that they should have an interview at York. He actually went to that city, and remained in it for six days, expecting the arrival of J., who never came. This piece of real or fancied neglect greatly enraged Henry. In 1542, the English having made an incursion across the border, were attacked and defeated with great loss by the Earls of Huntly and Home. To avenge this defeat, Henry sent the Duke of Norfolk into Scotland with an army of 20,000 men.

Negotiations for peace having failed, J. raised an army of 30,000 men to oppose Norfolk. The spread of the Reformation had now begun to divide the kingdom; the nobles being mostly on the reformed side, while the king sided with the clergy. When the Scottish army had reached Fala, news arrived of Norfolk's retreat. The nobles, actuated either by disloyalty, or by thoughts of Flodden, declined to follow the king in an invasion of England, upon which he was bent. While this controversy was pending between J. and the nobles, a report arose that Oliver Sinclair, a royal favourite, had been appointed to the chief command. The army became a scene of tumult and disorder. While in this disorganised state, it was attacked by Dacre and Musgrave, two English leaders, at the head of 300 men. The Scotch were utterly routed. This dishonour to his arms seems quite to have broken the heart of James. He shut himself up in Falkland Palace, where he died, December 13, 1542, seven days after the birth of his unfortunate daughter Mary, in the 31st year of his age, and 30th of his reign.

JAMES I. of England and VI. of Scotland (1567 [England 1603]—1625), only son of Mary, Queen of Scots, and Henry Lord Darnley, was born within the castle of Edinburgh, 19th June 1566. On his mother's forced resignation of the crown, J. was proclaimed king of Scotland, 29th July 1567. The direction of his childhood devolved principally on the Earl of Mar. His classical education he received from the famous George Buchanan. In 1578, the Earl of Morton, then regent, was driven from power, and J. nominally assumed the direction of affairs. But the new government was unpopular, and Morton soon succeeded in re-establishing himself. His fall was, however, ultimately effected by the united influence of the Duke of Lennox and of the Earl of Arran. Morton was condemned and executed on the charge of having been accessory to the murder of Darnley. After his death, Lennox and Arran ruled for some time without control. On the 12th of August 1582, however, a party of the nobles seized the king at Ruthven Castle; and by authority thus acquired, they imprisoned Arran, and banished Lennox. In 1583, a counterplot restored J. to freedom; he immediately restored Arran to power. The confederate lords were obliged to flee to England. In 1585, through the connivance of Queen Elizabeth, they returned, and with an army of 10,000 men, obliged J. to capitulate in Stirling Castle. Arran was again banished. In 1586, Queen Mary, then a prisoner in England, was condemned by the English court to be executed. Though J. remonstrated strongly, he nevertheless, after his mother's execution, concluded an offensive and defensive alliance with England. In the winter of 1589, J. went to Denmark, where he married the Princess Anne, daughter of Frederick II., king of that country. From 1591 to 1594, the kingdom was disturbed by various treasonable attempts by the Earls of Bothwell, Huntly, and other Roman Catholic lords. It was not till J. had marched against Huntly in person that these disturbances were suppressed. Long ecclesiastical disputes followed between king and clergy. In 1600, occurred the Gowrie Conspiracy (q. v.). By the death of Elizabeth in 1603, J. succeeded to the throne of England. He soon became unpopular with his new subjects. The anger of the Roman Catholics at the severities used towards them was the cause of the famous Gunpowder Plot (q. v.). The treason was discovered on the 5th of November 1605. Nor did time increase the popularity of J. with any class of his subjects. Weak and good-natured, he impoverished his exchequer to enrich parasites; he degraded the prerogative of the crown by the sale of titles of dignity; the title of baronet, which he originated, could be bought for £1000, a barony for £5000, and an earldom for £20,000. A Scotchman of the name of Carr became the royal favourite about the year 1607; honours and emoluments were showered

Buckingham. Under these minions, the name and power of England, so formidable under Elizabeth, sunk to insignificance. In 1617, J. revisited Scotland; a visit which his angry disputes with the clergy did not give him much leisure to enjoy. In 1619, his eldest son, Henry, Prince of Wales, died, to the great grief of the nation. J. had set his heart upon effecting a marriage between his son Charles (now Prince of Wales) and a Spanish princess. For some time, it seemed as if his design would succeed; and in 1623, Charles actually went to the court of Spain, along with Buckingham, to prosecute his suit. Buckingham, however, having quarrelled with the leading men of the Spanish court, the negotiation ultimately failed through his pique. A war with Spain was the result. J. died on 27th March 1625. He was aptly termed by Sully 'the wisest fool in Christendom.' 'He was indeed,' says Macaulay, 'made up of two men—a witty, well-read scholar, who wrote, disputed, and harangued, and a nervous, drivelling idiot who acted.' His reign is interesting to the student of English constitutional history, as it was during it that parliament may be said to have taken its first decided stand in its long contest with the crown. The parliament of 1621 is especially memorable on this account.

JAMES II. of England and VII. of Scotland (1685—1688), son of Charles I. and Henrietta Maria, was born 15th October 1633. In 1643, he was created Duke of York. In 1648, during the civil war, he made his escape to France. For some time he served in the French army under Turenne; but on peace being made with Cromwell, he was obliged to leave both the army and territory of Louis XIV. He then entered into the military service of Spain. At the Restoration, he was made Lord High Admiral of England, twice commanding the English fleet in the ensuing wars with the Dutch. In 1660, he married Anne, daughter of Lord Chancellor Hyde. On the death of the Duchess of York in 1671, J. avowed his conversion to popery. On the passing of the Test Act in 1673, he was obliged to resign office. On the 21st November 1673, he married Mary Beatrice, daughter of the Duke of Modena. During the great irritation against the Roman Catholics which arose in England on the publication of Titus Oates's supposed discoveries, the Duke of York resided for a short while on the continent. The bill for his exclusion from the throne was twice read before the House of Commons, and only prevented from passing by the prorogation of parliament, 26th May 1679. In 1680, the Exclusion Bill passed in the House of Commons, but was rejected in the House of Lords. On his return from abroad, and while the Exclusion Bill was before parliament, the duke was sent down to govern Scotland. On the death of Charles II., 6th February 1685, J. succeeded to the crown without opposition. He had scarcely been many hours a king when he violated the fundamental laws of the constitution by continuing the levy of customs, settled on the late king for life only, without the authority of parliament. At war with his parliament, in order to obtain money, J. was forced to become the pensioner of Louis XIV. In Passion Week 1685, the rites of the Church of Rome were openly celebrated at Westminster with full splendour. In the same year, the suppression of the Duke of Monmouth's rebellion in England, and that of the Earl of Argyle in Scotland, was followed by great severities. On the western circuit alone, well known as the Bloody Assize, presided over by the infamous Jeffreys, 320 persons were hanged. On the meeting army, which was a favourite scheme of his. He noticed in his speech, that in some recent appointments he had thought fit to dispense with the Test Act. After a stormy debate, government was finally beaten on the question of supply. To aid his endeavours in favour of the Roman Catholics, J. resolved to try to conciliate the Puritans, much as he hated them. On the 4th of April 1687, appeared the memorable Declaration of Indulgence, in which he announced his intention of protecting dissenters in the free exercise of their religion; and the nation beheld the extraordinary spectacle of the House of Stuart leagued with republican and regicide sects against the old Cavaliers of England. The attempt to conciliate the Puritans was, however, unsuccessful; and in March 1687, it began to be evident that the war between king and church must soon reach a climax. At that time, a vacancy having occurred in the presidency of Magdalen College, Oxford, a royal letter came down recommending Anthony Farmer, a Roman Catholic, to the vacant place. For Farmer was afterwards substituted Parker, Bishop of Oxford. He was known to be a Roman Catholic, though not avowed; besides which, he laboured under other legal disqualifications. The Fellows of the college declined to elect him. A special ecclesiastical commission was then sent to Oxford, escorted by three troops of cavalry with drawn swords. Parker was installed, the Fellows expelled, and declared for ever incapable of holding any church preferment. On the 27th April 1688, J. published a second Declaration of Indulgence; this he ordered to be read in all the churches in the kingdom. The order was generally disobeyed by the clergy, and seven of the bishops having ventured on a written remonstrance, were committed to the Tower on a charge of seditious libel. On the 10th June of the same year, J.'s luckless son, known in history as *The Pretender*, was born. The history of the trial and acquittal of the seven bishops on the 29th June 1688, forms one of the most glowing passages in the splendid narrative of Macaulay. On the night of the same day, an invitation was despatched to William, Prince of Orange, signed by seven of the leading English politicians, to come over to England and occupy the throne. On the 5th of November, William landed at Torbay with 14,000 men. J. found himself deserted by the nobility, gentry, and army; even his own children turned against him. He retired to France, where he was hospitably received by Louis XIV., who settled a revenue upon him. Early in March in the following year, he made a hopeless attempt to regain his throne by invading Ireland with a small army, with which he had been furnished by the king of France; he was totally defeated at the battle of the Boyne, 1st July 1690. He returned to France, continuing to reside at St Germain's till his death; 6th September 1701. There is hardly a sovereign mentioned in history of whom one can find less good to say than of James II.

JAMES, George Payne Rainsford, a fecund and popular novelist, was born in London in 1801, and commenced the career of authorship at an early age. Before he reached the age of 17, he wrote seven eastern tales, entitled *The String of Pearls;* but the first work that bore the author's name was *Richelieu*, which appeared in 1825. From this period till his death, which happened 9th June 1860, in Venice, where he held (since 1858) the office of British consul, his publications were, we might almost say, incessant. The principal are —*Darnley*, *De L'Orme*, *Philip Augustus*, *Henry Masterton*, and *Mary of Burgundy*. He also composed some poetry, and several historical works of a biographical kind, such as *Charlemagne*, *The Black Prince*, and *Richard Cœur de Lion*. J.'s writings are cheerful and pleasant in spirit, but his notions of the romantic, whether in scenery or character, are entirely conventional, and are apt to make quick-witted readers smile at the juvenility of the author's fancy.

JAMES, John Angell, an eminent Congregationalist minister, was born at Blandford, Dorsetshire, June 6, 1785, studied for a short time at a dissenting college at Gosport, and was placed on the 'preaching list at seventeen.' He was highly popular, and when only twenty, was settled as pastor of the 'church meeting in Carr's Lane,' Birmingham, where he remained till his death, 1st October 1859. In the course of years, Angell James came to be considered the most important and influential public man in connection with his own denomination, and on account of his 'evangelical' views of religion, he was also much esteemed both by the Low-Church party in the English Establishment, and by dissenters generally in Scotland and America. He published a multitude of sermons, tracts, addresses, and small religious volumes (the best known being the *Anxious Inquirer*), which had—and some of them still have—a vast circulation.—See Dale's *Life and Letters of John Angell James* (Lond. 1862).

JAMES RIVER, an important river of North America, formed by the union of the Jackson and Cowpasture streams, rises near the middle of Virginia, and has its entire course in that state. It flows in an east-south-east direction, passing Lynchburgh and Richmond; and widening into an estuary for the last 60 miles of its course, it falls into the Atlantic at the southern extremity of Chesapeake Bay. It is 450 miles in length, and is navigable to Richmond, 150 miles from its mouth. Its chief tributaries are the Appomattox on the right, and the Chickahominy on the left bank, made historical by the battles of 1862. It was at Jamestown, 32 miles from the mouth of this river, that the first English settlement in America was formed, 1607. By the James River and Kanawha Canal, which extends westward along the upper course of the river, from Richmond to beyond the Blue Ridge, the navigation of the James is carried into the centre of Virginia.

JAMES TOWN, the chief place and only seaport of St Helena (q. v.).

JA'MESTOWN, a village in New York, United States of America, 58 miles south-west of Buffalo, on Chatauque Lake, and near Lake Erie. It has a large trade and considerable manufactures. Pop. (1870) 5336.

JAMES'S BAY, a southerly arm of Hudson's Bay, extends in lat. from 51° to 55° N., and in long. from 79° to 82° 30′ W. It is so beset with islands, that its navigation is more dangerous than that of the other divisions of the same inland sea. Near its southern extremity is situated Moose Factory, the most important station, next to York Factory, of the Hudson's Bay Company on the coast.

JAMES'S PALACE, St, a large inelegant brick structure, fronting towards Pall Mall, succeeded Whitehall as the London residence of the British sovereigns, and remained as such from William III. to Victoria. It was reconstructed and made a manor by Henry VIII., having before been a hospital dedicated to St James; Henry also annexed to it a park, which he enclosed with a brick wall, to connect St James's with Whitehall, the then royal residence. Additions and improvements gradually made, totally changed the original palace, so that at the present time little, if any, of the old structure remains. In 1837, the royal household was transferred to Buckingham Palace, and St James's is now used only for levees and drawing-rooms.—The Court of St James's is the usual designation of the British Court.

St James's Park lies southward from the palace, and extends over 87 acres. Within the last forty years, it has been greatly improved, and is now richly embellished with avenues of trees, and a fine piece of water in the centre, which is stocked with waterfowl. On the east side is *the Parade*, where the body-guards on duty are mustered, and where the regimental bands perform in fine weather. On the outskirts are situated the Buckingham and St James's Palaces, Stafford House, Marlborough House, &c.

JAMES'S POWDER is a patent medicine discovered by a Dr Robert James, who was admitted as a licentiate of the College of Physicians in 1765, and died in 1776, aged 73. The fame that he might otherwise have acquired was tarnished by his patenting his 'fever powders,' and still more by his falsifying the specification to such an extent as to render it impossible to prepare the powder from his directions. Hence the *Compound Powder of Antimony* has been substituted for it in the British pharmacopœias. From the analysis of the patent medicine, for which one or two London chemists assert that they have the true original prescription, it appears to consist of more than 50 per cent. of triphosphate of lime, which must be altogether inert as an anti-febrile medicine; of from 35 to 45 per cent. of antimonious acid, and a little antimonite of lime and teroxide of antimony. The pharmacopœial preparation very closely resembles it. Both James's Powder (prescribed under the title of *Pulvis Jacobi veri*) and antimonial powder are very uncertain in their operation, at one time possessing considerable activity, and at another being almost inert. Either may be prescribed in doses of about five grains, as a sudorific in fevers and rheumatic affections, and may be given alone, or in combination with a few grains of calomel.

JAMESON, Rev. John, D.D., a meritorious Scotch scholar, was born in Glasgow, March 3, 1759, studied for the ministry, and in 1781 was ordained pastor of a congregation at Forfar, in connection with the Antiburgher Secession body. In 1797, he was translated to Edinburgh, where he died July 12, 1838. J.'s reputation as a man of letters rests on his *Etymological Dictionary of the Scottish Language* (1808—1809), of which he published an abridgment in 1818, and to which he added a supplement in 1825. It is a work of great industry, and very considerable value as a collection of Scotch words, phrases, customs, &c.; but it possesses little critical or philological merit, according to the present standard. His preliminary dissertation on the 'Origin of the Scots' Language' is an elaborate but unsuccessful attempt to prove that the Scottish Language is really the Pictish language; and that the Picts were not Celts, but Scandinavian Goths. Among J.'s other performances may be mentioned, *An Historical Account of the Ancient Culdees of Iona* (1811); *Hermes Scythicus, or the Radical Affinities of the Greek and Latin Languages to the Gothic* (1814); *An Historical Account of the Royal Palaces of Scotland;* an edition of Barbour's poem, *The Bruce* (1820); and Blind Harry's *Sir William Wallace*.

JAMESON, Robert, distinguished as a naturalist, was born at Leith, July 11, 1774, and died in Edinburgh, April 28, 1854. Although originally intended led him to devote himself to various branches of natural history. After having given evidence of considerable ability and indefatigable industry in various able memoirs, he went in 1800 to Freyberg, to study under Werner. He was elected in 1804 to the chair of Natural History in the university of Edinburgh; and during the term of his professorship, numbered among his students many of the best naturalists of the present day. In 1808, he founded the Wernerian Society of Edinburgh; and in 1809, brought out his *Elements of Geognosy*, in which he gave a comprehensive exposition of the Neptunian theory as it had been modified by Werner. In 1819, he founded, in concert with Sir David Brewster, the *Edinburgh Philosophical Journal*, and in 1826 the *Edinburgh New Philosophical Journal*, of which he continued to be the editor till his death. His principal works, in addition to those we have already mentioned, are *A System of Mineralogy* (1804); *A Mineralogical Description of the County of Dumbarton* (1805), which was intended to have been the first of a series of similar works on all the counties of Scotland; *Manual of Minerals and Mountain Rocks*, &c. (1821); and *Elements of Mineralogy* (1837). The Natural History Museum of the university of Edinburgh was largely indebted to the care and skill of J., for, besides having carefully arranged its collections, which had been almost created by his own donations, and those of a few other scientific men, he obtained, by his representations to government, an annual grant for its maintenance. He was a fellow of almost all the learned societies of Europe.

JAMESON, or **JAMESONE**, GEORGE, an eminent Scotch portrait-painter, called by Walpole *the Van Dyck of Scotland*, was born at Aberdeen in 1586. Of his early history, nothing is known. He was at Antwerp in 1616, studying under Rubens, had Van Dyck as a fellow-pupil, and returned to Scotland in 1628. He was first patronised by Sir Colin Campbell of Glenorchy, for whom he painted many portraits of the kings and queens of Scotland; among others, 'Robert Bruce' and 'David Bruce.' His great talents being at once acknowledged, he was largely patronised by the nobility, and in 1633 Charles I. sat to him. He died at Edinburgh in 1644. Though the pupil of Rubens and associate of Van Dyck, his productions bear very little resemblance to those of either of these great masters; distinguished for their clearness of outline, delicacy and softness of shading, and beauty of colour, they have neither the richness of the former nor the vigour of the latter. Though celebrated only as a portrait-painter, he has left numerous historical, miniature, and landscape pieces. His productions are very numerous; the largest collection of them is in the possession of the Earl of Breadalbane; and many others of the Scotch nobility possess paintings by him; there are also several in the halls of the university of Aberdeen.

JAMESON, MRS ANNA, an English authoress, born in Dublin, May 19, 1797. She was the daughter of Mr Murphy, a painter, and was married in 1827 to a Mr Jameson, a barrister, but soon after separated from her husband, and devoted herself to literature. She died 17th March 1860. Her principal works are—*Diary of an Ennuyée* (1826); *Loves of the Poets* (1829); *Characteristics of Shakspeare's Women* (1832); *Memoirs of the Early Italian Painters*, &c. (1845); *Sacred and Legendary Art* (1848); *Legends of the Monastic Orders* (1850); *Legends of the Madonna* (1852); *Commonplace Book as represented in Christian Art* (1860).

In all her writings, Mrs J. evinces a fine fancy, a delicate, womanly perception of the beautiful, and a genuine poetic enthusiasm. She is regarded as one of the first art-critics England has produced.

JA'MROSADE. See EUGENIA.

JAMU', a town and fort in the north of the Punjab, is in lat. 32° 44′ N., and long. 74° 54′ E. It stands, amid the more southerly mountains of the Himalaya, on both banks of an affluent of the Chenab, the town on the right side, and the fort on the left. It contains 8000 inhabitants.

JA'NESVILLE, a city in Wisconsin, United States of America, on both sides of Rock River, 45 miles south-south-east of Madison. It is built partly on a plain by the river, and partly on a bluff 100 feet above it, where the public buildings are seen to great advantage. It is connected with Chicago, Milwaukee, and the towns on the Mississippi by intersecting railways. There is a large water-power for many mills and factories, and a state asylum for the blind. Founded in 1836, it had, in 1870, a pop. of 8789.

JANIN, JULES GABRIEL, a very clever French critic, was born at St Etienne, in the department of Loire, December 11, 1804, studied at the college *Louis-le-Grand* in Paris, and addicted himself to journalism at an early period. His wonderful piquancy of style, his airy grace of sentiment and wit, and his dashing paradoxes of criticism, were greatly relished by his countrymen; so much so, indeed, that J., without fear of ridicule, was able to dub himself *le Prince de la Critique*. For many years he made and destroyed literary reputations in the columns of the *Journal des Débats* He also wrote a good many novels, tales, narratives of tours, &c., among which may be mentioned *L'Ane mort et la jeune Femme guillotinée*, *Contes fantastiques*, *Contes nouveaux*, *Voyage de Victor Ogier en Orient*, *Les Catacombs*, *La Bretagne historique*, &c., *Voyage de Paris à la Mer*, and *Les Symphonies de l'Hiver*. He was made a member of the French Academy in 1870, and died in June 1874.

JA'NINA, a city of Turkey, capital of the eyalet of Janina (the ancient Epirus), is situated on the south-western bank of a lake of the same name, 40 miles inland from the shore opposite the island of Corfu. The lake of Janina, called by the ancients *Pambotis*, consists of two portions connected by two channels. Its extreme length is about 12 miles, its greatest breadth about 3 miles. At its southern end, stood the ancient city of Dodona. The city of J. stands in the midst of an extensive and fertile plain, which produces fruits and grain in abundance. Its chief buildings are 19 mosques, 6 Greek churches, a Greek college, and two synagogues. Gold brocade is here extensively manufactured by Greek workmen, as well as gold lace for the east, morocco leather, silk goods, and coloured linen. J. was long the head-quarters of the gifted but unscrupulous Ali Pasha (q. v.). It is now in part deserted; its population, which was 40,000 under Ali Pasha, is now 25,000. Little is known of its early history.

JA'NIZARIES (*Jeni-tsheri*, new soldiers), a Turkish military force, originally formed by the Osmanli sultan Orkhan, about 1330, of young Christian prisoners compelled to embrace Mohammedanism; and more perfectly organised by Sultan Amurath I., after 1362, when the number was raised to about 10,000, and especial privileges were conferred on them. They were for some time recruited from Christian prisoners; but their privileges soon induced many young Turks to seek admission into their body. There were two classes of J., one regularly organised, dwelling in barracks in Constantinople and a few other towns, and whose number at one time amounted to 60,000, but was afterwards reduced to 25,000; and the other composed of irregular troops, called *Jamaks*, scattered throughout all the towns of the empire, and amounting in number to 300,000 or 400,000. At the head of the whole Janizary force was the *Aga* of the J., whose power was limited only by the danger of revolt, and extended to life and death. The J. were always ready to break out into deeds of violence if their pay or perquisites were withheld. In times of peace, they acted as a police force. They served on foot; generally formed the reserve of the Turkish army, and were noted for the wild impetuosity of their attack. The sultan's body-guard was formed of them. The J., however, soon began to be very unruly; and their history abounds in conspiracies, assassinations of sultans, viziers, agas, &c., and atrocities of every kind; so that, by degrees, they became more dangerous to the sultans than any foreign enemies. The attempts of the sultans to reform or dissolve them were always unsuccessful, till Sultan Mahmoud II., in 1826, being opposed in some of his measures by the J. in Constantinople, displayed the flag of the Prophet, and succeeded in arousing on his own behalf the fanatical zeal of other portions of his troops. The J., deserted by their aga, and other principal officers who remained faithful to the sultan, were defeated, and their barracks burned, when 8000 of them perished in the flames. A proclamation of June 17, 1826, declared the Janizary force for ever dissolved. All opposition was defeated with bloodshed. Not fewer than 15,000 were executed, and more than 20,000 were banished.

JAN MAYEN'S LAND, an island in the Arctic Ocean, named after a Dutch navigator by whom it was discovered in 1611. It lies between Iceland and Spitzbergen, and is the northernmost known volcanic land. Its highest point is the volcano of Beerenberg, 6640 feet high, a conical, snow-covered mountain, from which flames and smoke have been seen to proceed, and the sides of which exhibit immense glaciers and frozen waterfalls. Another volcano, called Esk, about 1500 feet high, was discovered by Scoresby in 1817. An interesting account of the island is to be found in Lord Dufferin's *Letters from High Latitudes*.

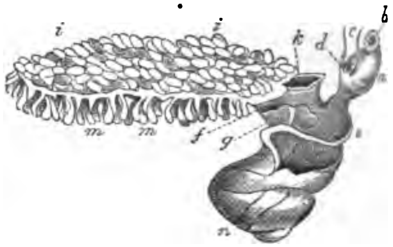
JANSEN, CORNELIUS, a celebrated divine, born of humble parentage in 1585, at Akkoi, near Leerdam, in Holland, from whom the sect of JANSENISTS derives its name. He was nephew of the well-known biblical commentator, and Bishop of Ghent, of the same name. The studies of J. were divided between Utrecht, Louvain, and Paris. Having obtained a professorship at Bayonne, he devoted himself with all his energy to scriptural and patristic studies, especially of the works of St Augustine. From Bayonne, he returned to Louvain, where, in 1617, he obtained the degree of Doctor, was appointed Lecturer on Scripture, and took a prominent part in the affairs of the university, especially in a contest with the Jesuits, on occasion of which he was sent upon a mission to the court of Madrid. In 1630, he was appointed to the professorship of Scripture; and having distinguished himself by a pamphlet on the war with France, *Mars Gallicus*, he was promoted, in 1636, to the see of Ypres. In this city he died of the plague, May 6, 1638, just as he had completed his great work, the *Augustinus*, which proved the occasion of a theological controversy, the most important, in its doctrinal, social, and even political results, which has arisen since the Reformation. Its main object, in which it coincided with the scheme of doctrine already condemned in Bajus (q. v.), was to prove, by an elaborate analysis of St Augustine's works, that the teaching of this Father against the Pelagians and semi-Pelagians (q. v.), on Grace, Free-will, and Predestination, was directly opposed to the teaching of the modern, and especially of the Jesuit schools (see MOLINA), which latter teaching he held to be identical with that of the semi-Pelagians. In the preface, he submitted the work to the judgment of the Holy See; and on its publication, in 1640, being received with loud clamour, especially by the Jesuits, and at once referred to Rome for judgment, the *Augustinus*—together with the antagonist publications of the Jesuits—was prohibited by a decree of the inquisition in 1641; in the following year, it was condemned as heretical by Urban VIII. in the bull *In Eminenti*. This bull encountered much opposition in Belgium; and in France, the *Augustinus* found many partisans, who were animated by a double feeling, as well of doctrinal predilection as of antipathy to the alleged laxity of moral teaching in the schools of the Jesuits, with whom the opposition to the *Augustinus* was identified. See JESUITS. The most eminent of the patrons of the *Augustinus* were the celebrated association of scholars and divines who formed the community of PORT ROYAL (q. v.), Arnauld, Nicole, Pascal, &c. Nevertheless, the syndic of the Sorbonne extracted from the *Augustinus* seven propositions (subsequently reduced to five) which were condemned as heretical by Innocent X. in 1653. Hence arose the celebrated distinction of 'right' and of 'fact.' The friends of the *Augustinus*, while they admitted that in point of *right* the five propositions were justly condemned as heretical, yet denied that in point of *fact* these propositions were to be found in the *Augustinus*, at least in the sense imputed to them by the bull. A further condemnation was therefore issued by Alexander VII. in 1656, which was rigidly enforced in France, and generally accepted; and in 1668, peace was partially restored by Clement IX., at least all overt opposition was repressed by the iron rule of Louis XIV. The more rigid Jansenists, however, and at their head Antoine Arnauld, emigrated from France, and formed a kind of community in the Low Countries. On the death of Arnauld in 1694, the controversy remained in abeyance for some years; but it was revived with new acrimony by the well-known dispute on the so-called 'case of conscience,' and still more angrily in the person of the celebrated Quesnel (q. v.), whose *Moral Reflections on the New Testament*, although published with high ecclesiastical authority, at various intervals from 1671 till his death, 1710, was denounced to the pope, Clement XI., as a text-book of undisguised Jansenism. This pope issued in 1713, in the constitution 'Unigenitus,' a condemnation in mass of 101 propositions extracted from the *Moral Reflections*, which, however, met with great resistance in France. The death of Louis XIV. caused a relaxation of the repressive measures. The regent, Duke of Orleans, was urged to refer the whole controversy to a national council, and the leaders of the Jansenist party appealed to a general council. The party thus formed, which numbered four bishops and many inferior ecclesiastics, were called, from this circumstance, the Appellants. The firmness of the pope, and a change in the policy of the regent, brought them into disfavour. An edict was published, June 4, 1720, receiving the bull; and even the parliament of Paris submitted to

Appellants for the most part submitted, the recusants being visited with severe penalties; and on the accession of the new king, Louis XV., the unconditional acceptance of the bull was at length formally accomplished, the parliament being compelled to register it in a *lit de justice*. From this time forward, the Appellants were rigorously repressed, and a large number emigrated to the Netherlands, where they formed a community, with Utrecht as a centre. The party still remaining in France persisted in their inveterate opposition to the bull, and many of them fell into great excesses of fanaticism. See CONVULSIONARIES.

In one locality alone, Utrecht, and its dependent churches, can the sect be said to have had a regular and permanent organisation, which dates partly from the forced emigration of the French Jansenists under Louis XIV., partly from the controversy about Quesnel. The vicar-apostolic, Peter Codde, having been suspended by Clement XI. in 1702, the chapter of Utrecht refused to acknowledge the new vicar named in his place, and angrily joined themselves to the Appellant party in France, many of whom found a refuge in Utrecht. At length, in 1723, they elected an archbishop, Cornelius Steenhoven, for whom the form of episcopal consecration was obtained from the French bishop Vorlet (titular of Babylon), who had been suspended for Jansenist opinions. A later Jansenist Archbishop of Utrecht, Meindarts, established Haarlem and Deventer as his suffragan sees; and in 1763, a synod was held, which sent its acts to Rome, in recognition of the primacy of that see, which the church of Utrecht professes to acknowledge. Since that time, the formal succession has been maintained, each bishop, on being appointed, notifying his election to the pope, and craving confirmation. The popes, however, have uniformly rejected all advances, except on the condition of the acceptance of the bull Unigenitus, and the recent act of the Holy See, in defining as of Catholic faith the dogma of the Immaculate Conception of the Blessed Virgin Mary, has been the occasion of a new protest. The Jansenists of the Utrecht Church still number about 5000 souls, and are divided over 25 parishes in the dioceses of Utrecht and Haarlem. Their clergy are about 30 in number, with a seminary at Amersfoort. So far as they can be said to possess a theological system, it may be described as a compound of Jansenist and ultra-Gallican principles.

JANSSENS, ABRAHAM, a celebrated Dutch painter, is supposed to have been born in Amsterdam about 1569. Of a thoughtless and excitable disposition, he made himself completely miserable by his marriage with a girl of extravagant tastes, and spent his latest years in extreme want. The year of his death is unknown. Many churches in Flanders possess pictures executed by him; the most famous are the 'Burying of Christ' and a 'Madonna and Child,' in the church of the Carmelites at Antwerp. There are also good specimens of his style in the galleries of Munich, Vienna, Dresden, and Berlin. J. displayed great vigour in drawing and designing; he was an admirable colourist, and he certainly ranks next, among the historical painters of the period—though at a considerable distance—to Rubens.—CORNELIS J., probably born in Flanders, died in Amsterdam in 1665, acquired a reputation as a very fine painter of portraits and historical subjects.—Another eminent artist of this name was VICTOR HONORIUS J. (born at Brussels 1664, died there 1739).

JANTHI'NA, a genus of gasteropodous molluscs (Haliotidæ) with ear-shells. The shell is very similar in form to that of a common snail, but thin and beautifully pellucid. These molluscs are remarkable as inhabitants of the open ocean, in which they swim at the surface of the water by means of a float formed of vesicles containing air, and secreted by the foot. To the under-surface of this float, the egg-capsules are attached. The vesicular float has no more anatomical connection with the animal than the shell has. The Janthinæ abound in the seas of warm climates; are plentiful in the Mediterranean, but rare on the British coasts.



Common Oceanic Shell (*Janthina fragilis*).
Shell with the animal, the float expanded.
a, head; *b*, mouth; *c*, tentacles; *d*, eyes; *e*, border of the mantle at the entrance of the branchia. cavity; *f*, foot, its posterior part, which is flat; *g*, lateral expansion of the mantle, provided for swimming; *k*, foot, anterior part forming a sort of pouch; *i*, *i*, bunch of aërated vesicles, serving to suspend the mollusc at the surface of the water; *m*, *m*, eggs suspended under the vesicular bunch; *n*, shell.

JANUA'RIUS, ST, a martyr of the Christian faith under Diocletian, was a native of Beneventum, or at least became bishop of that see in the latter part of the 3d century. According to the Neapolitan tradition, he was taken prisoner at Nola; and the place of his martyrdom, in 305, was Pozzuoli, where many Christians suffered the same fate. His body is preserved at Naples, in the crypt of the cathedral, and in a chapel of the same church are also preserved the head of the martyr, and two phials (*ampullæ*) supposed to contain his blood. On three festivals each year, the chief of which is the day of the martyrdom, September 19, and on occasions of public danger or calamity, as earthquakes or eruptions, the head and the phials of the blood are carried in solemn procession to the high-altar of the cathedral, or of the church of St Clare, where, after prayer of greater or less duration, the blood, on the phials being brought into contact with the head, is believed to liquefy, and in this condition is presented for the veneration of the people, or for the conviction of the doubter. It occasionally happens that a considerable time elapses before the liquefaction takes place, and sometimes it altogether fails. The latter is regarded as an omen of the worst import; and on those occasions when the miracle is delayed beyond the ordinary time, the alarm and excitement of the congregation rise to the highest pitch. Those who are curious as to the literature of the controversy regarding this celebrated legend, will find many documents in the sixth volume of the Bollandist *Acta Sanctorum* for September.

JANUARIUS, ST, ORDER OF, an order of knighthood, founded by King Charles of Sicily (afterwards Charles III. of Spain), on the 6th July 1738. It was abolished after the French invasion of 1806, and reintroduced in 1814. The badge is a gold octagonal white and red enamelled cross, with gold lilies in the upper and side angles. The obverse represents St Januarius in episcopal robes, with an open book. The round middle of the reverse shews a golden open book, and two phials partly filled with blood. The knights are either *Cavalieri di Giustizia*, who must count four noble generations, or *Cavalieri di Grazia*.

JA'NUARY, the first month of the year. It was, among the Romans, held sacred to Janus (q. v.), from whom it derived its name, and was added to the calendar along with February by Numa. It was not till the 18th c. that J. was universally adopted by European nations as the *first* month of the year, although the Romans considered it as such as far back as 251 B. C.

JA'NUS AND JANA, two very old Latin divinities, male and female, whose names are merely different forms of *Dianus* (probably the Sun) and *Diana* or *Luna* (certainly the Moon). The worship of the former held a high place in the regards of the Romans. In every undertaking, his name was first invoked, even before that of Jupiter, which is the more singular, as Jupiter was unquestionably the greatest of the Roman gods. Perhaps it may be taken as a verification of the tradition, that Janus was the oldest of them, and ruled in Italy before any of the others came thither. He presided not only over the beginning of the year, but over the beginning of each month, each day, and the commencement of all enterprises. On New-Year's Day, people made each other presents of figs, dates, honey-cakes, sweetmeats, &c., wore a holiday-dress, saluted each other kindly, &c. The pious Romans prayed to him every morning, whence his name of *Matutinus Pater* ('Father of the Morning'). He is represented with a sceptre in his right hand, and a key in his left, sitting on a beaming throne (probably a relic of the original, or at least very old worship of J. as the sun). He has also two faces (whence the expression applied to a deceitful person, 'Janus-faced'), one youthful, and the other aged, the one looking forward, and the other backward, in which some have professed to see a symbol of the wisdom of the god who beholds both the past and future, and others, simply of the return of the year. Numa dedicated to him the passage close by the Forum, on the road connecting the Quirinal with the Palatine. This passage (erroneously called a temple, but which was merely a sacred gateway, containing a statue of Janus) was open in times of war, and closed in times of peace. It is a striking commentary on the military habits of the Romans, that the place was shut only thrice in 700 years, first by Numa himself, again at the close of the first Punic war, and for the third time, under Augustus. It was also closed by Vespasian in 71 A. D.

JAPA'N (native name, *Nipon*—or *Dāi Nipon*, Great Nipon—i. e., the Land of the Rising Sun), a very ancient island-empire of Eastern Asia, long remarkable for the proud isolating policy of its rulers, and now claiming special consideration, both on account of its recent renewed relations with the civilised world, and the wonderful changes that during the last few years have been in progress in the country.

Japan Proper comprehends four large islands, viz., Nipon (the Japanese mainland), Sikok or Sikopf, Kiusiu, and Yesso, and extends from 31° to 45° 30′ N. lat. The empire of J.—the area of which has been estimated at 266,500 square miles—includes about 3800 small islands and islets besides the four larger ones, and is situated between 26°—52° N. lat., and 128°—151° E. long. It is bounded on the N. by the Sea of Okotsk, on the E. by the North Pacific Ocean, on the S. by the eastern Sea of China, and on the W. by the Sea of Japan. In 1871, the population of Japan was 32,866,161.

Physical Features.—The islands of J. appear to be of volcanic origin, and that part of the Pacific on which they rest is still intensely affected by volcanic action. Earthquakes occur very frequently in J., although certain parts of the country are exempt. The Japanese reckon that, on an average, some one of their cities is destroyed every seven years by this agency. J. has been called the land of mountains; but though these are very numerous, and many of them volcanic, they are of moderate elevation, and rarely attain the limits of perpetual snow. The country generally is of moderate elevation, with fertile valleys, picturesque landscapes, and a coast indented with magnificent harbours; the soil is productive, rich in mineral wealth, and teeming with every variety of agricultural produce. The great volcanic mountain Wunsentake, on a promontory of Kiusiu, reaches to the line of perpetual snow, and is both feared and worshipped by the Japanese. The celebrated and sacred Fusiyama ('Rich Scholar Peak'), the Parnassus of J., is an extinct volcano, the highest peak of which reaches to the height of 14,177 feet. Springs, lakes, and rivers are numerous; but the last, being sand-choked and very impetuous, are valuable chiefly for the purposes of irrigation.

Our knowledge of *the climate* of J. is yearly increasing. June, July, and August are the months of rain, which sometimes descends in unceasing torrents. The months of October and November are the pleasantest and most genial of the twelve, when fine weather is enjoyed without the scorching heat of summer. The summers are very hot, and the winters in the northern parts almost Siberian; the thermometer rising to 96° in the shade in the former, and sinking to 18° below zero in the latter season. Alcock says: 'The thermometer in the shade (during the summer) ranges from 70° to 85°, and averages 80° between the morning and the evening, while it is sometimes below 70° at night.' Hurricanes and waterspouts are frequent; dense fogs hide the sun, sometimes for four or five days together; and about the change of the monsoons, typhoons and equinoctial gales frequently sweep the Japanese seas.

Vegetable Productions.—In Hodgson's *Japan* will be found a systematic catalogue of Japanese flora by Sir William Hooker. We can only mention a few of the most noteworthy trees and plants. Chestnut, oak (both deciduous and evergreen), pine, beech, elm, cherry, dwarf-oak, elder, sycamore, maple, cypress, and many other trees of familiar name abound. The evergreen oak and the maple are the finest of all Japanese trees. The grandest forests of pine, and oaks of prodigious size, grow in Yesso; but the *Rhus vernicifera* or lacquer-tree, the *Laurus camphora* or camphor-tree, the *Broussonetia papyrifera* or paper-mulberry—the bark and young twigs of which are manufactured by the Japanese into paper—and the *Rhus succedanea* or vegetable wax-tree of J., are among the remarkable and characteristic trees of the country. Bamboos, palms, including sago-palms, and 150 species of evergreen trees, likewise flourish. Thus, the vegetation of the tropics is strangely intermingled with that of the temperate or frigid zone; the tree-fern, bamboo, banana, and palm grow side by side with the pine, the oak, and the beech, and coniferæ in great variety. The Camellia, the Paulownia, and the Chrysanthemum are conspicuous amongst its indigenous plants Nymphæas and Parnassia fill the lakes and morasses. The tobacco-plant, the tea-shrub, the potato, rice, wheat, barley, and maize are all cultivated. The flora of J. bears a remarkable resemblance to that of the North American continent.

Agriculture is the chief occupation of the Japanese.

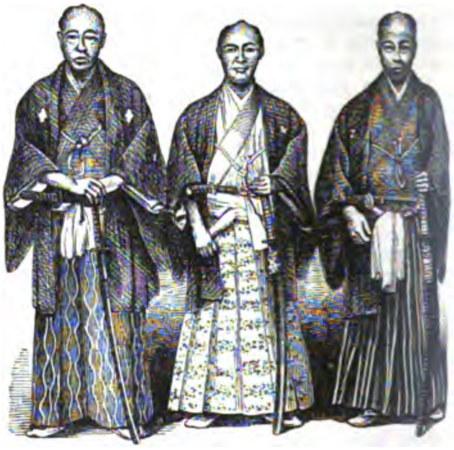
great care upon manures, and thoroughly understand cropping and the rotation of crops. The cultivated land is chiefly a light friable loam of great fertility. It grows tea, cotton, rice (the staple production), wheat, maize, buckwheat, millet, potatoes, turnips, beans, and peas. The rice harvest commences in October. Wheat is sown in drills in November and December, and reaped in May and June. Flails and winnowing-machines, similar to those used in England, are common.

Animals.—Wild animals scarcely exist in J., in consequence of the universal cultivation of the soil. A few wolves, foxes, and wild boars still roam in the north of Nipon. Wild deer are protected by law. The principal domesticated animals are horses, of which there is an indigenous race; oxen and cows, used only as beasts of burden; and dogs, held in superstitious veneration by the people. Birds are very numerous, and include two kinds of pheasants, wild-fowl, herons, cranes, and many species common both to Europe and Asia. There are few reptiles; and of insects, white ants, winged grasshoppers, and several beautiful varieties of moth are conspicuous.

Mineralogy.—J. is very rich in minerals. The gold mines of Matsumai and the north-east part of Nambu have long been celebrated; but the north of Nipon is, according to the Japanese, one continuous bed of gold, silver, and copper. Silver also comes from the islands to the west of Matsumai, from the province of Shanday, and from the islands in the vicinity of Neagata. The iron mines of Yesso are sealed to Europeans. Both lead and copper mines are worked within a few miles of Hakodadi. The sulphur of Yesso and the adjacent isles is almost inexhaustible, and of wonderful purity. In its abundant supply of coal, J. resembles Great Britain; coal-beds extend from Nagasaki and Fizen to Yesso and Saghalien. Basalt, felspar, greenstones, granites red and gray, rock-crystal, agate, carnelian, amber, scoria and pumice-stone, talc, alum, and other minerals are found in greater or less quantities.

Inhabitants.—Ethnologists have referred the Japanese to different types of mankind: Latham classifies them as Turanians, a tribe of the Asiatic peninsular stock; Pickering, as Malays; Prichard, as belonging to the same type as the Chinese; and in the narrative of the United States' Expedition, they are ranked as a branch of the Tartar family. Physically, the Japanese is distinguished by an oval head and face, rounded frontal bones, a high forehead, slightly oblique eyes—the irides of a brown-black colour, the eyebrows heavy and arched. The complexion varies from a deep copper colour to the fairness of western nations, but is more frequently of a light-olive tint. The expression of the face is mild and animated. The Japanese 'are a people of great qualities and exaggerated defects. They are honest, ingenious, courteous, clean, frugal, animated by a strong love of knowledge, endowed with a wonderful capacity of imitation, with deep self-respect, and with a sentiment of personal honour far beyond what any other race has ever reached. But they are proud, absolute, revengeful, profoundly suspicious, hesitating, and mistrustful, and, in the lower classes, openly and radically immoral. Their organisation (until lately) was purely military; war was the only occupation (with the exception of the priesthood) which was considered worthy of a man; agriculture was left to serfs; while commerce was regarded as degrading. The fighting-classes had the utmost contempt for trade, and the entire people were deficient in the commercial aptitudes.' The town costume of the

in at the waist, round which is fastened a girdle of brocaded silk. Over this is worn a loose, wide-sleeved jacket or spencer, decorated with the wearer's armorial device. A cylindrical cap made of bamboo and silk, white stockings, and neat straw sandals, complete the attire. Trousers are only worn by official persons on occasion of special ceremony. A head entirely shaven is the distinctive mark of priests and the higher class of medical practitioners; in others, the hair is shaved off about three inches in front, combed up from the back and sides, and glued into a tuft at the top of the head, where it is confined by pins of gold or tortoise-shell. The hair of the women is more abundant, but otherwise their dress very much resembles that of the men. In the country, a short cotton gown is often the only clothing, and the lower classes go almost in a state of nudity. The men are generally elaborately tatooed over the greater part of their body with figures of men and women, bright-blue dragons, lions, tigers, &c. The women have a mania for painting and powdering their skin.



The Japanese Ambassadors to Europe in 1862.
(From a photograph by Vernon Heath.)
1, Take no Ouchi Shimodzu Kéno Kami; 2, Matsudaira Iwamino Kami; 3, Kiogoku Notono Kami.

Manners and Customs.—The most remarkable custom of the Japanese is that of *Harri-kari* or *Hara-kiru* (or *Hara wo Kiru*, i. e., 'belly-cut'), a legalised mode of suicide, by making two cross-cuts on the abdomen with a sharp-pointed knife. This custom, according to some recent accounts, is now less frequent, and the ceremonies with which it was once performed have become obsolete. There are still, however, professors of the art in most large cities. The curious custom of *nay-boen* or *naibun* consists 'in ostentatious secrecy as regards events, or *incognito* in reference to persons.' Well-known events are totally ignored, and individuality is unrecognised under shelter of the nay-boen privilege.

The social position of women is, in some respects, more favourable than in most pagan countries. The ladies of Japan, however, live in strict seclusion, and little is known about them. Female education is not neglected. Polygamy is not allowed, but the power of divorce is permitted to the husband by law. The laws against adultery on the part of the wife are severe, and death is the penalty, which may hold no communication with the mainland; and the people lived like frogs in a well, till 1853, when they were rudely awakened from their dream of peace and security by Commodore Perry steaming into the harbour of Yokohama, with a squadron of United States war-vessels. He extorted a treaty from the frightened Shiogun (31st March 1854), and J., after a withdrawal of 216 years, entered once more the family of nations. Other countries slowly followed the example of the United States: Russia and the Netherlands in 1855; our own treaty followed in 1858; that with France in 1859; with Portugal in 1860; with Prussia and the Zollverein in 1861; with Switzerland in 1864; with Italy in 1866; and with Denmark in 1867. By these the seven Japanese ports of Yokohama, Nagasaki, Kanagawa, Niegata, Hiogo, Osaka, and Hakodadi have been opened to foreign commerce.

It will thus be seen that 'the history of the empire of the Rising Sun is divisible into four distinct periods: the first, which ends with the landing of the Portuguese in 1543, is purely local; the second, which extends from 1543 to 1638, includes the story of St Francis Xavier, the trade with Portugal, the persecutions, and the final expulsion of Europeans; the third, from 1638 to 1854, is distinguished by the Dutch monopoly, and the resolute exclusion of all foreigners; in the fourth, since 1854, J. has once more become accessible to everybody.'

In the J. of 1854, we went back to Europe of the 12th century—to the feudalism of England under the Plantagenets. An aristocratic caste of a few hundred nobles—the *Daimios* or territorial princes of J. (278 in number)—ruled large provinces with despotic and almost independent authority; their incomes reaching in one or two instances to £800,000. The Shiogun gave deep offence, both to the Daimios and the nation, by signing the Perry treaty at all; but especially by signing it without the sanction of the Mikado, and for ten years a policy of assassination and deadly hatred to foreigners (whom the government could not protect) was carried out. This resulted in the two bombardments of Kagoshima Chioshiu, by the English and combined fleets, which opened the eyes of the Japanese to the power of the western nations, and awakened in their minds an intense desire to raise their country to an equality with them. A complete reaction in favour of the despised foreigners set in; and a desire for a strong central government—'the unification of the nation in the hands of the Mikado'—who was urged by the most powerful of the daimios to suppress the Shiogunate. The Shiogun tendered his resignation; but, notwithstanding, a *coup d'état* appears to have been necessary for the complete extinction of the Shiogun and his party. This was carried out in the winter of 1867—1868, and after a short but sharp civil war of some six months' duration, the Shiogun, with his partisans, were defeated, and the Shiogunate (or 'government under generalissimo') became a thing of the past. The daimios decided upon a grand act of self-sacrifice, and suppressed themselves. 'Two hundred and seventy-eight military princes, possessing regal powers, vast wealth, and separate armies, abdicated from purely patriotic motives, the station which their families had held for twenty centuries!'

The Japanese government is now organised partly upon the French imperial system, and presents the following features: (1.) The Mikado is supreme in temporal and spiritual matters; (2.) An executive ministry divided into eight departments, viz.—Foreign Affairs, War, Navy, Finances, the Interior,

cil of State (*Shoin*), members unlimited; (4.) A 'Great Council'—by which the government is really carried on—divided into three sections, viz., the Centre, composed of the Prime Minister, Vice-Prime Minister, and five advisers; the Right, which includes the Ministers and Vice-Ministers of the eight departments; the Left, formed entirely of the Council of State, whose functions correspond to the French *Conseil d'Etat*. All matters of high importance are decided by the Great Council and the Mikado; but ordinary questions are left to the ministers, individually or in cabinet. An elective parliament is in contemplation. In 1871 the provincial administration was taken from the ex-daimios; and 'prefects,' with extensive powers, have been appointed, one to each of the 75 districts into which J. is now divided.

Great progress is being made in finance, education, and public works, as well as the reconstruction of both army and navy. The budget for 1872 shews a revenue of £12,229,531, and an expenditure of £11,420,385. This interesting document (for which we are indebted to an article in *Blackwood's Magazine* for September 1872) we here give in a condensed form, premising only that the dollars of the original have been converted into English money at an exchange of 4s. 3*d*.:

RECEIPTS.

Rice, at 4½ dollars per koku,	£11,444,556
Customs,	293,350
Internal revenue (excise duties, &c.),	225,675
Miscellaneous,	260,950
Total of receipts,	£12,229,531

EXPENDITURE.

Imperial household,	£113,060
Ministry of foreign affairs,	112,200
Army,	1,700,000
Navy,	382,500
Colonisation of Yeso,	418,836
Justice,	16,150
Education,	73,312
Finance department (including cost of collecting taxes),	369,962
Public works,	1,763,112
Municipal and provincial governments,	1,386,867
Miscellaneous,	452,412
Cost of manufacturing new bank-notes, and of establishing the Mint,	210,375
Pensions to daimios and retainers,	4,024,113
Balance of indemnity to European powers on the Simonosaki affair,	318,750
Interest on the English loan,	78,625
Total of expenditure,	£11,420,385

Surplus, £809,146.

It will be seen that the bulk of the revenue is derived from the rice-tax, which is a very certain and productive import; but as the principle of taxing the staple food of the people is radically wrong, and in this instance it weighs very unfairly upon the agricultural population (absorbing one-third of the entire annual crop), the newly inaugurated government is considering how gradually to diminish, and to replace it 'by other duties less objectionable, and more in harmony with the spirit which now guides the country.'

A Ministry of Instruction was created in 1871, and public primary schools are being established in towns. Lighthouses, dockyards, the buoying of harbours, and the construction of roads and railroads, have all been in progress during the last three years. A railway from Yeddo to Yokohama has been made, and telegraphs are in course of erection. Newspapers and printing-presses have nature; but in landscapes they fail, from erroneous

A Junk in the Bay of Yeddo, from a native drawing.—Oliphant's *Japan*.

perspective; and of the art of painting in oils they are entirely ignorant.

The *commercial intercourse* of J. is now carried on mostly with Great Britain, and the United States of America.

The following table shews the extent of the trade by exhibiting the value of the total exports from Japan to Great Britain, and of the total imports of British and Irish produce and manufactures into Japan during the five years 1867—1871:

Years.	Exports from Japan to Great Britain.	Imports of British Home Produce into Japan.
1867,	£317,799	£1,545,386
1868,	188,222	1,112,804
1869,	167,308	1,442,104
1870,	96,173	1,609,367
1871,	109,224	1,584,517

The principal items of export from J. to Great Britain are tea and unmanufactured tobacco, valued respectively at £40,539 and £37,668, for the year 1871. The staple British import into J. is cotton goods, valued at £1,049,701 for the same year.

The *national coins* of J. are—the *ichibu* (silver), average rate of exchange, 1*s.* 4½*d.*; the *riu* or *tael*, 5*s.* 10*d.*; the *koban* (gold), £1, 9*s.* 2*d.* A mint, manufactured in England, was set up at Osaka in the year 1870. The new coins issued from it are: 10, 5, and 2½ dollar gold-pieces; 50, 20, and 5 cent silver-pieces; besides iron and copper coins of small value.

For the latest information on J., see *Education in Japan*, with an Introduction by Arinori Mori, Minister or Envoy from Japan to the United States of America (New York, 1873); article 'Japan,' *Blackwood's Magazine*, Sept. 1872; *The Merchant's Handbook*, by W. A. Browne (Lond. 1872); *Japan*, being a sketch of the history, government, and officers of the Empire (Lond. 1869); *Japan in Our Day*, by B. Taylor (New York, 1871); *The Statesman's Year-book*, by F. Martin (Lond. 1873): and for general reference, see *The Capital of the Tycoon*, by Sir Rutherford Alcock, K.C.B., &c. (Lond. 1863); *A Residence at Nagasaki and Hakodati in* 1859—1860, by C. P. Hodgson (Lond. 1861); *First Elements of Japanese Grammar*, &c., by R. Alcock, Esq.; *Narrative of the Earl of Elgin's Mission to China and Japan in the years* 1857, 1858, and 1859, by Lawrence Oliphant (Lond. 1859); *The History of Japan*, by Engelbert Kämpfer, M.D. (Lond. 1727).

JAPA'NNING is the art of giving a coating of varnish and other materials to certain manufac-

The term is more generally applied in this country to metal-works upon which a dark-coloured varnish is applied with heat, but the process is quite as extensively applied to papier-mâché works. See Lacquering. The japanned works of our manufacturers are chiefly iron and tin, such as coal-boxes, tin canisters, and other articles, which are thereby made more ornamental, and are at the same time protected from rust.

The japanning material consists of anime or copal varnish, alone, or mixed with ivory-black, to produce a black japan; or with asphalt, to produce a dark or light brown, according to the quantity used. For very cheap tinned wares, a single coating is all that is usually given. After being varnished, they are put into a heated oven for a time, after which they are ready for use; but in the case of more valuable articles, such as the handsome coal-boxes of iron which are now extensively manufactured, and which are still further ornamented by gilding and painting, several coats of black japan varnish are applied, each being dried in the oven previous to the application of the next, so that a coating of sufficient substance to bear polishing is thus obtained. Rotten-stone and Tripoli powder are used by the polisher, and a beautiful surface is obtained, in no respect inferior to that of polished jet. The polishing powders are at first applied with leather, but the finishing is done by women, who use the palms of their hands only with small quantities of Tripoli.

The beautiful black surface thus produced is admirably adapted for decoration by gilding; and much taste is now shewn in these matters by our manufacturers, who surpass all others in the high finish and cheapness of japanned wares. Under Lacquering will be given the Japanese process, which is thus imitated on metal, under the name of japanning, in Europe.

JA'PHET, in Heb. *Yepheth*, a word apparently derived in Genesis from *pathah*, 'to open,' trop. perhaps 'to stretch forth,' and hence supposed to mean 'widely dispersed.' Gesenius and other scholars, however, suggest a derivation from *yaphah*, 'to be fair' or 'beautiful,' in allusion to the fair complexions of the Japhetic or European races. According to the Hebrew record, J. was the second son of Noah, whose descendants peopled first the north and west of Asia, after which they proceeded to occupy 'the isles of the Gentiles,' i. e., all the region about the Levant and the Ægean Sea. J. has at a later period, in Talmud and Midrash—not merely from its similarity to the Greek name Japetus, the supposed founder of the human race—been used as a typical expression for 'Greek.' Cf. *Meg.* 71, *b.*; *Ber. R.* 40, *b.* &c.

JAPU'RA, or **CAQUETA**, a river of South America, and tributary of the Amazon, rises in the Granadian Andes, in lat. 1° 26′ N., long. 76° 50′ W., and joins the Amazon about 65° 50′ E. long. Its entire length is upwards of 1000 miles; the navigation is impeded by cataracts.

JARGONI'SING is a phenomenon observed chiefly in acute mania; it consists in the utterance of uncouth and unintelligible sounds, which may resemble articulate words, or be little more than harsh ejaculations and bellowings. This symptom must not be confounded with those imitations of foreign tongues or provincial idioms, or the perversions of the faculty of language characteristic of mania and other forms of alienation, as these sounds are not intended to be, nor to appear, the vehicles of thought or manifestations of feeling. They stand in the same relation to the excitement and violence, as the rapid motion, the furious gesticulation, and the tendency to injure and destroy everything that is seemly and harmonious. The tone in which they are uttered is generally harsh and defiant, because intense passion thrills through every muscle, through those of the vocal apparatus as well as of the arm raised to strike. Jargonising is, in all probability, involuntary. It occurs at the commencement or crisis of mania, when the power to control the ideas and to regulate motion is most impaired. It may, however, be the result of volition, so far as that the individual desires and determines to speak, but fails from the rapidity or intensity of his emotions to call into action, and co-ordinate the organs engaged in articulation. Such utterances may be heard in soliloquy, if the phrase may be used, and during sleep. The feature has been accepted as pathognomic of mania. It has, however, been noticed in the delirium of certain stages of fever and of drunkenness, which are mental states depending upon blood-poisons. During periods of profound abstraction, similar sounds are said to have proceeded from the lips of sane and healthy men. In all these instances, the natural operation of the will would appear to be enfeebled or suspended.

JARNAC, Battle of, was fought at the town of that name, in the department of Charente, France, March 13, 1569, between 26,000 Catholics under the Duke of Anjou, afterwards Henri III., and 15,000 Huguenots under Louis, Prince of Condé. The latter were completely routed. See Condé.

JAROSLAV, Government of, one of the central provinces of European Russia; area, about 14,000 square miles; pop. in 1867, 999,383. The soil is generally not fertile; it hardly supplies the wants of the inhabitants, and forces them to be industrious, so that the province furnishes nearly the whole of Russia with the best carpenters, masons, smiths, &c. The staple industry is dressing, spinning, and weaving flax, which occupies more than 25,000 hands, mostly near Jaroslav, Uglitch, and Velikoe-Selo. In the northern districts of Mologa and Poshekhonje the whole population of many villages manufacture nails, springs, and other articles of hardware. The inhabitants of the Rostof district have the reputation of being the best kitchen-gardeners and fowl-breeders of the empire. The Volga crosses the government from west to east, and gives a special impulse to its industry. The inhabitants are remarkably handsome both as to form and feature. The government is divided into nine districts.

JAROSLAV (pron. Yaroslaf), capital of the government of that name, in European Russia, is a large and fine town, situated on the right banks of the Volga, and its affluent, the Kotorosl, in lat. 57° 37′ N., long. 39° 53′ E., at a distance of 164 miles from Moscow. It is one of the most ancient Russian towns, and is said to have been founded by Jaroslaw the Great in the 10th century. During the feudal period, it was the seat of powerful feudal princes, and several times suffered from the invasions of the Mongols. The town has a vast *gostinoidvor*, or market-place, nearly as lively as that of Moscow. Though possessing large stores of linen fabrics, flax, iron, flour, and grain, J. is but a second-rate commercial place on the Volga, the principal trade being concentrated at Rybinsk, 54 miles up the river, and at Rostof. Chemical works, principally of white lead and minium, constitute a sort of speciality of the town and its staple industry; next come several tanneries, extensive flour-mills on the Kotorosl, and a recently built cotton-mill of 40,000 spindles. The once celebrated silk, and especially linen and damask factories, are at present on the decline. The population of J. in 1867 amounted to 37,275 inhabitants, and is constantly increasing with the wealth of the town, owing to the development of steam-navigation on the Volga and the Kama. The extensive trade on these rivers occupies at present no less than 150 steam-boats.

JA'SHER, Book of (Heb. *Sepher ha-yashar*, 'the Book of the Upright;' translated by the LXX. *Biblion tou Euthous*, and by the Vulgate, *Liber Justorum;* but the Peshito [Syriac version] has *Sepher Hashir*, 'Book of Praises or Hymns'), is one of the lost books of the ancient Hebrews, which is quoted twice (Joshua x. 13; 2 Samuel i. 18). Regarding its character and contents, there has been much speculation. Talmudic and later Jewish authorities identified it variously with Genesis (sometimes called 'the Book of the Upright'), Deuteronomy, Judges, &c., to all which notions there is the obvious and fatal objection, that the two quotations from it which survive are not to be found in any of these books, and could not possibly be found in the first two, as they refer to incidents which occurred at a subsequent period in the national history. The conjecture of the Syriac and Arabic translators has been adopted by Dr Lowth, Herder, and other scholars, viz., that the Book of J. was a collection of national ballads—a Hebrew minstrelsy, in short—recording the warlike deeds of the national heroes, or singing the praises of otherwise celebrated men. Gesenius is inclined to adopt the same view, and suggests that it may have acquired its name, 'the Book of the Upright,' from having been written chiefly in praise of upright men. Donaldson, in his recent work, *Jashar, or Fragmenta Archetypi, Carminum Hebraicorum in Masorethico Veteris Testamenti Textu passim tessellata*, contends for its being a composition of the age of Solomon, and a work of Nathan and Gad. He conceives that it originated in the desire of the more religious of the community to possess a record of the national history which should chiefly set forth the righteousness of the true Hebrews, and he attempts to extract from the so-called canonical books of the Old Testament such passages as he believed to have originally formed part of it. It must be added, however, that Dr Donaldson's theory has met with little favour either from the mass of German scholars or from the few in England who are competent to consider the question.

JASMIN, Jacques, the most eminent modern patois poet of France, and, in the words of his ardent admirers, 'the last of the troubadours,' was born at Agen in 1798. He has given in his *Soubenis* a humorous account of his early life. According to it, he was of very humble birth, and was set to learn the trade of a hair-dresser, which agreed well with that of poet, as he himself says, because both are a kind of head-work. His poetry is full of beauty and power; the pathos of his serious, and the wit of his comic pieces, are unequalled, and both have been received with enthusiasm in France, and other parts of Europe. He was made a Chevalier of the Legion of Honour in 1846. J.'s principal works are *Me cal Mouri* (1825); *Lou Chalibari* (The Charivari, 1825), a comic poem; *L'Abuglo de Castel-Cuille* (The Blind Youth of Castel-Cuille, 1836), translated by Longfellow; and *Las Papillotos de Jasmin* (The Curls of Jasmin), of which the first part appeared 1835, and the second 1843. He died at his native town in 1864.

JA'SMINE, or JESSAMINE (*Jasminum*), a genus of plants of the natural order *Jasminaceæ*. This order is allied to *Oleaceæ*, and contains about 100 species of shrubs, some of them climbing, and many of them having exquisitely fragrant flowers. They

Many belong to the genus J., which has its calyx and corolla each 5 or 8-cleft, two stamens attached to and included within the tube of the corolla, and a two-lobed berry, one of the lobes generally abortive. The name J. is from the Arabic *Yasmeen*. The COMMON J. (*J. officinale*) is a native of the south of Asia, but now naturalised in the south of Europe, and as far north as the Tyrol and Switzerland. In more northern regions, it is much cultivated in gardens, but does not easily endure very severe winters. It is a shrub from six to ten feet high, with evergreen pinnate leaves, the terminal leaflet the largest, and very fragrant white flowers. The flowers were formerly employed in medicine, for strengthening the nervous system, but are now only used for preparing *Oil of Jasmine*, a delicious perfume. The commercial oil of jasmine, however, is not the pure essential oil, but merely oil of ben flavoured with it, and is prepared by placing layers of the flowers alternately with layers of cotton soaked in oil of ben.—*J. grandiflorum*, a native of the East Indies, has flowers still more fragrant, from which, and from those of *J. Sambac*, oil of jasmine is also made. The flowers of *J. Sambac* are often scattered about in houses and temples in the East Indies, to diffuse their fragrance. —Several other species, some with erect, and some with twining stems, are not uncommon in gardens and green-houses. Some have white, and some have yellow flowers.—Oil of jasmine cannot be obtained from J. flowers by distillation.

JA'SON. See ARGONAUTS.

JASPER (Gr. *iaspis*), a mineral generally regarded as one of the varieties of Quartz (q. v.), and distinguished by its opacity, owing to a mixture of clay or other substances with the silica of which it is chiefly composed. There are many kinds of J., some of them of one colour, as brown, red, yellow, green, white, blue, or black, and some variously striped, spotted, or clouded with different colours. J. is a very abundant mineral; it is found in veins and embedded masses in many rocks, sometimes appears as a rock of which whole hills are formed, and is very common in the shape of pebbles. It has been prized from the most ancient times for ornamental purposes, as it takes a high polish. Many kinds of it are very beautiful; and it can often be obtained in pieces of large size, so that it has been much used not only for rings, seals, and other small articles, but for the decoration of palaces. One of the best known kinds of J. is found in Egypt, and is therefore called *Egyptian Jasper*. It is generally yellow, prettily mixed with brown.—J. with very distinct stripes is called *Ribbon Jasper*.—The kind called *Porcelain Jasper* is rather rare. It is often full of minute holes, or is cracked in all directions. It is regarded as a kind of natural porcelain, formed by the action of fire.

JA'SSY, the capital of Moldavia, one of the Danubian principalities, is picturesquely situated on the slope of the Kopoberg Mountains, near the borders of Bessarabia, and about ten miles west of the Pruth. It is irregularly built and dirty, and in its crooked streets the palatial mansion of the Bojar—the Moldavian noble—alternates with huts of the most inferior description. It contains about 90 ecclesiastical edifices, one of which dates from the 14th century. On a height is the Prince's Court, formerly the residence of the governor of Moldavia. The streets are covered with dust in summer and with mud in winter, on which account, conveyances are here in great requisition, and every one except the Jew and the mendicant employs a drosky. In J., there are 1300 private carriages, 5000 droskies, and 12,000 horses. The manufactures trade in agricultural produce. Pop. 90,000, of whom about 40,000 are Jews.

JASZBERE'NY, a considerable town of Hungary, in the county of Jasygia and Kumania, is situated on both banks of the Zagyva, 42 miles east of Pesth. Pop. (1869) 20,233, who are employed in agriculture and in the trade in corn, cattle, and horses.

JÂTAKA (literally, 'relating to birth') is with the Buddhists the name of a work or a series of books containing an account of 550 previous births of Sâkya Muni, or the Buddha. Several tales that pass under the name of Æsop's fables are to be found in this collection of legends.

JATI'VA, or **XATIVA**, SAN FELIPE DE, a town of Spain, in the province of Valencia, 22 miles south of the city of that name. Its climate is delicious, and the well-watered plain on which it stands is luxuriant in fruits and flowers. Its trade and manufactures are unimportant. Pop. 14,000.

JAU'ER, an interesting old town in Silesia, Prussia, situated on the Neisse, 10 miles south-south-east of Liegnitz. The town is famous for its sausages; and there is a weekly corn-market, which has been regularly held since 1404, and is the most important in Silesia. J. was formerly a very prosperous town, being the only market for the linen-trade of Silesia; but the Thirty Years' War reduced its extent and prosperity. Pop. (1871) 9964.

JAU'NDICE, a yellow colour of the skin and conjunctiva of the eye, arising from the presence of the colouring matter of the bile in the blood and tissues, is a symptom of various disordered conditions of the system, rather than a special disease.

With this colouring of the skin and eyes the following symptoms are associated: the fæces are of a grayish or dirty-white tint, in consequence of the absence of bile, and the urine is of the colour of saffron, or is even as dark as porter, in consequence of the presence of the colouring matter of the bile. There is sometimes, but not in the majority of cases, an extreme itching of the skin. It is a popular belief, as old as the time of Lucretius—

> Lurida præterea fiunt quæcunque tuentur arquati—

that to a jaundiced eye everything appears yellow. This, however, like the preceding, is only an occasional symptom.

The most obvious cause of jaundice is some obstruction in the gall-ducts, preventing the normal flow of bile into the intestine. This obstruction may arise in any of the following ways: 1. It may be caused by the impaction of a gall-stone in the common hepatic duct. See LIVER. In this case, the jaundice is usually of short duration, and disappears soon after the gall-stone has passed into the intestine. 2. Another cause of jaundice is the obstruction of the gall-ducts by cancerous disease of the head of the pancreas, by tumours in the liver, or by a diseased condition of the duodenum, the portion of small intestine into which the common hepatic duct opens. In these cases, the obstruction is usually permanent, and causes a persistence of the jaundice. 3. Obstruction or closure of the gall-ducts sometimes occurs in the inflammation of the liver that is brought on by spirit-drinking, and sometimes may be caused by inflammation originating in the ducts themselves, which, from their small size, may be readily closed up by inflammatory swelling of their mucous membrane. 4. The jaundice that occasionally arises from constipation, or that occurs during the advanced stage of pregnancy, is probably caused by pressure upon the common hepatic duct.

But although jaundice is frequently caused by some of these mechanical impediments to the flow of bile into the intestine, it results primarily and solely in a great number of cases from the secretion of bile being suppressed or deficient. The secretion may be suppressed so as to cause jaundice by a sudden mental shock or by continued anxiety. Various poisons in the blood may also suspend the secretion of bile to such an extent as to cause jaundice. It may be produced in this way by the salts of copper and of mercury, by opium, and by the poison of serpents; and it often occurs, from the poisoned state of the blood, in the course of fevers, especially the virulent fevers of tropical climates.

The prognosis in jaundice is generally favourable, except when it depends upon structural disease of the liver, or on mental shock or anxiety. The treatment must be chiefly guided by reference to the conditions which give rise to it in any particular case, and should never be attempted without professional advice.

JAVA (Djåwå), 'the Queen of the Eastern Archipelago,' a most valuable colonial possession of the Netherlands, is situated in lat. 5° 2′—8° 50″ S., and long. 105° 12′—114° 39′ E. It is washed on the N. by the Sea of Java, on the E. by the Strait of Bali, on the S. by the Indian Ocean, and on the W. by the Strait of Sunda. The extreme length from east to west is 666 miles, the breadth varies from 56 to 136 miles, and the superficial area is reckoned at 50,260 square miles. The island is hilly, and cut in many parts by deep gorges and rushing streams. The mountains rise to a height of from 4000 to 10,000 feet, and are clothed to their summits with luxuriant foliage. Thirty-six of the lofty mountains are volcanoes, of which eleven are still active.

In 1870, the population of J. and Madura (q. v.) amounted to 16,671,236, having more than trebled in 45 years. The census gave 27,585 Europeans, 174,540 Chinese, and 16,943 Arabians and other Orientals. The Javanese belong to the Malay (q.v.) race, and are mostly Mohammedans; the remainder being 'heathen,' whose religion is a degraded superstition. In moral habits and civilisation, the Javanese are superior to the inhabitants of Sumatra and Celebes. There are 29 Dutch Protestant and 10 Roman Catholic clergymen, all paid by the government, which fixes their sphere of labour, and strictly prohibits proselytising. They chiefly labour among the Europeans, half-castes, and intermediate races at the ports, and the natives of the interior are neither made acquainted with the Christian religion nor with European education. The Javanese are much addicted to smoking opium, which is not permitted to be grown on the island, the government importing the quantity considered necessary, and granting licences for its sale, realising therefrom an annual revenue, which, in 1871, amounted to £832,308 sterling.

For upwards of forty years, J. has been steadily advancing in prosperity. Its producing power is only limited by the amount of available labour, and notwithstanding the energy which the Dutch have displayed in increasing the breadth of cultivated land, the greatest part of the island is still in a state of nature. Rice is grown extensively for native consumption and exportation; sugar, coffee, indigo, tea, tobacco, &c., for export. The increase in the trade of J. has been great and rapid. In 1848, the imports amounted to the value of £2,666,765; the exports to £4,510,472. In 1870, the imports had risen to £4,126,046 in goods, and £1,205,912 in specie; the exports to £8,980,016 in goods, and £791,600 in specie.

The countries which trade most extensively with J. are the Netherlands, Great Britain, China, and Japan. In the trade reports for 1860, Holland is set down as having imported into J. merchandise to the value of £1,864,740, and specie to the value of £1,511,854; while Great Britain sent goods to the value of £991,155. In the same year, the exports from J. to Holland amounted to £6,403,553, and those to Great Britain to £58,135. This great difference arises from the largest proportion of the products of the island being the property of the government, and managed, stored, shipped (exclusively in Dutch ships), and sold in Holland by the Netherlands Trading Company, whose profits arise from the commission allowed on the transactions. The import and export duties are very high, but much modified in favour of the Netherlands. The leading articles imported into J. are cotton and linen goods, wine and spirits, machinery, provisions, &c.; the principal exports are sugar, coffee, indigo, tea, rice, &c. In 1860, sugar was exported to the value of £2,751,998; coffee, £2,535,830; indigo, £293,363; rice, £562,185. Some years, the exports of these articles reach a considerably higher figure. In 1870, the produce was 983,634 piculs of coffee (of 133⅓ lbs.); 46,104,200 piculs of rice; 2,191,466 piculs of sugar; and 1,974,676 lbs. of tea.

The island is divided into East, West, and Middle Java, containing 22 subdivisions, called Residencies, over which a superior European official, the Resident, exercises general control, and acts as judge, collector, and magistrate. The Resident has European assistants, who perform the same functions in districts of the residency; and native agency is also extensively employed in the government service, all the chiefs being either present or expectant salaried servants of the colonial government, actually engaged, under European superintendence, in ruling the masses. The chief native official of a district is the Regent, selected from the family of the former local prince, and retained in office so long as he promotes the interests of the government.

The material prosperity of J. is owing in a great measure to the energy with which the Dutch government has extended the growth and manufacture of those articles which form its staple exports. By an elaborate and skilfully worked-out system of culture, introduced in 1830, the growth and preparation of the staples for exportation have advanced with amazing rapidity. The cultivators of the soil, the native chiefs, the European officials, and the government all share in the profits, and work harmoniously together in developing the capabilities of the land. In carrying out the extensive mercantile transactions which the culture-system involved, the government has been ably assisted by the Netherlands Trading Company, and the result has been the changing a burdensome colony into a mine of wealth. Between 1824 and 1833, the expenditure exceeded the income. From that time, the finances of J. have been prosperous, and the colony has transmitted to the Netherlands, since 1838, a sum not short of £30,000,000 sterling. In thirty years, the revenue rose from an average of £2,500,000 sterling, to £9,500,000 in 1857, in which year the net surplus was £3,500,000; since then a more liberal policy has been followed, and the surplus has decreased. Railways are being constructed, and from 1867 to 1871, 120 miles were opened.

Climate.—With the exception of some marshy districts on the north coast, the climate of J. is healthy and pleasant. On the coasts, the thermometer seldom indicates more than 93° F. during the dry, and 84° in the rainy season. The average is 80° at noon, and 70° in the evening. The heat is moderated by the sea-breezes, which constantly blow across the island. Along the high lands of the interior the air is not only breezy, but some-excellent roads, it is not difficult to reach the most beautiful and salubrious districts. Inland of Semerang, at an elevation of 4000 feet, Europeans enjoy a pleasant retreat during the dry season.

History.—The history of J., previous to the 14th c., is involved in fable and obscurity. It appears, however, that the Javanese, from a very early period, possessed a considerable degree of civilisation, which was probably the result of the labours of Brahmanical teachers from Hindustan. It is impossible to say precisely when Hindu civilisation and religion were introduced into J., though it must have been very early in the Christian era. Buddhism was superadded; and there are many old Buddhist temples scattered throughout the island, memorials of the former prevalence of that religion. The most famous is that called Boro Buddor (q. v.). Towards the close of the 14th c., Mohammedanism found a footing in the eastern provinces; and in 1475, the Hindu empire was overthrown, and Mohammedanism became the faith of the country; yet as late as 1511, when the Portuguese first visited J., they found a Hindu king in Bantam. In 1595, the Dutch sent out an expedition under Houtman, who, on arriving at Bantam, found the king at war with the Portuguese, and offered him assistance, obtaining in return permission to build a factory. In 1677, after many contests with the native princes, the Dutch obtained extensive territories and important trading concessions. In 1811, when Holland became incorporated with France, the British took possession of J., which, after five years' occupation, was restored to the Dutch. A long and bloody war ended in the whole island becoming virtually a Dutch province in 1830, though two states are still nominally ruled by native princes. Slavery was totally abolished in the island on September 20, 1859, by the legislature of Holland.—See Sir Stamford Raffles's *History of Java* (2 vols. London, 1817); Crawford's *Eastern Archipelago; Java, or How to Manage a Colony,* by J. W. B. Money; and the official Dutch Reports. See Java in Supp., Vol. X.

JA'VELIN, a short and light spear used for darting against an enemy. In the Roman legion, the first and second lines (the Hastati and the Principes) were both armed with two javelins to each man. Each javelin (Lat. *pilum*) was in all about 6¾ feet in length; the shaft 4½ feet long, of tough wood, an inch in diameter; and the remainder given to the barbed pyramidal head. In action, the legionary hurled one javelin on the enemy at the first onset; the second he retained as a defence against cavalry. The Goths and other barbarians used a javelin.

JAXA'RTES, now called Sihûn, or Sir-Daria (i. e., Yellow River), a river of Turkestan, which rises in the high plateau south of Lake Issikul, in the Thian Shan Mountains, flows in a westerly direction through the valley of Khokan, receiving in its course numerous accessions; after passing Otrar, it divides into two branches; the largest and most northerly retaining the name Sir-Daria, flows west-by-north, separating the Russian territory from the steppes of Turkestan, and, after a course of 1150 miles, falls into the Sea of Aral; the lesser branch, called Kuvan-Daria, flows westward, supplying some small lakes in the line of its old channel, but for several years back has not reached the Sea of Aral, though sixty years ago it had a greater volume of water than the Sir-Daria.

JAY, John, an American statesman and jurist, and first chief-justice of the supreme court of the United States, was born in the city of New York, admitted to the bar in 1768. He took a moderate and conciliatory part in the American Revolution, was a member of the Congress of Philadelphia, was president of Congress in 1778, and minister to Spain in 1779. He was very influential in negotiating the treaty of peace, and it was, according to Lord St Helens, 'not only chiefly, but wholly by his means that it was brought to a successful conclusion.' He wrote a portion of the *Federalist.* His services to the Federal party were deemed so great, that Washington offered him his choice of the offices in his gift, and he selected that of chief-justice. He resigned, and became governor of New York, and in 1794, minister to England. On the defeat of the Federal party, he retired from public life, and lived in great seclusion, only taking part in religious, peace, temperance, and anti-slavery movements. He died at Bedford, New York, May 17, 1829.

JAY, William, an English Congregational minister. See Supp., Vol. X.

JAY (*Garrulus*), a genus of the Crow family (*Corvidæ*), differing from magpies chiefly in the rather shorter bill, and in the shorter and rounded, or sometimes almost even tail. They are inhabitants of forests and wooded districts, chiefly in the temperate parts of Europe, Asia, and North America; and feed more on fruits and seeds than crows and magpies generally do; but they have the omnivorous character of the rest of the family, and often rob the nests of other birds, whether containing eggs or young.—The Common J. (*G. glandarius*) is a well-known native of England and of the south and middle of Scotland, although less common than it once was, in consequence of the incessant war which has been waged against it, both by gamekeepers and by the legislature itself; an English statute of the 17th year of George II. having empowered grand juries to offer threepence for the head of each jay, on account of alleged injury done to young trees. It is rather smaller than a jackdaw; the plumage is mostly ash-gray, finely tinged with red or purple, the quill-feathers and tail mostly black, a beautiful mottled patch on each wing rayed with bright blue, a broad moustache-like stripe of black extending for an inch from the base of the lower mandible on each side; the head is furnished with a crest of erectile feathers, each of which has a streak of black in the middle. Jays are most frequently seen solitary or in pairs. They build in thick trees or bushes, and their nest is a basket-like structure of small sticks, lined

Common Jay (*Garrulus glandarius*).

number, are yellowish-white, minutely and thickly speckled with light brown. When taken young, the J. is very easily tamed, becomes very familiar and amusing, and perhaps excels all other British birds in its power of imitating voices and sounds. —The Blue J. (*G. cristatus*) of North America, a species abundant from the Gulf of Mexico to Canada, is smaller than the Common J.; it has a similar crest or tuft on the head, and a longer and more rounded tail. The general colour of the upper parts is bright purplish-blue; the wings and tail white, barred with black; the neck surrounded with a curved black collar. It is more gregarious than the Common J., and partially migratory.—The Canada J., or Carrion Bird (*G. Canadensis*), is a more northern American species.—Other very beautiful species are found in the north-west of America, Mexico, and the Himalaya Mountains.

JAYADE'VA, the name of a celebrated Hindu poet, who, according to some, lived about the middle of the 11th, according to others, about the middle of the 16th c. after Christ. His great work is the *Gîtagovinda*, an erotic poem in honour of Krishna, an incarnation of Vishnu, and his wife Râdhâ, interpreted in a literal and mystical sense.

JEDBURGH, an old town, and royal and parliamentary burgh of Scotland, capital of the county of Roxburgh, is beautifully situated on the left bank of the Jed, 14 miles east-south-east of Selkirk, and 40 miles south-east of Edinburgh. J. has been greatly improved in recent years, many fine new buildings having been erected. The most interesting architectural feature of the town is the remains of the magnificent abbey of Austin Canons, founded by King David I. about 1130. Of this structure, the church (230 feet long) alone remains. The abbey was rifled and burned in 1523 by the Earl of Surrey, and again by the Earl of Hertford in 1544. To preserve it from threatened ruin, the abbey, a few years ago, was extensively repaired, with judicious regard to its ancient architectural features. The present jail occupies the site of a castle in which Malcolm the Maiden died, and William the Lion, Alexander II., and other Scottish kings frequently resided. The principal manufactures of J. are blankets, flannels, shawls, plaids, and hosiery. Pop. (1871) 3321.

J. appears in record as early as the 9th century. Between the years 829 and 854, Ecgred, Bishop of Lindisfarne, whose diocese then extended to the north of the Tweed, built two towns at Jedburgh. One of these is now represented by the hamlet of Old Jedburgh; the other by the town of J., which was made a royal burgh in the reign of David I. Situated on the border, its inhabitants were a warlike race, whose slogan, 'Jeddart 's here!' was seldom long silent. Their chief weapon was the 'Jeddart axe,' or 'Jeddart staff,' a stout pole four feet long, with a steel head.

JE'DDAH. See Jiddah.

JEEJEEBHOY, Sir Jamsetjee, a Parsee merchant-prince and philanthropist, was born of poor parents at Bombay, 15th July 1783. At an early period, he shewed a great aptitude for mercantile pursuits, and in consequence, his father-in-law, Framjee Nusserwanjee, a Bombay merchant, took him into partnership. While still a young man, he visited most of the maritime countries of Asia, besides Egypt, Syria, and England. After he had become chief partner in his father-in-law's firm, the wealth of which rapidly and prodigiously increased, J. kept his eye on the progress of political events in Europe; and when peace was restored there after the fall of Napoleon, the Indian trade was so much

the imports from Europe rose fı
£3,052,000—in which increase, w
'the house of Sir Jamsetjee and
enormously participated.' By the
he had completed his 20th year of
amassed an immense fortune, and
acknowledged to be the first merc
He now began to exhibit, on a mag
liberality of spirit and love of his
His contribution to the Jamse
Hospital was 160,500 rupees; his e
Parsee Benevolent Institution, 440,
Mahim Causeway, built by him, cos
the Dhurumsalla, or Poor Asylum,
the water-works constructed by hi
180,000 rupees; and the endowm
setjee School of Industrial Arts,
Altogether, between the years 182
Jamsetjee J. spent 'upwards of a qu
pounds sterling in founding, endow
ing undertakings of a purely bene
Parsee and Christian, Hindu and M
alike the objects of his splendid a
beneficence. At length the fame of
reached the ears of Queen Victori
on him the honour of knighthood-
sion on which that dignity had be
an Eastern. Other honours follow
he was made a baronet of the U
He died 15th April 1859, and was s
baronetcy by his eldest son, Curs
Jeejeebhoy, who, in accordance wit
of his father's will, took his father's

JEFFERSON, Thomas, third P
United States of America, was the
and was born at Shadwell, Alb
Virginia, April 2, 1743. He stud
and Mary's College, Williamsburg; a
college, was engaged for some year
of law. In 1769, he was elected
House of Burgesses, where he joined
the revolutionary party. In 1773,
the Assembly, he took a promine
measures which resulted in the
Continental Congress, to which he
delegate, where he drew up the cele
tion of Independence. During the
of this Declaration, he was governor
in 1784 was sent minister to Fra
manners, accomplishments, and mor
did much to secure to America the p
that insured her success. Returni
was appointed, by Washington, Sec
a post due to his abilities, his in
distinguished services. The Fede
had been adopted, and the two part
divided the country began to deve
Washington, John Adams, Jay, and
in favour of a strong centralised gove
the party in favour of states' rights,
government of restricted and carefully
The first party took the name of F
latter were first called Anti-Federal
licans, and finally adopted the title f
as a reproach, of Democrats. Wh
retired, after eight years of office
and a new election took place, th
candidates, as leaders of the opposin
John Adams and Jefferson. Adam
largest vote, was declared president,
the next highest number, became the
1797. The strife of these parties culm
when J. and Aaron Burr were ele
and vice-president, against John Ada
candidate. On entering upon the

made few removals, and resolutely refused to appoint any of his own relatives to office, saying that he 'could find better men for every place than his own connections.' The most important act of his administration was the purchase of Louisiana from France. At the end of eight years, he retired to his residence at Monticello; but he did not retire to a repose of idleness; he kept up an immense correspondence, dispensed the hospitalities of his mansion to visitors from every part of the world, and founded the university of Virginia, of which he was for many years the rector. Though born and educated in the first rank of colonial life, he was a democrat in theory and practice; he held that 'the world is governed too much,' and that 'that government is best which governs least.' Though a large slaveholder, he laboured for the prohibition of the slave-trade, and of slavery in the territory beyond the Ohio River, and advocated emancipation in Virginia. His writings consist mostly of state papers and letters. His only literary work was his *Notes on Virginia*, published in 1782. He had one child, a daughter, and has numerous descendants. His death was very remarkable; it occurred on the 4th of July 1826, while the nation was celebrating the fiftieth anniversary of the Declaration of Independence, which he had written. On the same day, and almost at the same hour, John Adams, the second president, who had signed with him the Declaration, died in New England.

JEFFERSON CITY, capital of Missouri, United States of America, on the south bank of the Missouri River, 125 miles from St Louis, with which it is connected both by the river and the Pacific Railway. It has a brisk trade with the hunters, and overland emigrants to California and Utah. The city has a state-house, governor's residence, state penitentiary, &c. Pop. (1870) 4420.

JEFFREY, Francis, Lord, a celebrated Scottish critic and lawyer, was born in Edinburgh, 23d October 1773; studied classics, logic, and belles-lettres at Glasgow and Oxford, and law at the university of his native city. In 1794, he was called to the bar. Two years before this, he had become a member of the Speculative Society (in connection with the university). J. soon became prominent among the members by the keenness and liveliness of his intellect, and the elegance of his literary taste, but his progress at the bar was slow, partly on account of the antipathy which then existed to literary lawyers, and partly on account of his political opinions. Meanwhile he and several other young men then residing in Edinburgh, ambitious of finding a wider outlet for their talent than the discussions in the Speculative Society or the practice of the bar afforded, conceived the idea of starting a critical journal. The first proposer of the scheme was the Rev. Sydney Smith. The result was the establishment of the *Edinburgh Review* (q. v.), of which J. became editor, an office he retained till 1829. His own contributions were generally the most brilliant and attractive that appeared in its columns. On ethics, politics, and many of the questions affecting the social wellbeing of man, he has written with much clearness, penetration, and force; but the thing on which he is said to have placed the highest value was his *Treatise on Beauty* (see Æsthetics), a charming melange of criticism, description, and sentiment, but of doubtful philosophic worth. After some years, J.'s practice at the bar began to increase; in jury trials, he shone to great advantage, and particularly in the trials for sedition between 1817 and 1822. In 1830, he became Lord Advocate for Scotland; and after the passing of for the city of Edinburgh, which he continued to represent till 1834, when he gladly exchanged the turmoil of party politics for the duties of a judge of the Court of Session. During the latter years of his life, J. resided at Craigcrook Castle, in the vicinity of Edinburgh, where he died, January 26, 1850. A selection of his Essays, in 4 vols., appeared in 1844. A biography of J., by his friend, Henry, Lord Cockburn (q. v.), a brother-judge of the Court of Session, was published in 2 vols. (Edin. 1852).

JEHO'VAH (Heb. *Yehovah;* more correctly, *Yahve*, *Yahăveh*, or *Yahăvâh;* in poetry, *Yâh;* generally believed to be derived from the verb *haya*, 'to be,' though scholars are far from unanimous in regard to its etymology) is one of the names of God employed in the Old Testament. Its meaning—if the root be *haya*—is, 'He that is,' 'the Being;' or, since the word contains all the forms of the past, present, and future tenses, 'the eternal One.' It is generally employed to express a different conception of the Deity from that which is contained in the word *Elohim* (q. v.). The latter appears to be the older term, in use before the Hebrews had attained a national existence, while *Jehovah* exclusively seems to denote the national God, supreme over all other deities, and who, under this name, had, according to Exodus vi. 3, not 'made himself known' to the patriarchs before the time of Moses. That J. is specifically the God of the Hebrews is clear from the fact, that the heathen deities never receive this name; they are always spoken of as *Elohim*. Moreover, the altars, the sacrifices, the festivals, the tabernacle, the temple, the priesthood, and the prophets, all belong emphatically to Jehovah. Gideon shouts, 'The sword of Jehovah and of Gideon,' as a Roman warrior would have invoked the aid of Jupiter. In one sense, the term J. is less broad and universal in its application than Elohim, who, in the first verse of the Bible, appears as the creator of heaven and earth, and who is God over all, irrespective of nations; but in another sense, it clearly indicates an advance in religious conception. While *Elohim* is introduced more as an Almighty Creative Power than a 'Being,' J. is God in full personal relation to man—He speaks to his creatures, makes covenants with them, becomes their lawgiver, and desires their homage and worship. The Hebrew writers even run their representations of the Divine personality into what seem to us the extremest forms of anthropomorphism.—Deep reverence for the Deity and the Divine name has led the Jewish church to the substitution of Adonai (*Lord*) in the *pronunciation* of J., the latter being vowelled by the Masoreths like the former.

A very nice and difficult controversy with respect to the authorship and unity of the Pentateuch, has long been carried on among scholars in connection with these two names. See Genesis and Pentateuch.

JELALABA'D, a town of Afghanistan, stands near the Cabul, in a fertile plain, which is separated from Peshawur by the famous Khyber Pass. It thus occupies a commanding position on the grand route between India and Central Asia. Pop. about 3000. The place acquired an historical interest during the Afghan wars, having been heroically held by Sir Robert Sale (1841—1842), notwithstanding the fatal disasters of the first expedition, till it was relieved by the triumphant advance of the second. See Afghanistan.

JELATO'M, JELATI'NA, or ELATMA, a town of Russia, in the government of Tambov, is situated 158 miles north of the town of that name, on the sulphur are here manufactured. Pop. (1867) 7376.

JELE'TZ, a town of Russia, in the government of Orel, is situated 110 miles east-south-east of the town of that name, on the Sosna. In the vicinity are extensive iron-mines, and the town has become famous for its wheaten flour, which is exported throughout the whole of Russia. Pop. (1867) 30,182.

JELLACHICH DE BUZIM, JOSEPH, BARON, a distinguished Austrian general, and Ban of Croatia, was born at Peterwardein in 1801. His father, the descendant of an old Croatian family, was a general in the Austrian service, and attained some celebrity in the Turkish wars, and in those of the French Revolution. The baron was early employed in military service on the Turkish frontier, and distinguished himself by his courage and skill. He succeeded also in winning in a high degree the confidence of the Croatians, so that in 1848 the court of Vienna was glad to appoint him Ban of Croatia, in order to secure the support of the Slavonian Croatians against the Magyars of Hungary, and he took a very active part in the suppression of the Hungarian rebellion. He not only displayed talents for government and military command, but also for poetry. He died at Agram, June 1859. A collection of his poems was published at Vienna in 1850.

JE'LUM. See JHELUM.

JEMA'PPES, a village of moderate size, not far from Mons, in the Belgian province of Hainault, which has acquired an historic celebrity from the victory won here by the French republicans, 40,000 strong, under Dumouriez, on 6th November 1792, over the Austrians, who were in nearly equal force. By this victory, the way into Belgium was opened to the French, and the spirits of the army and of the people greatly elevated by the first great victory of their raw levies over the disciplined and experienced Austrian troops. Pop. about 5000.

JE'NA, a town in the grand-duchy of Saxe-Weimar-Eisenach, and formerly the capital of the duchy of Saxe-Jena, is most beautifully situated in a romantic valley at the confluence of the Leutra with the Saale. Pop. (1871) 8197. It derives celebrity chiefly from its university, but also from the great battle fought here between the French and the Prussians.—The *University of Jena* was founded about the year 1547 by the Elector John Frederick of Saxony, who intended it to supply the place of Wittenberg as a seat of learning and of evangelical doctrine. It soon acquired a high reputation. The imperial authorisation was obtained, after some delay and difficulty, in 1558. It is the university of all the Saxon states, and is supported by contributions from them all. Its library contains upwards of 200,000 volumes. The most flourishing period of the university was that of Duke Karl August, a zealous patron of art and science, 1787—1806 A.D. To have obtained academic honours in J. is no small recommendation to employment in other German universities, and many of the most distinguished ornaments of other universities have been students of this. Some of its professors were among the first and most successful supporters of the philosophy of Kant. Fichte founded a new school of philosophy here in 1794, and the names of Schelling and Hegel are also connected with Jena. The brothers Schlegel, Voss, Fries, Krause, and Oken, have added to its celebrity in literature and science. The faculty of medicine, as well as those of theology and law, has reckoned many distinguished names. The most eminent theologians, however, have been of the most extreme rationalistic school; the name of Paulus may be mentioned as a sufficient example.

versity, which about the year 18
is now less than 500.

The great battle of Jena was fo
bourhood of the town on 14th O
Prussian army, numbering abou
under the command of the Prin
while the French, commande
amounted to 90,000. The forme
defeated. On the same day, Da
aged Duke of Brunswick at Auer
French against 60,000 Prussians
battles decided for a number of
the Prussian kingdom and of the
The loss of the Prussians on that
in the conflicts of the preceding
to 50,000 killed, wounded, and
the loss sustained by the Saxons,
French gave out their loss to b
270 officers.

JENNER, EDWARD, the disco
tion, was born at Berkeley, in G
the 17th of May 1749, and was th
Rev. Stephen Jenner, vicar of the
of Rockhampton. His scholastic
finished, he was removed to Sodb
in order to be instructed in the ele
and pharmacy by Mr Ludlow, an
there; and on the expiration of hi
gentleman, he went to London, in
his age, to prosecute his professio
the direction and instruction of th
Hunter (q. v.), in whose family he
years. Under Hunter's superinten
an expert anatomist, a sound path
experimenter, and a good naturalis
of the master exerted a lasting eff
and Hunter's letters, which J. ca
evince the affectionate feeling an
tastes which subsisted between th
London, J. settled at Berkeley,
professional knowledge and kindly
acquired for him a large amount
1788, his well-known memoir,
History of the Cuckoo, appeared in
of the Royal Society, containing the
tigations begun at the request of
years afterwards, the fatigues of
having become irksome to him,
confine himself to medicine, and w
obtained the degree of M.D. from
St Andrews.

The discovery of the prophyl
vaccination, by which the name o
immortalised, was the result of a
of observations and experiments.
whilst he was yet a youth, was f
to the nature of cow-pox in the fo
He was pursuing his professional
house of his master at Sodbury,
country-woman came to seek advi
of small-pox being mentioned in h
observed: 'I cannot take that dis
had cow-pox.' This was before th
was not till 1775 that, after his re
tershire, he had an opportunity of
the truth of the traditions respecti
it was five years later before he
see his way to the great discovery t
for him. In the month of May 1
with his friend Edward Gardne
between Gloucester and Bristol, 'h
natural history of cow-pox; state
to the origin of this affection from
horse [when suffering from the greas
different sorts of disease which atta

variety which afforded protection against small-pox; and with deep and anxious emotion, mentioned his hope of being able to propagate that variety from one human being to another, till he had disseminated the practice all over the globe, to the total extinction of small-pox.'—Baron's *Life of Jenner*, p. 128. Many investigations regarding the different varieties of cow-pox, &c., delayed the actual discovery for no less than 16 years, when at length the crowning experiment on James Phipps (see INOCULATION) was made on the 14th of May 1796, and J.'s task was virtually accomplished. This experiment was followed by many of the same kind; and in 1798 he published his first memoir, entitled *An Inquiry into the Causes and Effects of the Variolæ Vaccinæ.* Although the evidence accumulated by J. seemed conclusive, yet the practice met with violent opposition until a year had passed, when upwards of 70 of the principal physicians and surgeons in London signed a declaration of their entire confidence in it. His discovery was soon promulgated throughout the civilised world. Honours were conferred upon him by foreign courts, and he was elected an honorary member of nearly all the learned societies of Europe. Parliament voted him, in 1802, a grant of £10,000, and in 1807, a second grant of £20,000; and during the last few years, a public statue in his honour has been erected in the metropolis. His latter days were passed chiefly at Berkeley and Cheltenham, and were occupied in the dissemination and elucidation of his great discovery. He died of apoplexy at Berkeley in February 1823.

JERA'SH. See GERASA.

JE'RBA. See GERBI.

JE'RBOA (*Dipus*), a genus of rodent quadrupeds, of the family *Muridæ*, remarkable for the great length of the hind-legs, and kangaroo-like power of jumping. The fore-legs are very small, hence the ancient Greek name *dipous* (two-footed). The tail is long, cylindrical, covered with short hair, and tufted at the end. The jerboas are inhabitants of sandy deserts and wide grassy plains in Asia and the east of Europe, Africa, and Australia. They are burrowing animals, nocturnal, very destructive to grain and other crops, laying up hoards for their winter use. They take prodigious leaps when alarmed; the fore-feet are then not used at all, but by means of the hind-feet and the tail, they leap, although they are small animals, several yards. Their flesh is said to resemble that of the rabbit.—Closely allied to the jerboas are the *Gerbils* (*Gerbillus*), small quadrupeds, also distinguished by great length

Jerboa (*Dipus Ægyptius*).

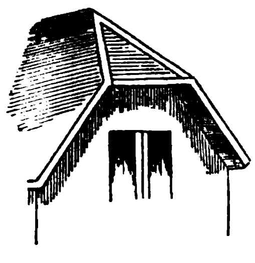
the warm and sandy portions of the Old World.

JEREMI'AH (Heb. *Yirmiyahu*), a Hebrew prophet, was the son of Hilkiah, a priest of Anathoth, a place about three miles north of Jerusalem. He prophesied under the reigns of Josiah, Jehoahaz, Jehoiakim, Jehoiachin, and Zedekiah (630—590 B. C.), and even later. His character and fortunes are clearly discernible in his writings. To him, a man of an emphatically spiritual, truthful, self-sacrificing nature, it was given to predict in the midst of the, both politically and religiously, rotten state of the commonwealth, under the successive weak kings, its speedy destruction. Fearless yet hopeless, he delivers his mournful messages from year to year, and battles with despairing heroism against the inevitable. His life thus became one long martyrdom. We read of his enduring 'reproach and derision daily' (xx. 8); his townsmen of Anathoth threatened to slay him, if he did not stop prophesying woe (xi. 21); his own brethren, the house of his father, 'dealt treacherously' with him (xii. 6); so that his spirit at times failed him. There were two political parties in Judah at this time—in favour of a Chaldæan and an Egyptian alliance respectively. Like the earlier patriotic prophets, J. repudiated both at first. The course of events, however, had necessitated a compromise, and the religious party—gradually decreasing in numbers and influence—had declared against Egypt, and in favour of Chaldæa. King Josiah, who belonged to it, perished at Megiddo, in the valley of Esdraelon, in an attempt to stop the progress of Pharaoh-Necho (609 B. C.). After this, things grew worse. The Egyptian party became predominant, and J. was now forced to take a side, and become a partisan as well as a prophet. He speaks of the king of Babylon as God's servant, and prophesies the destruction of the temple. A cry arose from the priesthood and the prophets for his life, and he escaped with difficulty (xxvi.). At last came the judgment. The best portion of the people were carried into captivity; and J. urged his countrymen to wait for the period of deliverance with religious fortitude and patience. A sudden irruption of the Egyptians drove the Chaldæans out of Judah, and J. was again exposed to persecution, thrown into a pit to die, and only rescued by the kindness of an Egyptian eunuch. The capture of Jerusalem by Nebuchadnezzar rendered the prophet's position more tolerable. J. had always preached submission to the Chaldæans. He was even patronised by the conqueror, and offered a home at Babylon, but he preferred to reside among the wretched remnant of the people left in Judah (xl.). Intestine strifes, however, soon drove some to take refuge in Egypt. J. was carried off along with the exiles, and here he is believed to have died, and his grave was long shewn at Cairo. According to others, however, he came back to Judæa. The writings of this prophet, dictated by him to Baruch, have been arranged with little regard to order, and the text is in a state of great confusion, notwithstanding that J. himself undertook two distinct redactions. They exhibit great tenderness and elegiac beauty of sentiment, but lack the sublime grandeur of Isaiah. He often borrows largely from his poetic predecessors. Several of the Psalms have been attributed to him, especially by modern critics. Hitzig numbers 34, which he believes to be the composition of Jeremiah. There is no reason to doubt that the Lamentations are properly ascribed to him, while the apocryphal work of his, mentioned by Jerome (Matth. 27), deserves little notice. Among commentators may be mentioned Origen, Jerome, Theodoret, Oecolampadius, Sanctius, Venema, Michaelis, Umbreit, Henderson, Dahler, Knobel, Ewald, Hengstenberg, and Bunsen.

JERICHO, once one of the most flourishing cities of Palestine, two hours' journey westward from the Jordan, and six hours north-east from Jerusalem. Westward from J. lies a waste tract of limestone mountains, rising in stages; but the immediate vicinity is well watered and fruitful, yielding dates, raisins, balsam, and honey, yet a favourite abode also, in early times, of poisonous snakes. The capture of J. by the Israelites on their first entry into Canaan, its destruction, and the rebuilding of it by Hiel the Bethelite in the reign of Ahab, about 918 B.C., are found recorded in Josh. vi.; 1 Kings xvi. 34. It appears to have been afterwards the seat of a school of prophets (2 Kings ii. 4, &c.). Herod the Great resided in J., and beautified it. It was destroyed in the reign of Vespasian, and again rebuilt under Hadrian. In the time of the Crusades, it was repeatedly captured, and at last completely destroyed. At the present day, its place is occupied by a miserable village called Richa, or Ericha, with scarcely 200 inhabitants.

JERKED-BEEF, beef preserved by drying in the sun. It is properly called *charqui*, and, like its name, is of Chilian origin, although now made in large quantities in Monte Video, Buenos Ayres, and other places in South America, where the vast droves of cattle on the prairies are available for the purpose. The beasts are slaughtered when in good condition, and the fleshy parts are dexterously pared off in such a manner as to resemble a succession of skins being taken from the same animal. These sheets of flesh, which are rarely more than an inch in thickness, being exposed to the sun, dry before decomposition commences, and in that state can be kept almost any length of time. Sometimes the charqui is dipped into brine, or rubbed with salt, before being dried. It is largely imported to Cuba, where it is called *tasajo*, for feeding the slaves. The manufacture of charqui, or jerked-beef, has been introduced into Australia, and in 1862, shipments of it were made from Victoria to the mother-country, but with what success is not known. As it contains all the nutritive matter of animal food, and only wants proper cooking to make it palatable, it may become an important article of consumption. The price is about three-halfpence or twopence per pound.

JERKIN-HEAD, a form of roofing which is half-gable, half-hip. The gable generally goes as high as the ties of the couples, above which the roof is hipped off.



Jerkin-Head.

JEROME, St (Eusebius Hieronymus Sophronius), was born at Stridon, a town whose site is now unknown, on the confines of Dalmatia and Pannonia, at some period between 331 and 345—probably nearer to the latter year. His parents were both Christians. His early education was superintended by his father, after which he studied Greek and Latin rhetoric and philosophy under Ælius Donatus at Rome, where he was also admitted to the rite of baptism. After a residence in Gaul, he seems to have revisited Rome; but in the year 370, he had settled in Aquileia with his friend Rufinus. For some unknown reason, he suddenly went hence to the East; and after a dangerous illness at Antioch, which appears to have still further added to the religious fervour of his disposition, he retired, in 374, to the desert of Chalcis, where he spent four years in penitential exercises and in study, especially of the Hebrew language. In 379, he was ordained a priest at Antioch, after which he spent three years in Constantinople in close intimacy with Gregory of Nazianzus; and in 382 he came on a mission connected with the Meletian schism at Antioch (see Meletius) to Rome, where he resided, until 385, as secretary of the pope Damasus, and where, although already engaged in his great work of the revision of the Latin version of the Bible, he attained to great popularity and influence by his sanctity, learning, and eloquence. Many pious persons placed themselves under his spiritual direction, the most remarkable of whom were the Lady Paula, and her daughter Eustochium. These ladies followed him to the Holy Land, whither he returned in 384. He permanently fixed his residence at Bethlehem in 386, the Lady Paula having founded four convents, three for nuns, and one for monks, the latter of which was governed by J. himself. It was in this retreat that J. pursued or completed the great literary labours of his life; and it was from these solitudes, all peaceful as they might seem, that he sent forth the fiery and vehement invectives which marked not only his controversy with the heretics Jovinian, Vigilantius, and the Pelagians (q. v.), but even with his ancient ally, Rufinus (q. v.), and, although in a minor degree, with St Augustine. His conflict with the Pelagians rendering even his life insecure at Bethlehem, he was compelled to go into concealment for above two years; and soon after his return to Bethlehem in 418, he was seized with a lingering illness, which terminated in his death, September 30, 420. His original works, consisting of letters, treatises, polemical and ascetical, commentaries on Holy Scripture, and his version and revision of former versions of the Bible, were first published by Erasmus, 9 vols. folio (Basel, 1516), and have been several times reprinted. The best editions are that of the Benedictines, 5 vols. folio (Paris, 1693—1706), and, still more, that of Vallarsi, 11 vols. (Verona, 1734—1742). St J. is universally regarded as the most learned and eloquent of the Latin Fathers. His commentaries on the Bible are especially valuable for the learning which they display; but his opinions are often exaggerated and fanciful, and through his controversial writings there runs a strain of violent invective, which contrasts unfavourably with the tone of his contemporary St Augustine. See Vulgate.

JEROME OF PRAGUE, the companion of John Huss, whom he surpassed in learning and eloquence, though he was inferior in judgment and moderation, was born at Prague in the latter half of the 14th century. After attending the university of his native town, he continued his studies at Paris, Cologne, Oxford, and Heidelberg, and in 1399 took out his degree as Master of Arts and Bachelor of Theology. His reputation for learning was so great, that his advice was taken by Ladislas II., king of Poland, with respect to the founding of the university of Cracow in 1410; and Sigismund, king of Hungary, invited him to preach before him at Buda. He entered with his whole soul into the contest carried on by his friend Huss against the abuses of the hierarchy and the profligacy of the clergy. His zeal, however, carried him too far; he publicly trampled the relics under his feet, committed to prison the monks who did not share his opinions, and even ordered one of them to be thrown into the Moldau. When Huss was arrested at Constance, J. hastened to defend him; but receiving no satisfactory answer to a letter in which he had demanded a safe-conduct from the council, he set out on of Sulzbach, and conveyed in chains to Constance. Here he was cast into a dungeon, and placed on trial. After some months' imprisonment, he recanted his opinions, but subsequently abjured his recantation with horror, and went to the stake with great firmness. He was burned alive, 30th May 1416. J.'s life has been written by Heller (Tübingen, 1835) and by Becker (Nördlingen, 1858).

JERROLD, DOUGLAS, dramatist, journalist, and miscellaneous writer, was born in London on the 3d January 1803. His early efforts in literature were directed to the theatre, and some of his pieces—*Black-eyed Susan* (1829), for instance—still hold possession of the stage. At a later period, he produced several five-act comedies, the best known of which are *Time Works Wonders*, and *The Bubbles of a Day*. J.'s reputation stands more securely on his novels, sketches, and essays than on his dramatic works. His *Men of Character* was originally published in *Blackwood*. He joined the staff of *Punch* (1841), and contributed to that periodical *A Story of a Feather*, *Punch's Letters to his Son*, and the world-famous *Caudle Lectures*. Later appeared *The Chronicles of Clovernook*, the kindliest and most delightful of all his books, and *St Giles and St James*, his most elaborate novel. For several years before his death, he edited *Lloyd's Weekly Newspaper*. He died from disease of the heart at Kilburn Priory, at the age of 55.

J. was a brilliant rather than a great man of letters. His plays are sparkling, but they want body and substance, and uninteresting matter had never perhaps so epigrammatic a setting as in his novels and tales. His reputation as a social wit stands higher than his reputation as a writer. He was greater in society than in his closet. Like a flint, every stroke brought fire from him. See *Life and Remains of Douglas Jerrold*, and *Douglas Jerrold's Wit and Humour;* both by his son, William Blanchard Jerrold (Lond. 1858).

JERSEY—THE CHANNEL ISLANDS. J. is the chief of the group called the Channel Islands (q. v.). The other inhabited islands of this group are Guernsey, Alderney, Sark, Herm, and Jethou. The coast is very dangerous, but light-houses are placed on most of the island headlands, and on the dangerous rocks called the Casquets, west of Alderney. The Chaussey Islands belong to France. The following table exhibits the area and population of the principal islands:

Name of Island.	Acreage.	Acreage cultivated.	Population.	
			1861.	1871.
Jersey, . .	29,000	20,000	56,078	56,627
Guernsey, .	14,000	9,000	29,780	30,593
Alderney, .	2,000	1,000	4,933	2,788
Sark, . .	1,200	400	600	546
Other Islands, .	....	....	230	92

Physical Geography—Description.—J., which lies 17 miles south-west of Guernsey, and 16 miles from the coast of France, is of an oblong form, about 10 miles in length and 6 in width. The land is high on the north coast, and slopes to the south and east. It is intersected by several small streams. The coast is indented by large open bays on the west, south, and east; but on the north, by small rocky inlets. The interior is mostly table-land, well wooded, especially in the valleys along the winding streams. J. is divided into 12 parishes. The churches have little architectural pretension, but are generally picturesquely situated. The principal

bay of that name. It possesses a diminutive harbour and castle, a good grammar-school, and extensive vineries. Mont Orgueil Castle is a grand and imposing medieval fortress, looking over Gorey Harbour. Some parts of it are said to be of the time of Julius Cæsar. It was the prison of Prynne and the Parliamentarians, and has been used as a barrack. A good view of the island may be obtained from *Hougue Bie*, or Prince's Tower, a building raised on a mound of legendary interest.

ALDERNEY and **GUERNSEY** are described elsewhere (see those heads).

SARK (*Sercq, Gers*). Great and Little Sark are one island, connected by a natural causeway called the *Coupée*. They are lofty table-lands, with precipitous sides. The total length of the islands and rocks is about five miles; the greatest width, including Brechou and the Burons, about three miles. Sark is eight miles from Guernsey. The principal objects of interest are the pierced rocks, caverns, and fissures. The caves are very rich in zoophytes. The seigneur is the Rev. W. Collings, who resides on the island. There is one parish church, and a lodging-house for visitors, &c. The coast is very difficult of access, the only entrance to the interior being through a *creux* or tunnel cut in the rock.

Geology.—Most of the islands are composed of primary or granitic rocks. Alderney is a mass of syenite, with hornblende, porphyry, and occasional sandstone. The structure of Guernsey is hard syenite to the north, and gneiss to the south. The geology of Jersey is more varied, presenting a mixture of metamorphic rocks, conglomerates, and sandstones, with syenites and quartzites. Shale and blown sand are also prevalent. Sark is composed of very hard syenite, with veins of greenstone and felspar. Granite is quarried from all the islands, especially from Guernsey, Herm, and Mount Mado in Jersey, both for home use and exportation.

The scenery of the Channel Islands is exquisitely varied and beautiful; probably in no other area of similar size could be found such a combination of savage rocks and pleasing landscapes.

The climate of the Channel Islands is agreeable and suitable to invalids. The prevailing winds are from north and north-west. The mean annual rainfall is 35 inches in Guernsey; but the climate is not overmoist, the soil being porous and evaporation rapid. The mean annual temperature of Jersey is 50°·8; of Guernsey, 51°·5, or 2°·5 warmer than Greenwich. The range of temperature is very moderate; but the climate of Guernsey is rather more equable than that of Jersey. August is the hottest month; February, the coldest. Frost and snow are rare. The autumns are very beautiful; and a second summer, called the *Petit Été de Saint Martin*, generally sets in about the 10th of October, and lasts till the middle of December. Flowering plants and shrubs are a fortnight earlier in the spring than in England.

The produce of the islands is principally agricultural; but horticulture and floriculture are successfully followed—the latter especially in Guernsey. The soil is generally light, deep, and fertile. The system of cultivation is very primitive. The principal manure is sea-weed, which is gathered in vast quantities from the shores, at certain seasons, under strict regulations. Its annual value to Guernsey alone is estimated at £30,000. A great quantity is burned for the manufacture of kelp and iodine.

The land is held in small parcels ranging from five to twenty English acres. The principal crops are hay, wheat, turnips, potatoes, mangel-wurzel, upwards of 30 bushels to the acre—the average of England being 24. The Channel Islands possess an excellent breed of horned cattle, usually known as Alderneys, remarkable for their small size and symmetry, and for the quantity and quality of the milk which they yield. From 16 to 17 pounds of butter are sometimes obtained weekly from the milk of one cow. Fruit is much cultivated in Jersey, especially the vine, and the peach, apricot, plum, apple; and the pear, particularly the Chaumontel, attains extraordinary size and flavour in Guernsey. About 30,000 bushels of table-fruit are annually exported from the islands to London and Paris. Shrubs and flowers flourish abundantly. The Acclimatisation Society of London receive favourable accounts from the Guernsey branch of the successful cultivation of the Brazilian arum, for the manufacture of arrow-root, the produce being very large and profitable. Vegetables are plentiful; and the cow-cabbage grows to the height of ten or twelve feet. The other products of the islands are principally fish, viz., turbot, red mullet, John Dory, conger, *lauçons* or sand-eels, also lobsters and oysters, large quantities of which are exported. A considerable traffic is carried on in granite from all the islands; the blue granite from Guernsey for macadamising, and the pink syenite from Mount Mado, in Jersey, for paving purposes, are highly esteemed, and largely imported into London. The quantity of granite exported annually from the harbour of St Sampson averages 125,000 tons.

History.—The early history of the Channel Islands is mythical and legendary; but it is probable that the earliest inhabitants were Bretons. The islands were under Roman occupation during the 3d and 4th centuries, the name of Cæsarea or Jersey (Cæsar's Isle) occurring in the Itinerary of the Antonines. Christianity was probably introduced by missionaries from Ireland about 460 A. D.—St Helerius being the traditional apostle of Jersey, and St Sampson of Guernsey. Probably a mixed population of Saxons, Danes, Goths, and Gauls betook themselves to these islands during succeeding centuries, as the Franks possessed the continent. The islands were taken possession of by Rolf or Rollo previous to his invasion of Normandy. After the Norman Conquest, the islands were alternately English, under William the Conqueror; Norman, under Rufus; English, under Henry I.; and Norman again, under Stephen. With Henry II., the allegiance of the islands reverted to the king, as sovereign of Normandy as well as England; and after the loss of Normandy, the islands still remained faithful to England.

John is said to have given a constitution to Guernsey. The islands still belonged ecclesiastically to Normandy, the Bishop of Coutances being their diocesan. Edward III. and Henry V. materially weakened the papal bond; but it was not wholly severed till the Reformation, after which (in 1658) they were attached to the see of Winchester. In Henry VI.'s time, the French held Jersey for six years. During the civil war, Jersey was loyal and Episcopal; Guernsey, republican and Presbyterian; and traces of this divergence are still to be found. In 1781, during the first American war, a French expedition, under the Baron de Rullecourt, landed in Grouville Bay, and marched into the market-place of St Helier, but was repulsed with loss by the garrison and militia. During the French and American wars, the islanders fitted out many privateers, and obtained rich prizes. Smuggling was finally suppressed in 1800. Since the peace, the Channel Islands have thriven and prospered by commerce and agriculture, and especially by becoming

have been attracted thither
scenery or the salubrity of the

Antiquities.—Formerly, ther
lechs in the islands; the la
those near Mont Orgueil in Jers
Bay in Guernsey. A few old
architecture remain. The old
is that of St Brelade, said to
1111.

Language.—The vernacular la
is the old Norman-French. It
ities of spelling and pronunciati
than in Jersey, where the Fren
where the English element
dialect. French, however, is
the law-courts of all the islands
may address the court or ex
English. The church services
French in the country parish
service takes place in most of th

Inhabitants.—The proportion
Jersey is very large, British
French 2000; the native popul
nearly all of whom live in the co
are generally frugal and indep
much divided into cliques; the 's
in Guernsey are a marked divisi

Government and Laws.—Thou
British crown, the islands have
ent *status* and action. The prin
island is the *lieutenant-governor*
officer in the army, and supre
matters; but he has also certain
duties. In Jersey especially, hi
is very extensive. He continues

The *bailiff* or judge is the fi
each island. He is also appoin
generally for life. He presides
and has a casting vote in civil a
He originates all measures prop
and represents the crown in all
jurats are twelve in number, ele
suffrage of ratepayers, for life.
courts, and have a voice in all
Guernsey, they are elected by t
The rectors of the different par
seat in all councils: in Guerns
eight out of ten have a vote. Be
there are an attorney and a so
each island, and a high-sheriff, ca
vicomte, and in Guernsey, the *prév*

The other members of the 'sta
are, in Jersey, the *constables* of th
the 14 *deputies* of the *vingteniers*,
from the *vingtaines* of each parish.
on each island consists of the bailiff
'states,' not convenable without t
governor, pass *ordonnances*, which
three years; laws intended to be
be submitted to the sovereign.
governor has a *veto* on all question

In Guernsey, the 'Deliberativ
nearly of the same body, but th
'Elective States,' a more popular a
ing to 222 persons—the great ma
douzaniers, elected by the ratepaye
parishes. The douzaniers (origina
parish) are the managers of all
and elected for life. The bailif
lieutenant-governor has no veto,
passed take effect without the ro
The proceedings of the states relat
administration of the islands.

Alderney and Sark, though pos
their own, and jurisdiction in pet

wick of Guernsey.

The laws of the islands are very peculiar, being mainly derived from the ancient customary law of Normandy. The laws relating to property are singular: arrest takes place in Jersey without proof or affidavit. Until recently, the Queen's writ had no power in the islands, and the Act of *Habeas Corpus* has only lately been admitted. Encroachments on property are sometimes met by a curious appeal called *Ha! Ro! à l'aide, mon Prince!* repeated thrice. It is considered to be the remains of an old appeal to Rollo, Duke of Normandy, and is still a valid form of injunction.

Ecclesiastical State.—There is a dean in each island. The livings are in the gift of the crown, and of small value. The principal educational establishments are Victoria College in Jersey, and Elizabeth College in Guernsey. In both, a first-class education is given on very moderate terms, by an excellent staff of teachers, and they have various exhibitions at the universities of Oxford and Cambridge.

There is regular steam-communication between England and the Channel Islands, also between Jersey and the French ports of Granville and St Malo; and in summer there is generally an excursion-boat once a week to Sark and Herm.

The islands are protected by numerous forts, especially about the harbour of refuge in Alderney.

Books of Reference.—The principal historical authorities are the Rev. P. Falle's *History of Jersey;* Mr Duncan's and Mr F. B. Tupper's Histories of Guernsey; and Mr Dally for the agriculture of the islands. A more recent and a very comprehensive work is *The Channel Islands*, by D. T. Ansted, M.A., F.R.S., and R. C. Latham, M.A., M.D., F.R.S., &c. (Lond. 1862).

JERSEY CITY, a city in New Jersey, United States of America, on the west bank of the Hudson River, opposite New York, of which it is, in fact, though in another state, an extension, and to which it is united by large and powerful steam ferry-boats, lighted with gas, which ply night and day. It is the entrepôt of the Cunard and other ocean steamers, and the terminus of the New York and Philadelphia, Erie, Easton, Morris and Essex, and Northern Railways, and of a canal for coal-transport. It has manufactories of locomotives, machinery, glass, crucibles, &c.; and about twenty churches, the finest of which once stood in Wall Street, New York, but was removed, and carefully built up, stone by stone, in this city. Pop. (1860) 29,226; (1870) 82,546.

JERU'SALEM (Heb. *Yerushalem*, Gr. *Hierousalem*, Lat. *Hierosolyma;* called also in Arabic *El-Khuds* or *El-Kods*, 'the Holy'), the Jewish capital of Palestine. Its origin and early history are very obscure. Josephus (*Antiq.* i. x. 2) identifies it with the 'Salem' of which Melchizedek (Gen. xiv. 18) is called king; but St Jerome doubts the correctness of this view. Critics are better agreed as to the identity of J. with Jebusi, the city of the Jebusites (Josh. xviii. 28), and we know that the Jebusites retained possession of the strong positions of the hill of Zion for a considerable time after the conquest of Canaan, and even after the storming of J. (Jud. i. 8), while the tribes of Judah and Benjamin occupied the lower city. They were finally dispossessed by David (2 Kings v. 7). The name J. is first mentioned in Joshua x. 1. It lies upon the original border of Judah and Benjamin, the line of which runs through the valley of Hinnom; so that Zion and the northern city lay within the territory of Benjamin. Its historical importance dates from the time of David, who there fixed his residence, calling it

an altar to the Lord, on the place of the apparition of the angel by which the plague was stayed (2 Kings xxiv. 25). The building of the temple under Solomon was the consummation of the dignity and holiness of J., which was further enlarged, strengthened, and beautified by this king and by his successors. It suffered a diminution of political importance through the revolt and secession of the Ten Tribes, from which date its history is identified with that of the kingdom of Judah. It was pillaged (973 B.C.) by Sesac (Shishak) king of Egypt (2 Chron. xii. 9), by Joash king of Israel (4 Kings xiv. 13, 14); and finally (588 B.C.), it was taken, after a siege of three years, by Nabuchodonosor, who razed its walls, and destroyed the temple and palaces by fire (4 Kings xxv.). Having been rebuilt after the Captivity (536 B.C.), it was again taken and pillaged under Ptolemy Lagos (320 B.C.), and under Antiochus Epiphanes (161 B.C.), after the well-known and mysterious repulse of Heliodorus (176 B.C.); and Pompey (63 B.C.) took the city on the anniversary of its capture by Nabuchodonosor, put 12,000 of the inhabitants to the sword, and razed the walls to the ground, sparing at the same time the treasures of the sanctuary. However, a few years later, they were pillaged (51 B.C.) by Crassus; and from these beginnings dates the continued series of Roman aggressions, which terminated in the complete destruction of the city and dispersion of the Jewish race, under Vespasian and Titus (70 A.D.). From the description of the contemporary historian Josephus, we learn that at this period, J., which occupied the four hills Zion, Acra, Moriah, and Bezetha (separated from each other by deep valleys or gorges), consisted of three distinct regions—the Upper City, with the citadel of Zion; the Lower City, which lay to the north, on the hills of Acra and Moriah; and the New City, still further to the northward. The temple stood on the hill of Moriah, and John Hyrcanus built, on the north-western angle of this hill, a fortress called Baris, which was strengthened and beautified by Herod, and called 'Antonia,' in honour of Mark Antony. Herod's own palace stood at the northern extremity of the Upper City, and on the eastern angle was an open place called Xystus, surrounded by galleries, and communicating by a bridge with the temple. The environs of the city were adorned with gardens, parks, ponds, and tombs. In the progress of ages, ancient J. was surrounded by three walls, the direction of which, in some portions of their course, is difficult to be determined, although it is upon this that the controversy as to the authentic site of the Holy Sepulchre (q. v.) mainly turns. (A plan of the city will be given along with the map of PALESTINE, q. v.) The first and most ancient wall surrounded the Upper City on the hill of Zion, and joined on its northern side the prodromum of the temple. The second wall, or the wall of Ezechias, enclosed the hill Acra, around which stood the Lower City. It was connected at the south-western angle with the first wall, from which it ran in a semicircle to the north and north-east, surrounding the Upper City till it joined the fortress Antonia, described above. The third wall, built by Herod Agrippa, which enclosed the hill Bezetha and the so-called New City, appears to have started from the north-western angle of the first wall, probably at the tower called 'Hippicus,' and to have taken a northerly and north-easterly direction around the New City till it met the north-eastern angle of the temple wall. It thus, for a part of its course, was external to the second wall. The site of the Church of the Holy Sepulchre and the Hill of Calvary are thus supposed, by the that is, the second wall, although they were taken in by the subsequent extension of the city a short time afterwards, when the third wall was built, at some distance to the west of the second, by Herod Agrippa. The investigation of the exact direction of the second wall has long been an object of desire with biblical antiquaries, and it is probable that the excavations now projected or in progress will remove all uncertainty.

The city destroyed by Titus was rebuilt by Hadrian; but only as a heathen and Roman city, under the name Ælia Capitolina, with a temple of Jupiter; not as the capital of the Jewish race, who were forbidden, under pain of death, to visit it. Constantine, under the inspiration of his mother Helena, took measures to consecrate and perpetuate its Christian memories by ascertaining the sites of the various events in the Passion of our Lord, and erecting on them churches and other suitable memorials of those scenes of the redemption of the world, which thenceforward became an object of pious veneration to pilgrims from every part of the church. On the contrary, Julian the Apostate, with the design, according to the contemporary Christian account, of falsifying the prediction of our Lord, that 'not one stone should be left upon another,' encouraged and assisted the Jews to return and rebuild their ancient capital; an enterprise which, as the same writers—supported, in most respects, by the pagan historian Ammianus Marcellinus (xxiii. 1)—affirm, was frustrated by an earthquake or eruption, which the Christians ascribed to divine interposition.

J. again fell under foreign domination in 614, when it was stormed by the Persian king, Chosroes II. It was restored to the Emperor Heraclius in 628; but in 637 it fell into the hands of the Calif Omar, and in 1077 passed under the Turkman domination. During this long period, the practice of pilgrimages to J. was never entirely interrupted. In consideration of a tribute paid by each Christian visitor, a contemptuous permission was accorded for the purpose; but the cruelties practised on the pilgrims by the Turks being reported in the West, and especially by the fiery enthusiast Peter the Hermit, aroused the piety and chivalry of Europe, and led to that extraordinary succession of holy wars which for a time restored the tomb of our Lord and the holy city to Christian hands. On the 15th July 1099, J. was taken by assault, and was declared the capital of a Christian kingdom. Through a rapid succession of undistinguished names, with the exception of the first, the celebrated Godfrey of Bouillon, the new sovereignty was precariously maintained until 1187, when it fell once more before the arms of the great Saladin, since which time—if we except the brief and empty pageant in which Frederick II., emperor of Germany, having assumed the title by a collusive treaty with the sultan, entered into J. in March 1229—the city can hardly be said to have known other than Moslem rulers. It was retaken by the Sultan of Damascus in 1239; and although it was given up in 1241 to the Knights Hospitallers, they were driven out in the year 1244 by the Chorasmian Turks, by whom the ascendency of the Crescent was finally established. It was captured from the Saracens by the Mamelukes in 1382, but recovered in 1517 by the Sultan Selim, whose son, the celebrated Soliman, built the wall which at present encloses the city. J. is now the seat of a pasha, with the ordinary powers of a Turkish viceroy.

It remains to describe the present condition of the city. It is situated in 31° 46′ 43″ N. lat., 35° 13′

which it is distant 29 miles
shape, it is an irregular squ
rounded by the embattled
in circumference, erected by
The modern enclosure, howev
ciding with that of the Jewi
tion to the changes produce
of the city under Hadrian, b
part of the region anciently
was excluded, the stream of
Christian period having flowe
Places, the modern city has
ably towards the west. The fo
ancient city stood are enclosed
precincts; but the portion of th
north of Bezetha is now exclu
between the hills having been
lation of ruins, but little ineq
now observable. The streets a
and irregular, and the houses
metrical; although, owing to i
especially when viewed from th
number of minarets and domes
level of the flat-roofed houses,
ance of the city, seen from wit
and pleasing. There are seven
principal are the Jaffa Gate, th
the Stephen's Gate, and the Zi
be drawn between these four g
be divided into four parts, whi
with the four quarters into wh
—Christian, Armenian, Jewish,
divided; the Christians occupyi
the Armenians the south-west
south-east, and the Mohammed
portions of the space within t
population—which is about 18,000
medans; 8000 or 9000 are Jews
Christians of the various rite
the city is the seat of many s
The Jews have seven small
gogues. The Mohammedans, s
the first occupation, have held
site of the Temple of Solomo
so-called Mosque of Omar now
pasha's Seraiyah, or official resid
site of the Tower Antonia. The C
Sepulchre (see Holy Places), w
which is occupied by all the
nities in common, has been alread
Latins possess, for their own wo
of St Saviour; it is attached t
convent, in which Europeans of
receive ready hospitality. In
Greeks, Armenians, Syrians, Copts,
have convents or hospitals appr
several communions. That of th
Mount Zion is said to be one of t
East; and the same communion
convent on the reputed site of the h
The street leading from the East
Gate to the Holy Sepulchre is
Dolorosa, and is believed to foll
our Lord's sorrowful procession f
Judgment to Mount Calvary. I
the city or its immediate environs,
reputed sites of the Mount of Oli
the Virgin, the Pool of Bethesda, th
and the sites of almost all the event
of our Lord or of scenes connected
authenticity of these sites has b
of considerable controversy in lat
Holy Places. Beyond its religi
the modern city possesses few adv

Jerusalem ware, viz., chaplets, crucifixes, beads, crosses, &c., made of mother-of-pearl or wood, and sold to the pilgrims, who number from 6000 to 8000 annually. Considerable quantities of these articles are also exported to Spain, Italy, and France. The beads are either berries or are manufactured either from date-stones or from a species of hard wood called Mecca fruit. For the use of the Mohammedan pilgrims—for whom the Mosque of Omar is only inferior in sacredness to Mecca and Medina—there is a considerable manufacture of amulets of black stone, reputed to be a protection against the plague.

In ecclesiastical history, J. has not filled the space which might at first sight be expected. When the city was rebuilt after its destruction under Titus, the new city Ælia was so inconsiderable as a Christian community, that it became a suffragan see of the metropolitan of Cæsarea. The Council of Nice recognised a precedency of honour; but it was not till the Council of Chalcedon that the church of J. was raised to the rank of a patriarchate, with jurisdiction over all the bishops of Palestine. J., however, ranked last among the eastern patriarchates. In common with the other eastern churches, J. followed in the train of Constantinople in its secession from the West. The patriarch of J. was a party to the decree of union in the Council of Florence; but his flock soon fell back into schism; and although the titular rank of patriarch of J. has been maintained in Rome, the church remained under the care of the Franciscan community, and the Latin patriarch had never resided in J. until the accession of the present pope, Pius IX., by whom the duty of residence was re-established. In the year 1841, the governments of England and Prussia united for the establishment of a Protestant bishopric in J., the appointment to which rests alternately with England and with Prussia.—See Robinson's *Biblical Researches*, Stanley's *Sinai and Palestine*, Williams's *Holy City*, Richardson's *Travels along the Mediterranean*, Ritter's *Erdkunde*, Sepp's *Forschungen eines Teutschen Reisenden;* and on the Patriarchate, Wiltsch's *Kirchliche Geographie*, Le Quien's *Oriens Christianus*, Mosheim's *Church History*.

JERUSALEM ARTICHOKE, or **TOPINAMBURI** (*Helianthus tuberosus*), a plant of the natural order *Compositæ*, and of the same genus with the common Sunflower (q. v.), is a native of Brazil. The word *Jerusalem*, in the English name, is a corruption of the Italian *girasole*, sunflower; the name *artichoke* is merely from a supposed similarity of flavour in the eatable part—the tuber—to the artichoke. The J. A. has straight simple stems from eight to twelve feet high, and many rough ovate acute stalked leaves; and in the end of autumn, but rarely in Scotland, produces yellow flowers resembling those of the common sunflower, but smaller. The thick, fleshy, and knotted perennial root produces, pretty closely around it, oval or roundish tubers, sometimes thirty or fifty in number, which are reddish on the outside, and whitish within, in appearance very similar to potatoes. They have a sweetish, mucilaginous taste when boiled, and are much more watery and less nourishing than potatoes. They are, however, very palatable, when properly prepared with sauce, and make very good soup. The plant is also useful for fodder for cattle, yielded by its leaves and the more tender parts of the stems. The fibre of the stems may probably be found valuable for paper-making. The stems and leaves contain much nitre, and have been used for making potash. The J. A. is scarcely an agricultural crop in Britain, although it is to some extent in some to which it in some measure gave place. It is generally propagated by small tubers, or cuttings of tubers, like the potato; and its cultivation is in most respects similar, although the aspect of the plant is very different.

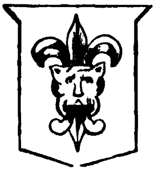
Jerusalem Artichoke (*Helianthus tuberosus*).

JERVIS, John, Earl of St Vincent, a British admiral, was born January 9, 1734. He obtained a commission in the navy as lieutenant in 1755, and in 1769 commanded the *Alarm* frigate in the Mediterranean. When she was paid off, he made a tour of inspection to the naval arsenals of France and Northern Europe. He was then appointed to the *Foudroyant*, the finest two-deck ship in the British navy, and engaging the *Pegase*, 74, off Brest, he took her without the loss of a man. For this gallant exploit, he was made K.C.B. In 1787, he was made rear-admiral; in 1793, he commanded the naval part of the expedition against the West India Islands, Sir C. Grey commanding the troops; and so successful was this expedition, that although the French were well prepared, and fought desperately, every island fell in succession into the hands of the British. In 1795, he received the command of the Mediterranean fleet; and here, for the first time, he made the acquaintance of Nelson, Hood, Collingwood, Hallowell, Troubridge, &c. On the 14th Feb. 1797, with only fifteen sail of the line, he fell in, off Cape St Vincent, with the Spanish fleet of twenty-seven sail. Without a moment's hesitation, J. determined to engage the enemy; and the battle of St Vincent was fought. The genius of Nelson, however, contributed greatly to the success of the day. For this victory, the king created J. Earl St Vincent, and parliament settled upon him a pension of £3000 a year. After having, by great firmness, repressed a mutiny off Cadiz, which threatened the loss of the whole fleet, he was compelled by ill health to return home. He was soon applied to by government to subdue the spirit of sedition which had openly manifested itself in the Channel fleet; and his endeavours were eminently successful. After having held the appointment of First Lord of the

March 13, 1823. A public monument was erected to his memory in St Paul's Cathedral. History has enrolled the name of St Vincent in the first rank of the eminent naval commanders who broke the maritime power of France and Spain, and established the naval supremacy of Great Britain.

JE'SSAMINE. See Jasmine.

JE'SSANT, in Heraldry, springing forth, a term frequently used as synonymous with *Issuant*, rising, as a demi-lion is often represented doing, from the bottom line of a field, or upper line of an ordinary. Jessant is sometimes used improperly for *naissant*, or rising from the middle of an ordinary. The phrase *jessant-de-lis* is used with respect to a strange heraldic device representing a leopard's head *affronté* with a fleur-de-lis passing through it. The family of Moreley, Hants, bears sable, a leopard's head argent jessant-de-lis; and gules, three leopards' heads jessant-de-lis or, are the arms of the family of Cantelupe.



Jessant-de-lis.

JE'SSO. See Yesso.

JESSO'RE, a town of Bengal Proper, capital of a district of the same name, is 77 miles to the north-east of Calcutta, in lat. 23° 10′ N., and long. 89° 10′ E. Pop. (1871) 8152. Here, in 1838, was erected, by the zemindars of the neighbourhood, a commodious school, in which instruction is given in English, Persian, and Bengali.—The *district* of Jessore contains 5528 square miles, and (1871) 2,075,021 inhabitants. Salt is obtained from the southern frontier; and sugar and rum are largely prepared from the sap of the palm-tree.

JESSULME'RE, a fortified city of Rajpootana, capital of the protected state of the same name, contains about 35,000 inhabitants. It is in lat. 26° 56′ N., and long. 70° 58′ E., being 1290 miles to the north-west of Calcutta. It has several Jaina temples, and various tanks and wells, the only sources of water-supply.—The *state* of Jessulmere contains an area of 12,252 square miles, and about 75,000 inhabitants. The country is poor and sterile, and the public revenue is under £9000.

JE'SUITS, or SOCIETY OF JESUS, a celebrated religious order of the Roman Catholic Church, which has filled a large space in the ecclesiastical and even the political history of the world. It was founded in 1534, by the well-known Ignatius of Loyola (see Loyola), in concert with five associates—Peter Le Fevre, a Savoyard; three Spaniards—James Lainez, Francis Xavier, and Nicholas Bobadilla; and a Portuguese named Rodrigues. The original object of association was limited to a pilgrimage to the Holy Land, and a mission for the conversion of infidels; but as all access to the Holy Land was precluded by the outbreak of a war with the Turks, the associates turned their thoughts to a more comprehensive organisation, specially designed to meet those more modern requirements which had arisen since the Reformation. With this view, Ignatius of Loyola, with Lainez and Le Fevre, having meanwhile recruited several new associates, repaired to Rome in 1539, and submitted to the pope, Paul III., the rule of the proposed order, the great aim of which was expressed in their adopted motto: *Ad majorem Dei Gloriam* (To God's greater glory); and the vow of which, in addition to the threefold obligations common to all Catholic religious orders, of chastity, poverty, and obedi-

to any country which the pop
them. The new rule was appr
September 27, 1540; and in th
association was practically ina
by the election of Ignatius of
general.

The original constitution of th
gone so few subsequent modific
be described without specifyi
Although it is commonly repres
monarchical, yet the authority
in many respects, strictly limite
the general—who is elected by
professed members selected for t
whole body of professed memb
provinces—holds his office for
he is aided in his government
five assistants from the five ch
not obliged to follow their voice,
mous. But, on the other hand,
by the constitutions of the orde
may dispense in particular cases,
his own authority, to annul or to
constitutions. In like manner, al
of deposition has ever occurred,
deposed by the sentence of a ge
in certain contingencies which are
out by the constitutions.

The body over which this gener
of four classes: 1. Professed, w
through all preparatory stages,
extend over ten or twelve years
period, have solemnly taken th
above, including that of obedie
It is from this class alone that
all the higher officials of the socie
Coadjutors, spiritual and tempor
who have completed their studies,
before their thirty-second year, o
admitted to holy orders—being
the professed in preaching, teachi
tion of souls; the latter being lay-
the minor and menial offices of
assigned. 3. Scholastics, who, havi
the novitiate, are engaged for a lon
either in pursuing their own studi
in the various schools of the o
novices, who, after a short trial as
admission, are engaged for two ye
spiritual exercises, prayer, meditat
ing, or ascetic practices, and gene
of disciplinary training. The ad
executive government of the soc
the various provinces or countries
divided, is intrusted, under the ge
cials, who are named by the general
as do all the other officials, for thre
separate province, there are three
nities—professed houses or residen
novitiates. Not only the superiors
who are called by different names—
various office-bearers in each, are
general, who receives at stated int
from provinces, quarterly from col
tiates—a detailed report of the ch
and position of each member of the
these gradations the subordination
the obligation of obedience is imme
served; and one of the most fami
against the society is, that this du
implicit obedience makes the super
final arbiter of conscience for all
judge of good and evil, of virtue and
theless, whatever may be said of

the so-called 'examen' of the candidate, there is contained, in the duty of obedience to a superior, an explicit reservation for the subject, 'unless where the superior should command what is sinful.'

Such is the internal organisation of this renowned association. The system of training applied to the formation of its members exhibits the most profound knowledge of the human heart, and the most correct appreciation of the religious instincts and impulses of mankind. The long exercises of the novitiate were designed by Ignatius to form the individual character in habits of personal holiness, and practices of personal piety. It was the business of the school and college to form the social character of the future teachers of men, and directors of the destinies of society. To learning carefully adapted to the actual condition and progress of knowledge, they sought to add manners and habits calculated to inspire confidence, and to disarm prejudice and suspicion. Unlike the older orders, they made no parade of a special calling, whether by a peculiar habit, or by peculiar exterior indications of austerity or asceticism. They enjoyed, indeed, in these respects, some exemptions from the more austere practices of other orders. Their churches were but designed as supplementary to those of the parish clergy (whose ordinary costume they adopted as their own conventual dress), without the canonical services, without much imposing or attractive ceremonial, being chiefly appropriated for religious instruction, and for the duties of the confessional. Their casuistry avoided all harsh and excessive rigour; and it cannot be doubted that some of their writers carried it to the opposite extreme. But above all, they addressed themselves to the great want of their time—education; and through the mastery which they soon obtained in this important field, as well as their eminence in every department of learning, divinity, philosophy, history, scholarship, antiquities, and letters, they attained to unbounded influence in every department of society. It may be added that to their extraordinary success in thus drawing to themselves, for education, the youth of every country into which they were introduced, the historians of the society ascribe much of the opposition which they encountered from the universities and collegiate bodies whose monopolies they invaded.

The organisation of the society is settled, in every important particular, by the original rules and constitutions of St Ignatius. The opponents of the J., however, allege that, in addition to these public and avowed constitutions, there exists in the society, for the guidance of their hidden actions, and for the private direction of the thoroughly initiated members, a secret code, entitled *Monita Secreta* (Secret Instructions), which was meant to be reserved solely for the private guidance of the more advanced members, and which was not only not to be communicated to the general body, but was to be boldly repudiated by all, should its existence at any time be suspected or discovered. This singular code, a master-piece of craft and duplicity, was first printed at Cracow in 1612, and has been repeatedly reprinted by the enemies of the J.; but it is indignantly disclaimed by the society. The accounts of the time and circumstances of its discovery are suspicious and contradictory. The book has been repeatedly condemned, both at Rome and by other authorities, as well as by the society, and its apocryphal character is now commonly admitted (see Barbier, *Dictionnaire des Anonymes*).

The history of the society is so varied in the different countries, that it is necessary, although

the restoration of the order.

In Italy, its early career was brilliant and unclouded. Before the death of the first general, Ignatius, in 1556, the Italian J. had swelled to 1000 in number, and the order was established in twelve provinces. Their first check in Italy occurred in Venice. In the contest of this republic with Paul V. (q. v.), the J., taking the side of Rome, accepted, in 1606, the alternative, proposed by the senate, of leaving the Venetian territory; nor was it till 1656 that they were re-established in Venice, from which time they continued to enjoy undisturbed influence in Italy until the suppression of the order.

The earliest settlements of the J. outside of Italy were in Portugal and Spain. In 1540, Rodriguez —who was a Portuguese nobleman—and Francis Xavier opened colleges in Portugal, at the invitation of the king. Francis Borgia, Duke of Gandia, in Spain, was equally well received in his native country, where the order flourished so rapidly, that, at the time of the suppression, the Spanish J. numbered above 6000.

In France, although a house for novices was founded in Paris by St Ignatius in 1542, the university of Paris opposed their introduction as unnecessary, and irreconcilable with its privileges. They were distasteful to supporters of the Gallican liberties, and still more to the Huguenots. The jurists, the parliament, and the partisans of absolutism, were alarmed by the free political opinions which had found expression in some of the Jesuit schools. On the other hand, the democratic party attributed to them a sinister use of their influence with courts. And thus their progress in France was slow, and their position at all times precarious. It was with much difficulty that the parliament of Paris consented to register the royal decree which authorised their establishment. In more than one instance, the university protested against their schools as invading its privileges. In the wars of the League, they did not fail to make new enemies; and at length, the assassination of Henry III. by Clement (although no evidence of any connection with the J. appeared in his case), and the circumstance, still more industriously urged against them, that Chatel, who attempted the life of Henry IV., had at one time been a pupil in their schools, led to their expulsion from France in 1594. They were reinstated, however, in 1603; but on the assassination of Henry IV. by Ravaillac, the outcry against them was renewed. Although it seems quite certain that this clamour was utterly without foundation, yet the opinions held by one of their order, Mariana (q. v.), on the right of revolt, although condemned by the general, gave a colour to this and every similar imputation. A less deep but more permanent and formidable movement against them was gradually stirred up at a later period, by a combination of all the causes of unpopularity already described, to which new point was given by the well-known Jansenist controversy, and by the questions as to the imputed laxity of the moral teaching of the J., and their alleged corrupt and demoralising casuistry. What the ponderous and indignant prelections of the Sorbonne, and the learned folios of the Dominican and Augustinian schools had failed to accomplish, the wit and brilliancy of the celebrated *Lettres Provinciales* of Pascal (q. v.) effectually achieved. The laxity of some of the Jesuit casuists was mercilessly exposed by this brilliant adversary, who represented it as the authorised teaching of the order, and the crafty maxims and practices popularly ascribed to the society were placed before the world in a light at once exquisitely amusing attempts at rejoinder on the part of the J. but served to fix the ridicule more firmly. Of the thousands who laughed at the happy humour, or sympathised with the vigorous raillery, of Pascal, few, indeed, could plod through the learned but heavy scholasticism of his adversaries. In vain the J. insisted that the obnoxious casuists had been condemned by the society itself; in vain they shewed where their opinions differed from those imputed to them. The wit of Pascal remained unanswered; and whatever were the logical merits of the controversy, no doubt could be entertained as to its popular issue. The pungent pleasantries, too, of the *Provincial Letters* were but a foretaste of the acrimony of the later Jansenistical controversies, in which the J. stored up for themselves an accumulation of animosities in the most various quarters, the divines, the lawyers, the courtiers, which were destined to bear bitter fruit in the later history of the society in France. Nevertheless, after a long conflict, they enjoyed a temporary triumph in the last years of the Regency and the beginning of the reign of Louis XV.

In Germany, the Jesuit institute was received with general and immediate favour. In the Catholic territories, Austria, Bavaria, and the Rhenish principalities, they not only founded colleges and other establishments of their own, but they were appointed at Ingolstadt and other universities to hold important professorships, and received in many dioceses the charge of the episcopal seminaries then newly established. Before the death of the first general, St Ignatius, the order could reckon in Germany 26 colleges and 10 professed houses; and Lainez, the second general, was able to say that there was scarce a German town of note which had not a Jesuit college. In the mixed states, their career was not so unclouded. Their great learning and ability, and their thorough devotion to the church, made them at once eager and formidable polemics. In Hungary and Transylvania, much bitterness arose out of their introduction; the same may be said of Bohemia and Moravia; and through the whole course of the Thirty Years' War, the J., though in many instances wrongfully, were regarded by the belligerent Protestants as the soul and centre of the Catholic camp.

In the Netherlands, they encountered some opposition at first; but in 1562, Lainez, the second general of the order, came to the Low Countries, and a college was opened at Louvain, which eventually became one of the greatest colleges of the order. In the Netherlands, the Jansenistical party was less numerous and less influential than in France, and the conflict with them was less permanently prejudicial to the Jesuits. In the Protestant kingdoms, the J. obtained entrance only as missionaries, and in some, as in England, Scotland, and Ireland, under circumstances of great difficulty and peril. From England they were excluded by the penal laws under pain of death; nevertheless, with a constancy and devotedness which it is impossible not to admire, they maintained through the worst times an unbroken succession of missionaries in many parts of England. They often resorted to the most singular disguises, and generally bore false names; and several of the old Roman Catholic mansions still shew the 'Priest-hole,' which was contrived as a retreat for them in cases of sudden emergency. Into Ireland they effected an entrance almost at the first foundation, and after many vicissitudes, towards the close of the reign of Charles II., they had more than one considerable college for the education of youth.

But a still more fertile field for the enterprise of

which they outstripped all the
church. In the Portuguese c
successes of Francis Xavier (q.
The results of their missions
(see Ricci, Schall) were even
as also in Northern and Centı
all, their establishments in the
in Brazil, in Paraguay and
Pacific coast, in California,
Islands, were missions of civilis
religion; and Sir John Bowrin
present condition of the nativ
Philippines to the present day
judicious labours of the early Je

Such was this association in
history. At their first centenar
bers already numbered 13,112,
provinces. At their suppressio
they had increased to to 22,589,
of 24 professed houses, 669 colle
61 novitiates, 335 residences, a
stations in infidel countries, or
states of Europe.

The decline in the fortunes of t
decisive in its consummation. Tl
they sustained was in Portugal.
colonial territory having been eff
kingdom and the crown of Sp
'Reductions' of Paraguay (q. v
Jesuit missionaries possessed an
sovereign, were transferred to
native Indians having resisted
Portuguese ascribed their disaff
missionaries. The Portuguese
de Carvalho, to whom the J.
possessions in Portugal had lon
of desire, instituted a commissior
while it was still pending, an at
of the king, Joseph, which was l
of the J., furnished him with a
impeachment; and without wait
proof of either accusation, he issu
1759, a royal decree, by which
expelled from the kingdom. Tl
followed in other kingdoms. In
Duke de Choiseul, the immediate
disgrace of the J. was a trial in
Father Lavalette, as procurator
Martinque, had consigned to a com
Marseilles two valuable cargoes, w
by English cruisers, and Lavalette
meet the bills, the Marseilles mer
successfully against the order. Th
Lavalette acted not only without
the order, but against its positive c
appealed to the parliament of P
sentence. The inquiry thus raise
opportunity of which the ancient
order in the parliament eagerly ava
A report on the constitutions of th
damnatory, was speedily drawn up,
was made for the suppression of the
irreconcilable, in its constitution an
the interests of the state and of soci
effort was made to arrest the proc
powerful court-faction, aided by the
of the royal mistress, Madame de P
was irritated by the refusal of her Jes
grant her absolution unless on co
separating from the king, and sup
press by the philosophic party, car
public and private, against the Jesuit
at compromise was proposed to the
Ricci, by which the obnoxious const
be abolished or modified; but his un

are, or let them cease to exist'), cut short all negotiation; and a royal edict was published in 1764, by which the society was suppressed in the French territory. This example was followed by Spain, in 1767, with circumstances of great harshness and severity; and by the minor Bourbon courts of Naples, Parma, and Modena. The court of Rome had zealously but vainly interposed in their behalf, and from Clement XIII. especially, they received earnest support. But his successor, Clement XIV. (q. v.), inclining in this and all other questions of church and state to the side of peace, having in vain endeavoured to procure from the courts by which they were condemned a relaxation of their severity, and being pressed by the ambassadors of France and Spain, at length issued, July 21, 1773, the celebrated bull, 'Dominus ac Redemptor Noster,' by which, without adopting the charges made against the society, or entering in any way into the question of their justice, acting solely on the motive of 'the peace of the church,' he suppressed the society in all the states of Christendom. The bull was put into execution without delay. In Spain and Portugal alone, the members of the society were driven into exile. In other Catholic countries, they were permitted to remain as individuals engaged in the ministry or in literary occupations; and in two kingdoms, Prussia under Frederick the Great, and Russia under Catherine, they were even permitted to retain a quasi-corporate existence as a society for education.

What was meant, however, to be the suppression of the society, proved but a temporary suspension. The ex-members continued in large numbers, especially in the Papal States and Northern Italy; and soon after the first storm of the Revolution had blown over, measures began to be taken for the restoration of the society. The first overt reorganisation of them was in 1799, by the Duke of Parma, at an inconsiderable town called Colorno, in which one of the earliest novices was the afterwards celebrated Angelo Mai. This proceeding on the part of the Duke of Parma was barely tolerated by the pope; but in 1801, Pius VII. permitted the re-establishment of the society in Lithuania and White Russia, and with still more formality in Sicily in the year 1804. It was not, however, until after the restoration, and the return of Pius VII. from captivity, that the complete rehabilitation of the Jesuit order was effected, by the publication of the bull *Solicitudo Omnium Ecclesiarum*, August 7, 1814. In the same year, they opened a novitiate at Rome; and in 1824, their ancient college, the Collegio Romano, was restored to them. In Modena, Sardinia, and Naples, they were re-established in 1815, as also in Spain, where their ancient property and possessions were restored to them. They were again suppressed by the Cortes in 1820, and again restored in 1825; but at the final change of public affairs in Spain in 1835, the J. shared the fate of the other religious establishments, which fell under the double influence of revolution and retrenchment. In Portugal, they have never obtained a firm footing. Dom Miguel, in 1832, issued a decree for their restoration; but almost before they had entered into possession, the order was reversed by Dom Pedro in 1833. Their position in France has been one of sufferance rather than of positive authorisation; nevertheless, they are very numerous and influential, and their educational institutions hold the very highest rank. In Belgium, they established themselves after the revolution, and they now possess many large establishments, professed houses as well as colleges, which are very numerously attended by the Catholic youth, as well of Belgium as of other countries. In Holland, well as in England, Ireland, the United States, and, within a recent period, Scotland. In Switzerland, they opened in 1818 a college at Fribourg, which became a most flourishing establishment, and subsequently they extended themselves to Schwytz and Lucerne; but the war of the Sonderbund (one of the main causes of which arose from the Jesuit question) ended in their expulsion from the Swiss territory. Of the German states, Bavaria and Austria tolerated their re-establishment for educational purposes. In the Italian provinces of the former, as also in the Tyrol, they had enjoyed a certain freedom until the revolution of 1848. In Russia, they were placed under sharp restrictions in 1817; and a few years later, 1820, in consequence of their successful efforts at proselytism, they were banished by a final ukase from the Russian territory, whence they still remain excluded. The Italian revolution of 1848 seriously affected their position in that country. In that year, Pius IX. found it expedient to permit the breaking up of the college and other houses in Rome. They returned, however, with the pope himself, and resumed possession of their ancient establishments. On the proclamation of the kingdom of Italy, they withdrew from Sardinia, Naples, Sicily, and the annexed territories in general. In the recent legislation of the kingdom of Italy, the J. have been visited with a special measure of repression. While each of the other principal religious orders is permitted to retain its 'mother house' at Rome, in which the general of the order may reside, the J. have been required to quit their principal convent of the Gesu. In Germany also they have been treated with exceptional severity, being held responsible as the main agents and advisers of the measures adopted in the Vatican Council, which are complained of by the government as infringing the rights of the state. By the law of July 4, 1873, the order is excluded from the empire; its establishments are abolished; and all foreign Jesuits are ordered to be expelled, and the German members of the society, as well as of kindred orders and congregations, to be 'interned.'—The literature of the history of the J., whether hostile or friendly, is almost endless in extent and variety; we shall only refer to two of the most recent works on either side —Gioberti's *Il Gesuita Moderno*, 1847, and Cretineau Joly's *Histoire de la Compagnie de Jesus*, 1845. See also *Die Preussischen Kirchen-gesetze des Jahres* 1873, *mit Einlietung und Kommentar*, by Dr Paul Hinsohius (Berlin, 1873).

JESUITS' BARK. See CINCHONA.

JE'SUS, the Greek form of the Hebrew word *Joshua*, *Jehoshua*, 'Jehovah, the Saviour,' is the name given to the son of the Virgin Mary by the angels who announced his approaching birth (Matt. i. 21; Luke i. 31). The reason of the name was at the same time declared: 'for he shall save his people from their sins.'

The date of the birth of J. is now generally fixed a few years—at least four years—before the commencement of the Christian era. The reasons of this opinion we cannot here state, but it may be observed that the reckoning of dates from the birth of Christ did not begin till the 6th c., when error on such a point was very probable. The precise date of the birth of J., however, cannot be determined, nor can the year of his death be much more confidently stated. The common computation fixes his death in 33 A.D., or when he was probably at least 37 years of age. As to the month or day of the birth of J., nothing is known, although the circumstance, that shepherds were watching their flocks by night, makes it very certain that it did

Christmas (q. v.) is held.

With the accounts given by the Evangelists of the birth of J., his ministry, death, resurrection, and ascension into heaven, every one may be supposed familiar.

The opponents of Christianity have not, in general, disputed the historic truth of the gospel narrative of the life of J.; the miracles of course excepted. Celsus and other heathen writers admitted even the truth of the miracles, but alleged them to have been wrought by magic, or to have been too few and inconsiderable to attest the claims of Jesus. Their modern successors have, of course, rejected these views. Some of them have endeavoured to shew that J. was ambitious of earthly power, but this has not been a prevalent theory. More generally, they have regarded him as merely adapting his conduct and teaching to the notions common among the Jews, and in particular to their expectation of the Messiah; whilst they admit the unequalled excellency of the religious and moral system taught by him. The inconsistency of this scheme is held to be obvious by orthodox theologians. They allege that it represents the noblest and purest system of morality as based on imposture. The character of J., as displayed both in his life and in his teaching, is one of the great arguments relied on by the advocates of Christianity.

The correspondence of J. with Abgarus, king of Edessa, although we have it in Eusebius, can only be ranked with monkish legends. Of no greater value are descriptions of the personal appearance of J., and pictures of him. See CHRIST, PICTURES OF.

JESUS, COLLEGE OF, Oxford. In 1571, Queen Elizabeth, on the petition of Dr Hugh Ap-rice, or Price, granted a charter for the foundation of Jesus College, in which there were to be a principal, eight fellows, and eight scholars. In 1622, King James I. granted the college a new charter, including a code of statutes. These original foundations were set on a new footing in 1685 by the will of Sir Leoline Jenkyns, who added considerable endowments to the college, but arranged that the greater part of the fellowships, scholarships, and exhibitions should be confined to Wales. The endowments were subsequently increased to 19 fellowships and 18 scholarships. The commissions under 17 and 18 Vict. c. 81, converted five of the fellowships into scholarships, and entirely suppressed one fellowship. Of the remaining fellowships, one moiety was confined to the Principality, and the other thrown open. Four may be lay fellows; the others must take orders within one year after they shall be of sufficient standing to be masters of arts. The scholarships are confined to Wales, with the exception of, King Charles I.'s scholarships (confined to Jersey and Guernsey), and two others, which are open. There are nearly thirty exhibitions in this college, of about £40 per annum. This college presents to about 20 livings; in 1873 there were about 200 names on the books. This was the first Protestant college, and in its statutes the Protestant religion was asserted and guarded by many enactments.

JESUS COLLEGE, Cambridge, was founded by John Alcock, Bishop of Ely, in 1496, to whom the king granted for the purpose the nunnery of St Radegund, which was suppressed for the dissolute conduct of its inmates. The appointment of the master rests with the Bishop of Ely. There are sixteen foundations, and three bye-fellowships, and numerous scholarships. Amongst the distinguished members of this college are to be noted Richard Fox, Bishop of Winchester in the reign of Henry VII.;

in the reign of Henry VIII.

JESUS, SON OF SIRACE

JET, a bituminous minera
colour, not harder than ordin
of being easily cut and carve
very beautiful polish. It ta
river of Lycia, from the ba
obtained. In the time of Pl
river and a small town on its
the pieces of jet obtained fro
gagates, afterwards successivel
and jet. It is now found i
world. In Great Britain, it i
Whitby, in Yorkshire, where i
fragments of bituminised wood
the Upper Lias or Alum Shale o
only a peculiar form of pitch-c
37½ per cent. of volatile matte
of New Brunswick and some
It is electrical when rubbed, hen
black amber by the Prussian
it occurs in sand and gravel bed

Very large quantities are ob
the department of Aude, where
to numerous artisans, who form
crosses, and other trinkets, wh
sold in Roman Catholic cou
supplies fine jet, which, like t
workings, is found in irregular
marls of the cretaceous series,
the Sussex gault. The Spani
Villaviciosa, in the province of
principally manufactured at Ovi
for mourning ornaments, jet is
and for that purpose is used l
other countries.

JETSAM means goods cast i
sink and remain under water.
Crown until the owner appear an
FLOTSAM. The subject is now
from its effects on the owners, an
the head of Jettison (q. v.).

JETTISON is, in the law of
dom, the throwing overboard of a
in whole or in part, in cases of
lighten the vessel in a storm, or t
or for other justifiable cause.
great discretion is required, so as
proper time arrives for resorting
expedient; and in case of part
being sacrificed, to select which
must depend on its own circums
master of the vessel is the autho
to bind all parties in such a sit
happens that the goods belong to
and therefore, in order to compe
of the particular goods thrown
doctrine of general average is r
AVERAGE. In case of a storm, th
interested in the ship, freight, and
contribute rateably to the loss;
exceptions when the goods were
When the goods sacrificed by jet
insured, the insurer has the benefi
bution or average *pro tanto*.

JEW, THE WANDERING. The
Wandering Jew, who cannot die, bu
ment of his sin, is obliged to wand
of the earth till Christ shall pronou
the last day, seems to have originat
sage of the gospel of St John (xxi.
says of John: 'If I will that he t
what is that to thee? follow thou

13th c., when it is first related by Matthew Paris, and may be supposed to indicate the Jewish people, scattered throughout the world, and nowhere finding a home. According to the current legend, the Wandering Jew is Ahasuerus, the shoemaker at Jerusalem, who, when the Saviour wished to rest before his house, on his way to Golgotha, drove him away. Another legend states him to be Pilate's door-keeper, Kartaphilus, who struck Jesus on the back, as he led him out of his master's judgment-hall. So recently as the last century, impostors took advantage of the belief in this legend, and gave themselves out for the Wandering Jew; and people were not wanting who, from time to time, maintained that he had appeared to them under different forms. A popular book relating in detail the history of the Wandering Jew has been repeatedly printed in the German, French, Dutch, and Latin languages. The legend has likewise been frequently worked up in a poetical form, as by A. W. von Schlegel in the romance entitled *Die Warnung;* by Schubert in his poem of *Ahasuer;* by Goethe in *Aus meinem Leben;* by Mrs Norton in *The Undying One* (Lond. 1842); and by Eugène Sue in his *Le Juif errant.* Compare Grässe, *Die Sage vom Ewigen Juden.*

JEWEL (Ital. *gioiello*, from *gioia*, joy), a personal ornament, usually understood to mean a decoration in which one or more precious stones are set. Popularly, there is much confusion between the terms gem and jewel; the former belongs especially to precious stones, and the latter to ornaments formed of the precious metals with or without the aid of gems. The word is derived from the Italian *gioia*, joy, whence *gioiello*, a jewel, such ornaments being indicative of pleasure.

JEWELLERY. The manufacture of jewels has in all times been a test of the artistic powers of a nation; for, being intended only for personal adornment, the genius of the jeweller has been directed to the production of the largest amount of beauty in the most limited space. It is probable that the wearing of ornaments of gold and silver is almost as early as the discovery of those metals. A mere hole drilled through the small pieces of gold or silver, to enable them to be strung round the waist or neck, would be the first stage; then, when the ductility of the metals became known, they would be beaten probably into bands or rings, giving rise to ring-money; these rings, when increased in size, would become torques for the waist, neck, arms, or ankles, labrets for the lips, and rings for the ears and fingers. As refinement increased, these articles would be made more and more ornamental; and the original object, of mere convenience and safety in carrying the much-valued metals, would be lost in the secondary one of personal adornment; the art of the goldsmith would be called into play, and the taste of the nation would be marked by the good or bad designs in demand for this purpose. Jewels being mere articles of luxury and taste, their possession always indicates to a certain extent the wealth of nations, and we are as much impressed with the advanced state of the ancient Egyptians by the nice art and refined taste exhibited in the jewellery found in their tombs, as by the vast architectural works of which they have left so many remains; indeed, modern art, with all its wondrous advances, cannot do more than equal the exquisite workmanship of those elegant golden jewels sent by the late viceroy of Egypt and M. Mariette to the International Exhibition, which were taken from the difference between the jewellery of ancient and modern times. Our goldsmiths depend very much upon the processes of casting, drawing, stamping, and other metallurgical operations, and produce thereby great accuracy of outline and high finish. The ancients wrought by hammering, chasing, and *repoussé*, depending entirely upon the taste and skill of the artist, instead of the perfection of his tools and mechanical arrangements; consequently, their works bear the stamp of artistic productions, whilst modern works, however beautiful, have usually the character of mere manufactures executed with mechanical precision rather than artistic taste; and what they gain in nicety of finish is more than counterbalanced by what is lost in richness of effect. See DIAMOND.

JEWELS, USE OF, IN HERALDRY. By an egregiously absurd and unnecessary complication of nomenclature, introduced by way of adding dignity to the science of Heraldry, the tinctures of the arms of peers have sometimes been designated by the names of precious stones: argent is pearl or crystal; or, topaz; gules, ruby; azure, sapphire; sable, diamond; vert, emerald; and purpure, amethyst.

JEWISH LITURGY. See LITURGY.

JEWISH SECTS, a term generally applied (after Josephus) to certain divergent schools which grew up in the midst of Judaism, subsequently to the Syrian wars. So far, however, from forming, as the word would seem to imply, separate communities with places of worship and a religious law of their own, antagonistic to that of their brethren, the disciples of the different 'sects' belonged to the same religious community, adhered to the same practical religious Law, and consequently could not well look upon each other as, in a manner, heretics. The chief points at issue were certain abstract doctrines, in connection with the peculiar manner in which this Law, as far as it is contained in the Scriptures, was interpreted and further developed. While the *Pharisees* (q. v.) claimed for certain time-hallowed observances and doctrines not found in the Bible a divine origin, drawing them back through tradition—orally transmitted from generation to generation—to Moses and the Sinai itself, and while they, by peculiar rules of an exegesis of their own, proved these same doctrines to lie often latent, as it were, in the very letters of the Bible—the *Sadducees* (q. v.) rejected the divine origin of the 'oral law,' as well as certain spiritual dogmas not distinctly set forth in the Sacred Record. An advanced or exalted class of Pharisees were the *Essenes* (q. v.), who formed a kind of brotherhood, far away (with only solitary exceptions) from the corruption of cities, chiefly intent upon the exercise of practical virtues, and ruled by a severe code of morals. The tenets of each of these three 'sects' will be found treated separately under the headings indicated.

At a later period, shortly before and after Christ, numerous divergent religious doctrines, for the most part the result of a confused mixture of Judaism and Hellenism, or rather Alexandrianism (see GNOSTICS), were promulgated, and found adherents both within and without the pale of Judaism. Many and obscure are the names of these 'sects' recorded by the early fathers of the church, but very little is known respecting their history and dogmas. Mention is made of *Hellenians* (Hillelites?), not to be confounded with the large body of the Hellenists (q. v.) and *Meristes* (antagonistic school of Shamai?), *Galileans* (Christianising Jews?), *Herodians* (adherents of the foreign government?), *Gaulanites* (Rabbinists

Sabbatarians ?), *Hemerobaptists* (Essenes ?), &c.

In the 8th Christian c. (761 according to Munk), the Sadducean doctrine of the invalidity of the 'oral law'—a doctrine which had died out after a brief existence—was revived again by Anan ben David, who is supposed to have held a high spiritual office (Resh Gelutha ? Gaon ?) at Bagdad at the time of Calif Abu Giafar Al-Mansor (754—775 A. D.), and who, rejecting the Talmud and Midrash as the work of man, only allowed such laws and ordinances to be binding upon the community which resulted immediately from a simple and natural Scriptural exegesis. He thus became the founder of the most important sect of the *Karaites*, who, within an astonishingly brief period, spread over Palestine, Egypt, Greece, Barbary, Spain, Syria, Tartary, Byzantium, Fez, Morocco, and even to the ranges of the Atlas. They are now, however, found only in small numbers in Poland, Galicia, Odessa, the Crimea, Constantinople, Jerusalem, and Alexandria. Abrogating the 'rabbinical' traditions, they erected a new traditional system of their own, to be altered and freely developed by each of their successive spiritual heads. Prayer, fasting, pilgrimages to Hebron, are the points of religious practice to which they pay the greatest attention. Their general conduct is even by their antagonists allowed to be of the highest moral standard. They have produced an extensive special Hebrew literature of their own, chiefly consisting of works on theology, philosophy, mathematics, astronomy, &c. The greatest number of these is now found in the Imperial Library at St Petersburg. Some of their principal authors are Anan, Shalmon b. Jeruham, Joseph b. Noah, Jeshua, Jehudah Hadassi, Aron b. Joseph, Aron b. Eliah, Eliah Beshitzi, Kaleb, Moses Beshizi, Mardochai b. Nissan, &c.

Another rather curious sect, known as the *Shebsen*, was that founded by Sabbathai Levi from Smyrna (1625—1677), who proclaimed himself the Messiah, and found numerous followers throughout Germany, Poland, Italy, and Holland. Sultan Mohammed IV., however, put an end to his mission by imprisoning him, and making him adopt Mohammedanism. Many of his disciples followed his example, others turned Roman Catholics—adhering, withal, to their former doctrines and tenets, consisting chiefly of the belief in the Messiahship of their master, a distinct leaning to the dogma of the Trinity, and the abandonment of the hope of a final return to Jerusalem under the guidance of 'Messiah ben David.' They put a thoroughly mystical interpretation upon the Bible, rejected unconditionally the Talmud, and extolled their special Kabbalistic gospel, the Zohar, above all things created. This sect did not die out until the end of the last century, Jakob Frank, their last supreme pontiff (whose more intimate friends and followers called themselves by his name, *Frankists*), dying in a debtor's prison on the Rhine (1791).

We have finally to mention the modern *Chasidim*—not to be confounded with the ancient Chasidim (q. v.)—or *Beshters* (Baal Shem Tob), a side branch of the former sect, taking its stand like this on the Kabbala, but remaining ostensibly within the province of rabbinical Judaism. They are chiefly remarkable by their wild mode of praying, their supreme contempt for any but mystical and religious science, by their belief in the miracles wrought by their temporary chiefs or saints (*Zaddik Baal Shem*), who rule their community unconditionally, are supposed to be invested with divine powers, and who also cure all their bodily ailments. The grandeur and pomp with which these are surrounded, contrasts most strikingly repentance, joyfulness, disinterestedness, benevolence, peacefulness, with intrepidity, cleanliness, and temperance, are some of the chief points of the practical doctrine of this sect. One of the great reproaches, however, brought against them is, that their 'joyfulness' often leads them into transgression; that, in fact, they are rather given to sensuality. They are very numerous in Poland, Galicia, Russia, and Palestine.

The modern 'Reformers,' aiming chiefly at a simplification of the ceremonial, and abrogation of what they consider to be abuses and late additions in the divine worship, cannot well be called a sect—although, for the most part, they have synagogues and prayer-books of their own—since they belong, to all other intents and purposes, to the great body of the Jewish community. As the chief promoters of this movement may be considered Zunz, Geiger, Chorin, Creizenach, Holdheim, Hess, Stern, &c.

JEWS (corrupted from *Yehudim*), the name given, since the Babylonish captivity, to the descendants of the patriarch Abraham, who, about 2000 years B. C., emigrated from Mesopotamia, on the east side of the Euphrates, to Canaan or Palestine. They were originally called HEBREWS (q. v.). Monotheism, or a belief in one God, the practice of circumcision, and the expectation of ultimately possessing the land in which they then sojourned, were the three distinguishing peculiarities transmitted by Abraham to Isaac, and from Isaac to Jacob and his descendants. The picture of patriarchal life presented to us in the book of Genesis is marked by an exquisite beauty and simplicity, and bears traces of a great antiquity. In consequence of a famine in Canaan, Jacob, on the invitation of his son Joseph, who had become chief minister of the king of Egypt, went down thither with all his family, which numbered seventy 'souls;' and obtained from Pharaoh permission to settle in the land of Goshen. Here the Hebrews resided, according to Exod. xii. 40, 430 years; [Bunsen (EXODUS) calculates *fourteen* centuries]; according to the genealogical table of the Levites, in Exod. vi. 16—25, however, their sojourn would not have lasted longer than 210 or 215 years; most of the commentators, therefore, take, with Josephus, the 430 years to indicate the period from Abraham to the Exodus (cf. Galat. iii. 17). During the lifetime of Joseph, and probably for some generations afterwards, they were well treated, and prospered; but a new dynasty, supposed by some—with little shew of reason—to have been that of the Hykshos (q. v.) arose, and they were reduced to relentless slavery. A deliverer at length appeared in the person of Moses (q. v.), a man of grave and heroic character, who, though brought up by the daughter of Pharaoh as her son, and trained in all the learning of the Egyptians, was nevertheless filled with an intense and indignant patriotism, that acquired an additional elevation from the ardour of his religious feelings. The circumstances that preceded and characterised the exodus (about 1600 B. C.)—such as the ten plagues and the crossing of the Red Sea—are a source of continual controversy between the Rationalistic and the Supranaturalistic schools of biblical criticism; but the *fact* of an exodus would be disputed only by the wildest scepticism. The entire history of the people is pervaded by the memory of this grand event, upon which, as it were, their whole national existence is based; it inspires their poetry, and consecrates their religion; and the Passover, with all its ceremonials and mementoes, was instituted expressly to remind them of that wondrous night of sudden liberation; while the Feast of Tabernacles was to wanderings through the desert; and Pentecost, the act of the legislation on Sinai. Whether, however, in 215, or even in 430 years, the seventy 'souls' could have increased to 600,000 adult men, or, including wives and children, to between 2,000,000 and 3,000,000 souls, is a point to be determined rather by physiologists than by theologians.

The wandering in the wilderness of the Sinaitic peninsula is said to have lasted forty years, though a record of the events of two years only has been preserved. These, however, are obviously the most important, as they contain an elaborate account of the giving of the law (Exod. xix. *et seq.*), which is represented as a direct revelation made to Moses by Jehovah himself, who descended upon Mount Sinai in fire, amid the roar of thunders and the quaking of hills. The antiquity, however, of the priestly or ecclesiastical portions of the Pentateuch is keenly disputed by many modern scholars of the highest reputation, who endeavour to shew the probability of such passages having been composed and inserted subsequent to the great organisation of the priesthood by David; and in proof of this, point, among other evidences, to the Book of Judges (q. v.), which narrates the history of the Hebrews for 300 years *after* the conquest of Canaan, and which yet contains scarcely a single trace of the existence of a religious institution among them. Yet it is allowed almost on all hands, that the *foundations*, at least, of the Jewish theocracy, and probably also a large part of the superstructure, were the direct work of Moses himself, who indeed appears to have been pre-eminently fitted for the task of a legislator:—not to mention the fact that the ritualism of the Hebrews has many striking points of contact with that of the ancient Egyptians, with which he was well acquainted. This view, of course, does not interfere with the theory of a later composition of the Pentateuch (q. v.), in its present shape and its successive redactions and enlargements. But whatever period be allowed for the sojourn in the desert, the rough nomadic life, the frequent fighting with the fierce Beduin tribes, through whose territories they passed—besides the lofty influences of a stern religion—had transformed the runaway slaves of Egypt, by the time they approached the eastern borders of Canaan, into a nation of high-spirited and irresistible warriors.

Before proceeding further, it behoves us to trace a general outline of the Mosaic legislation. The laws promulgated under the 'Covenant' were, as we said, not entirely new. Many were merely the solemn confirmation of ancient patriarchal tenets, such as the worship of One Supreme Being through sacrifices, prayer, vows; circumcision; the government by heads of tribes and families, &c. Others must have been adaptations of Egyptian institutions. Others, again, owed their existence to the altered circumstances of the community; and it is undeniable that some of the ordinances contained in the Pentateuch were never carried into practice. The fundamental features of the religious as well as political constitution—both closely interwoven with each other—are the following: God is Creator and Lord of the universe. The universe is His own, and to man the use of all created things has been intrusted by His will. God is therefore the King of the people. By the priests He is visibly represented. No man has the right to dispose of his own liberty. The soil is only given to the people for the *usufruct:* man has no further individual right of possession over it. Every seventh year it is to be left to itself. The sale of land is prohibited; and after seven times seven years, every lease and mortgage of it is null and void, and it is to return to the heirs of those division of the land.

The office of the Priests (q. v.) was in the hands of the tribe of Levi (q. v.), more especially the descendants of Aaron (q. v.). The Levites assisted in the management of the sanctuary and the holy rites, copied and expounded the Books of the Law, kept the genealogical lists, and had the care of the general instruction of the people. Together with the priests, they had administrative and judicial functions, and they gave their judgment always in the name of God. The High-Priest (q. v.) constituted the highest court, and his was the oracle (Urim and Thummim). Periodical Feasts (q. v.) were instituted, in order that the dependence from the Divine King should always be kept in view by the people. Every seventh day the body should rest from labour (Sabbath), as every seventh year the soil was to rest (Sabbatical year); and every fiftieth (7 × 7) year (Jobel) was the great year of Remission. Three annual feasts, partly of an agricultural, partly of an historical character, were the Passah (q. v.), the Feast of Weeks (q. v.), and the Feast of Tabernacles (q. v.). No less was the first of the seventh month to be kept holy. The tenth of the same month was instituted a day of atonement and forgiveness of sin.

The form of government was at first a theocratical one. The people was divided into 12 tribes, which formed small republics, but were all united under the invisible rule of Jehovah. General national assemblies decided upon war and peace, and the like. Special provisions are also found for the contingency of the election of a king. After the conquest of Palestine, every city had a judge, chosen by the heads of the families and tribes. The punishments were either death, flagellation, or fines. Three Levitical cities were named by Moses as asylums or places of refuge for man-slayers whose guilt was not yet fully established. Every free citizen was bound, from his 20th year, to military service in case of war. To the besieged city, terms of capitulation were first to be offered; were these rejected, the city was to be taken, and the males were to be put to the sword. In all other cases, the virtues of charity, justice, and kindness, even towards animals, are repeatedly impressed upon the people. How far these fundamental rules were either further developed or neglected, we cannot shew in this place.

The 'land of promise' became theirs at last (about 1430 B.C.), under Joshua (q. v.), the successor of Moses. Tribe after tribe was swept from its ancient territory, and for the most part either annihilated or forced to flee. Yet the whole bulk of the native inhabitants was not extirpated or wholly expelled, nor even subdued till a much later period: a circumstance fraught indeed with the most disastrous consequences to the new commonwealth. The country was now divided among the tribes. The magnificent pastoral region to the east of the Jordan had before been chosen by the tribes of Reuben, Gad, and the half-tribe of Manasseh at an earlier period, because they 'had a very great multitude of cattle' (Numb. xxxii. 1); but they now for the first time entered on possession of it. The land west of the Jordan was parcelled out to the remaining—Judah, Simeon, Dan, Benjamin, Ephraim, the second half-tribe of Manasseh, Issachar, Zebulon, Naphtali, and Asher. The tribe of Levi received, instead of a province, 48 cities scattered throughout Canaan and the tenth part of the fruits of the field, and were allowed generally to settle individually throughout the land where they chose (LEVITES, PRIESTS, HIGH-PRIEST).

After the death of Joshua (about 1350 B.C.), the palpable. Little regard was paid to the Mosaic institutions; the single tribes pursued their own individual interests; intermarriages with the idolatrous natives weakened the bond of union still further; and the next consequence was, that the tribes were singly subdued by the surrounding nations. At this juncture there arose at intervals valiant men and women—Shofetim—Judges, who liberated the people from their oppressors, the Moabites, Philistines, Ammonites, Amalekites, &c. Fifteen of those are named, some of whom appear to have been contemporary with each other, and to have exercised authority in different parts of the country. This period constitutes the 'heroic' age of Hebrew history. Among these Judges, the prophetess Deborah (q. v.), Gideon (q. v.), Jephthah (q. v.), the herculean Samson (q. v.), and the prophet Samuel (q. v.), are especially notable; the last mentioned was, in every sense of the word, the greatest Hebrew that had as yet appeared since the days of Moses. With him begins a new and higher stage in the development of the national character, chiefly through the instrumentality of the priestly order, whose spiritual, for the most part well-directed and humanising, influence was by him first exalted and most distinctly brought to bear upon the commonwealth. Samuel, the first of the prophets, was also the last of the republican chiefs of the confederate tribes. Wearied of their intestine feuds, harassed by the incursions of their predatory neighbours, chiefly, however, goaded by the characteristic desire 'to be like all the other nations' (1 Sam. viii. 5), the people compelled him, when he had become 'old and gray-headed' (1 Sam. xii. 2)—while the behaviour of his sons, whom he had made judges, unfitted them to be his successors—to choose for them a king (1080 B. C.).

The first who exercised regal authority was Saul (q. v.), the Benjamite. But though a distinguished warrior, and a man of royal presence, he appears not to have possessed the mind of a statesman; and his wilfulness, and the paroxysms of insanity, brought on chiefly, as it would seem, by the openly-expressed dissatisfaction of Samuel, finally alienated from him many of the bravest and best of his subjects. After his death on Mount Gilboa, David (q. v.), his son-in-law, was proclaimed king. This monarch was by far the greatest that ever sat on the throne of Israel. He ruled, as is commonly computed, 1058—1018 B. C. His reign, and that of his equally famous son, Solomon (q. v.), are regarded as the golden time of Hebrew history. The remaining aborigines of Canaan and its borders—viz., the Philistines, Edomites, Amalekites, Moabites, &c.—were thoroughly subdued; the boundaries of the Hebrew kingdom were extended as far as the Euphrates and the Red Sea; Jerusalem was captured by escalade, and made the capital of the conqueror; the priesthood was reorganised on a splendid scale; the arts of poetry, music, and architecture were cultivated; schools of prophecy (first established, probably, by Samuel) began to flourish; a magnificent temple for the worship of Jehovah was built in the capital; and commercial intercourse was carried on with Phœnicia, Arabia, Egypt, with India and Ceylon, and perhaps with even Sumatra, Java, and the Spice Islands. But there was a canker at the root of all this prosperity. The enormous and wasteful expenditure of Solomon forced him to lay heavy taxes on the people. His wealth did not enrich them; it rather made them poorer; and although gifted with transcendent wisdom and the most brilliant mental powers, towards the end of his life he presents the sad spectacle of a common eastern despot, voluptuous, idolatrous, B. C.) cannot but be regarded, both politically and financially, as a splendid failure. After his death (978), the Hebrew monarchy, in which the germs of dissension—chiefly jealousy against the influence of Judah—had been silently growing up for many a year, split under Rehoboam into two sections (975 B. C.): the kingdom of Judah, under Rehoboam, son of Solomon; and the kingdom of Israel, under Jeroboam, the Ephraimite. The former of these countries comprised the two tribes of Judah and Benjamin, together, probably, with some Danite and Simeonite cities; the latter, the remaining ten. After 19 kings, of different dynasties, among whom Jeroboam, Ahab, Joram, Jeroboam II., Pekah may be mentioned, had reigned in Israel, few of whom succeeded to the throne otherwise than by the murder of their predecessors, the country was finally conquered by Salmanassar, king of Assyria; its sovereign, Hoshea, thrown into prison; the mass of the people carried away captive (720 B. C.) into the far east, the mountainous regions of Media, and their place supplied by Assyrian colonists, brought from Babylon, Persia, Shushan, Elam, and other places by Asnappar. These, mingling and intermarrying with the remnant of the Israelites, formed the mixed people called Samaritans (q. v.). Among the twenty kings of the House of David who ruled over Judah, Jehoshaphat, Uzziah, Hezekiah, and Josiah distinguished themselves both by their abilities as rulers, and by their zeal for the worship of Jehovah. Yet even they were, for the most part, unable to stay the idolatrous practices of the people, against which the prophets' voices even could not prevail. Other kings were, for the most part, more or less unfaithful themselves to the religion of their fathers, and unable to withstand the power of the Egyptians, Assyrians, and Babylonians, to each of whom they in turn became tributary, until at last Nebuchadnezzar stormed Jerusalem (586 B. C.), plundered and burned the temple, put out the eyes of King Zedekiah, and carried off the most illustrious and wealthy of the inhabitants prisoners to Babylon. The Israelites, who had been exiled 134 years before the inhabitants of Judah, never returned. What became of them has always been, and, we presume, will always remain, matter of vaguest speculation. See BABYLONISH CAPTIVITY.

All that we know of the condition of the Hebrews during the captivity, relates exclusively to the inhabitants of the kingdom of Judah. And so mild, especially during the later years, was the treatment which they received in the Babylonian empire, that when liberty was announced to the whole body of the captives, only the lowest of the low returned, together with the Levites and Priests (cf. Talm. Kidd. iv. 1). The Book of Esther likewise bears testimony to the vast numbers that had remained scattered over the vast empire. See BABYLONISH CAPTIVITY.

The influence of this exile, however, was of a most striking and lasting nature. Babylon henceforth became and remained, up to about 1000 A. D., the 'second land of Israel'—in many respects even more highly prized than Palestine. To this brief period of the captivity must be traced many of the most important institutions of the synagogue in its wider sense. Common religious meetings, with prayer, were established; many of the Mosaic laws were re-enforced in their primitive rigour; and the body of the 'oral law' began to shape itself, however rudely, then and there. Besides, there began to grow up and unfold itself the belief in a Messiah, a Deliverer, one who should redeem the people from their bondage. The writer of the last belong to this period, and expresses in glowing language the hopes of the exiles; no less do many of the Psalms belong to this time. 'From this period, likewise, the immortality of the soul, and the belief in another life, appear more distinctly in the popular creed, in which, if they had existed at all, they had been obscured by the more immediate hopes and apprehensions of temporal rewards and punishments revealed in the law. But in the writings of the Babylonian prophets, in the vision of dry bones in Ezekiel, and in the last chapter of Daniel, these doctrines assume a more important place; and from the later books, which are usually called the Apocrypha, these opinions appear to have entered fully into the general belief. In other respects, particularly in their notions of angels, who now appear under particular names, and forming a sort of hierarchy, Jewish opinions acquired a new and peculiar colouring from their intercourse with the Babylonians' (Dean Milman's *History of the Jews*, Lond. 1829, vol. ii. pp. 13, 14). Compare articles DEMONS and DEVIL.

The exile is generally computed to have lasted seventy years. This is not strictly correct; it lasted seventy years, if reckoned from the appearance of Nebuchadnezzar in Anterior Asia (606), but only fifty-two counting from the destruction of Jerusalem. When Cyrus, the Persian king, had overthrown the Babylonian kingdom (538 B.C.), the condition of the Hebrews improved considerably. The new monarch must have felt that he could rely on them, as being really strangers in the land, and necessarily more or less hostile to their conquerors, the Babylonians. Daniel rose higher and higher in dignity and power, and finally became 'supreme head of the pashas to whom the provinces of the vast Persian empire were committed.' Through his influence, Cyrus was prevailed upon to issue an edict permitting the exiles to return home. A minute account of the circumstances attending this joyous event is given in the Books of Ezra and Nehemiah. Upwards of 40,000 persons, including four of the twenty-four courses of priests, set out under the leadership of Zerubbabel, a descendant of their old kings.

Notwithstanding the many and harassing obstacles raised by the Samaritans, the mixed people of Assyrians and Israelites, against whom the scrupulous exiles entertained strong religious and national objections, the rebuilding of the 'Temple of the Lord' was at last commenced in the first year of Darius, and in the sixth year of his reign it was finally completed. [HAGGAI; ZACHARIAH.] The waste cities were likewise rebuilt and repeopled. During the long reign of Darius, the J. were blessed with a high degree of material prosperity. Under his successor, Xerxes, probably occurred the incidents recorded in the Book of Esther. In the seventh year of Artaxerxes, the successor of Xerxes, Ezra the priest, invested with high powers, and accompanied with a great retinue of his professional brethren, headed a second migration. Thirteen years later, during the reign of the same monarch, Nehemiah, his cup-bearer, but a man of Jewish family, was ordered to proceed to Jerusalem, and, aided by Ezra and others, succeeded in secretly fortifying the city, notwithstanding the continuous opposition from Samaritans, Ammonites, and Arabians. The strictest observance of the 'written law,' even of those of its parts which had been for some reason or other disregarded, was now rigorously enforced, and many 'oral ordinances' were put into practice, which do not seem to have been much heard of previously. The supreme spiritual authority the 'Great Synagogue,' of whose existence modern scholars no longer see any reason to doubt. The compilation and transcription of the sacred records began, periodical public readings and expoundings of the law were instituted, and the vast Targumic, as well as the so-called rabbinical literature, generally dates—in its earliest beginnings—from this point. During the life of Nehemiah, the breach between the J. and Samaritans became final, by the erection on Mount Gerizim (near Samaria) of a rival temple to that at Jerusalem, and the creation of a rival priesthood. For more than a hundred years, the J. lived quietly under the Persian yoke, too insignificant to excite any attention from the Greeks, then in the full meridian of their political and literary greatness; and scanty are the accounts which, as yet, have out of the mazes of ancient Jewish literature been brought to light, with respect to the inner intellectual life of the J. during that period. That, although silent, it must have been extremely active and rich, is amply evidenced by the sudden appearance, immediately afterwards, of a vast number of literary productions.

Alexander the Great, on his way to conquer the whole East, did not deem it necessary to storm Jerusalem. The inhabitants submitted, and he even deigned to have sacrifices offered on his behalf to the national god of his new subjects, a great number of whom, and of Samaritans, he carried away to Egypt (where J. were supposed to have immigrated as early as the time of the last kings of Judah, and later under Artaxerxes Ochus), and peopled a third of his newly-founded city Alexandria with his Jewish captives. After him, Ptolemy the son of Lagos, surnamed *Soter*, one of Alexander's generals, who had become king of Egypt, invaded Syria, took Jerusalem (301 B.C.), and carried off 100,000 of its inhabitants, whom he forced to settle chiefly in Alexandria and Cyrene. The Egyptian (Alexandrian) 'Dispersion' (Golah)—destined to be of vastest importance in the development of Judaism and Christianity—gradually spread over the whole country, from the Libyan desert in the north, to the boundaries of Ethiopia in the south, over the Cyrenaica and part of Libya, and along the borders of the African coasts to the Mediterranean. They enjoyed equal rights with their fellow-subjects, both Egyptian and Greek, and were admitted to the highest dignities and offices: so that many further immigrants followed of their own free-will. The free development which was allowed them, enabled them to reach, under Greek auspices, the highest eminence in science and art. In Greek strategy and Greek statesmanship, Greek learning and Greek refinement, they were ready and brilliant disciples; even their artisans and workmen were sent for by distant countries. From the number of Judæo-Greek fragments, historical, didactic, epic, &c. (by Demetrios, Malchos, Eupolemos, Artapan, Aristæos, Jason, Ezechielos, Philo, Theodot, &c.), which have survived, we may easily conclude what an immense literature must have sprung up here within a few centuries in the midst of the Judæo-Egyptian community. To this is owing, likewise, the Greek translation of the Bible, known as the Septuagint (q. v.), which, in its turn, while it estranged the people more and more from the language of their fathers, the Hebrew, gave rise to a vast pseudo-epigraphical and apocryphal literature (Orphica, Sybillines, Pseudophoclea; poems by Linus, Homer, Hesiod; additions to Esther, Ezra, the Maccabees, Book of Wisdom, Baruch, Jeremiah, Susannah, &c.), not to mention the peculiar Græco-Jewish philosophy, which sprang from a mixture of Hellenism and

For a hundred years, Judæa herself remained under Egyptian rule. During the reigns of the first three Ptolemies, Soter, Philadelphus, and Euergetes, it prospered, but after the accession of Ptolemy Philopator, a change for the worse came over the fortunes of the Jews. Their fate became harder still under his son, Antiochus Epiphanes, or Epimanes (the Madman). With every means a cruel and foolhardy policy could devise, this king outraged the religious feelings of the nation, and endeavoured to tear out every root of the sacred creed. At different periods he sent his generals to Jerusalem to pillage and burn, and to force the Jews into the Greek religion. The temple at Jerusalem was finally dedicated to Jupiter Olympius; idol altars were built in every village, and the people forced to offer swine daily. Some yielded, many fled, the greater part preferred martyrdom in some shape or other.

At this juncture the heroic family of Matathia, a priest of the house of the Asmoneans, rose, together with a few patriots, against the immense power of the Syrians. The national cause quickly gathered strength, and after the death of Matathia (166), Judas Maccabæus (q. v.) led the national hosts to victory against the Syrians. After his death (161 B. C.), his brothers Jonathan and Simon completed the work of deliverance, and re-instituted the Sanhedrim (145 B.C.). During their rule, alliances were twice formed with the Romans, and the country once more began to prosper. Under Simon more especially, Syrian rule became a mere shadow: his was an almost absolute power. So much so, that in the year 170 of the Seleucidian era (142 B. C.), a new Jewish era was commenced, and public documents bore date, 'In the first year of Simon, high-priest and chief of the Jews.' Simon's son, John Hyrcanus, after a brief period of vassalage to the Syrians, extended his authority over Samaria, Galilee, and Idumea—his grand triumph, in the eyes of his countrymen, being the destruction of the Samaritan temple on Mount Gerizim (129 B. C.); but in reality his most surprising success was the subjugation of the Idumeans, and their conversion to the Jewish religion. His son, Aristobulus, added Iturea—a district at the base of the Anti-Libanus—to his dominions, but died, after a short reign, of remorse for the murder of his mother, Salome Alexandra, to whom the secular dominion had been bequeathed by Hyrcanus, but whom Aristobulus had cast into prison, and caused there to die of hunger. The son who succeeded him was Alexander Jannæus. Constantly fighting, and generally beaten, this king yet, strange to say, contrived to enlarge his territories; restless and enterprising as he was cruel and sanguinary, he gave his opponents no rest, and his opponents were all his neighbours in turn, excepting Cleopatra, queen of Egypt. Attached to the Sadducees (q. v.), like his father, and probably something of a pagan, he was disliked by the mass of his countrymen, and a civil war of six years' duration ensued. After a brief period of peace, he died (78 B. C.), recommending, however, his wife, Alexandra, to throw herself into the arms of the very party who had thwarted him all his life, the Pharisees (q. v.), as the best way of retaining her authority. This she did; and governed, on the whole, prudently for nine years. The Pharisaic party, however, abused the power which fell into their hands, and a reaction took place. Aristobulus, youngest son of the queen, and a prince of great spirit, placed himself at the head of the movement, marched to Jerusalem, took possession of the city, and ejected his elder brother, Hyrcanus II., from the sovereignty.

Great, fled to Aretas, king of Northern Arabia, who was induced, by the promise of a cession of the territory which had been acquired by Alexander Jannæus, to take up arms on his behalf. This led to the interference of the Romans, who were then fighting both in Syria and Armenia. After several vicissitudes, Jerusalem was captured (63 B. C.) by Pompey, who had decided in favour of Hyrcanus, and Judæa made dependent on the Roman province of Syria, and Hyrcanus appointed ethnarch and high-priest. Aristobul, however, with his two sons, Alexander and Antigonus, and two daughters, were carried captive to Rome.

In 54 B.C., Licinius Crassus plundered the temple, which Pompey had piously spared; his ill-gotten gains are said to have amounted to £2,000,000. He fell shortly afterwards in the war against the Parthians, and his companion, Cassius Longius, succeeded in completely routing Aristobul's army.

Meanwhile, the war between Cæsar and Pompey broke out. In Syria, the partisans of the latter were numerous, and contrived to poison Aristobulus, and execute his son Alexander, who were Cæsareans (49 B. C.). After the death of Pompey, however, things changed; and Hyrcanus, or rather Antipater the Idumean (who was both his minister and master), saw the necessity of securing the favour of Cæsar. With Hyrcanus II. ended the line of *Asmonean* princes: they exercised (nominally) supreme authority both in the civil and religious affairs of Palestine, i. e., they were both sovereigns and high-priests; but, as we have already indicated, the real religious authority had passed into the hands of the priesthood, and especially of the Sanhedrim (q. v.). The *Idumean* dynasty, which succeeded the Asmonean, virtually commenced with Antipater, who prevailed on Cæsar to restrict Hyrcanus to the high-priesthood, and obtained for himself the office of procurator of Judæa, while his eldest son Phazael was appointed governor of Jerusalem, and his younger son Herod governor of Galilee. The Jewish or national party took the alarm at this sudden increase of Idumean power; strife ensued; and ultimately Antipater perished by poison; but Herod, by the assistance of the Romans, finally entered Jerusalem in triumph (37 B. C.), caused Antigonus, the last male representative of the Asmonean line, and his most dangerous enemy, to be put to death, and commenced the difficult task of governing a people who were growing more and more unruly every day. The political events which occurred during the government of the Herods, are briefly touched upon under the heads HEROD (q. v.), AGRIPPA (q. v.), and ANTIPATER (q. v.).

After Herod's death (3 B. C.), Archelaus, one of his sons, ruled Judæa and Samaria; but his arbitrariness, and still more his constant attacks upon religion, made him hateful to the people; and Augustus, listening to their just complaints, deprived him of his power, and banished him to Vienne (6 A.D.). Judæa was now thrown together with Syria, and was ruled by Roman governors.

In the year 38 A. D., the Emperor Caligula issued an edict ordering divine honours to be paid to himself. Everywhere throughout the Roman dominions the J. refused to obey. At Alexandria, a frightful massacre took place, and for a moment it seemed as if the whole of the inhabitants of Judæa, too, were doomed to perish; but Herod Agrippa I. (q. v.), tetrarch of Northern Palestine, and a friend of Caligula's, dissuaded the emperor from carrying out his barbarous design. About the same time, the Babylonian J. became involved in a quarrel with the Parthians, and were slaughtered in vast nation of Caligula, seemed, however, the dawn of a brighter day for them. Herod Agrippa, a loyal friend and favourite of the new emperor, obtained anew the dominion over all the parts once ruled by his grandfather Herod, and many privileges were through his influence granted to his Jewish subjects, and even to foreign Jews. They received the rights of Roman citizenship (41 A. D.), and Herod even tried to conciliate their religious prejudices by the strictness with which he observed their law (a circumstance, we may say, in passing, that will account for his persecution of the Christians); yet the national party remained malcontent, and in an almost permanent state of mutiny. After the death of Herod Agrippa I. (his son being but a youth of seventeen) the country was again subjected to Roman governors. The confusion soon became indescribable. The whole land was overrun with robbers and assassins, some of whom professed to be animated by religious motives (such as the Sicarii), while others were mere ruffianly freebooters and cut-throats; the antipathy between J. and Samaritans waxed fiercer and fiercer, and the latter waylaid and murdered the orthodox Galileans as they went up to worship at Jerusalem; all sorts of impostors, fanatics, and pretenders to magic made their appearance; the priesthood was riven by dissensions; the hatreds between the populace and the Roman soldiery (mostly of Græco-Syrian origin), and under the commands of cruel procurators, such as Albinius and Gessius Florus, increased; frightful portents (according to Josephus) appeared in the heavens, until, in 66 A. D., in spite of all the precautionary efforts taken by Agrippa, the party of Zealots, i. e., the Sicarii or Assassins, burst into open rebellion, which, after a horrible carnage (Josephus calculates the number killed at 1,356,460), was terminated (70 A. D.) by the conquest of Jerusalem by Titus, the destruction of the temple, and the massacre and banishment of hundreds of thousands of the unhappy people, who were scattered among their brethren in all parts of the world. The defence of Jerusalem (as narrated by Josephus) is one of the most magnificent and melancholy examples of mingled heroism and insanity that the world affords. Still, very considerable numbers were allowed to remain in their native country, and for the next thirty years, although both hated and treated with rigour, they appear, on the whole, to have flourished. The Emperor Nerva was as lenient to them as to the rest of his subjects; but as soon as they had attained some measure of political vitality, their turbulent and fanatical spirit broke out anew. Their last attempts to throw off the Roman yoke, at Cyrene (115 A. D.), Cyprus (116 A. D.), Mesopotamia (118 A. D.), and Palestine, under Bar-Cochba (q. v.), (130 A. D.), were defeated after enormous and almost incredible butchery. The suppression of Bar-Cochba's insurrection (135 A. D.) marks the final desolation of Judæa, and the dispersion of its inhabitants. Talmud and Midrash (especially *Midrash Echa*) appear to exhaust even eastern extravagance in describing what followed the capture of Bither—the great stronghold of the Jews. The whole of Judæa was made like a desert, about 985 towns and villages lay in ashes, 50 fortresses were razed to the ground; the name of Jerusalem itself was changed into *Ælia Capitolina*, and a heathen colony settled in the city, from entering which every Jew was strictly debarred. The hardships to which the unfortunate race were subjected, were again alleviated in the reign of Antoninus Pius, whom the Jewish writers represent as secretly attached to their religion (see Jost's *Geschichte der Israeliten*, &c.), and better times seemed in store placed Abraham on the same divine level as he did Christ, and obtained from the grateful people the title of 'Father of the Synagogue.' Heliogabalus, among his many senseless whims, patronised various Jewish practices, such as circumcision and abstinence from swine's flesh; and generally speaking, from the close of the 2d c. till the establishment of Christianity under Constantine (330 A. D.), when their hopes were once more dashed to the ground, the J. of the Roman empire appear to have thriven astonishingly. In this period falls the redaction of the chief code and basis of the 'Oral Law,' the Mishna (q. v.) completed by Jehuda *Hanassi* (the Prince), or *Hakkadosh* (the Saint), president of the great school at Tiberias (220); upon which code were grafted subsequently the two gigantic commentaries or complements, the Palestinian and the Babylonian Gemaras (q. v.). The Babylonian J. were even more fortunate than their western brethren, though they did not perhaps attain the meridian of their prosperity till the revival of the Persian, on the downfall of the Parthian empire. Their leader was called 'The Prince of the Captivity' (*Resh Gelutha*), and was chosen from among those held to be descended from the House of David. He lived in great splendour, assumed among his own people the style of a monarch (though extremely submissive to the Parthian or Persian ruler), had a bodyguard, counsellors, cup-bearers, &c.; his subjects were, many of them, at least, extremely wealthy, and pursued all sorts of industrial occupations. They were merchants, bankers, artisans, husbandmen, and shepherds; and in particular had the reputation of being the best weavers of the then famous Babylonian garments. In fact, his government was quite an *imperium in imperio*, and possessed a thoroughly sacerdotal or at least theocratic character. The reputation for learning of the Babylonian schools, Nahardea, Sura, and Pumbeditha, was very great. What was their condition at this time further east, we cannot tell, but it seems quite certain that they had obtained a footing in China, if not before the time of Christ, at least during the 1st century. They were first discovered by the Jesuit missionaries of the 17th century. They did not appear ever to have heard of Christ, but they possessed the Book of Ezra, and retained, on the whole, a very decided nationalism of creed and character. From their language, it was inferred that they had come originally from Persia. At one time, they would appear to have been highly honoured in China, and to have held the highest civil and military offices.

Reverting to Europe, the ascendency of Christianity, as we have already said, was baneful to the Jews. Imperial edicts and ecclesiastical decrees vied with each other in the rigour of their intolerance towards this unhappy people. They were prohibited from making converts, from invoking (in Spain at least) the divine blessing on the country, from marrying Christian women or holding Christian slaves; they were burdened with heavy taxes; yet no persecution apparently could destroy the immortal race. About this time, they are found in large numbers in Illyria, Italy, Spain, Minorca, Gaul, and the Roman towns on the Rhine; they are agriculturists, traders, and artisans; they hold land; their services, in fact, cannot be dispensed with; Constantine, during whose reign a fierce revolution, incited by his co-regent, Gallus, broke out among the Arians and Jews (353), terms them, in a public document, 'that most hateful of all people;' yet in spite of this, they fill important civil and military situations, have special courts of justice, and exercise the influence that springs from the possession of wealth and knowledge. The brief rule of Julian the Apostate even shed a momentary gleam of splendour over their destinies, and the transport which they manifested on obtaining his permission to rebuild the temple at Jerusalem, is one of the most sublime spectacles in their history. The death of this emperor, however, frustrated their labours, and the rapid increase of ecclesiastical power was, of course, hurtful to them in a variety of ways, although the emperors now began, in the decline of their authority, to protect them as far as they could. In 418 A.D., they were excluded from the military service; and in 429 A.D., the patriarchate at Tiberias was abolished. After the fall of the West Roman empire, their fortunes were different in different countries. In Italy, Sicily, and Sardinia, they were for a time almost unmolested; in the Byzantine empire, they suffered many oppressions; while in the 6th and 7th centuries, the Franks and Spanish Visigoths inflicted on them frightful persecutions.

The sudden volcanic outburst of Mohammedanism in the Arabian peninsula, was at first disastrous to the J. in that part of the world. For several centuries, a Jewish kingdom had existed in the south-west of Arabia. It was called Himyaritis or Homeritis, and was in a flourishing condition 120 years before Christ. About 230 A.D., the Jewish religion even mounted the throne of Yemen. Twice, however (by the Ethiopian kings, Aidog and Ez-Baha), were the Jewish kings driven from it, and the Christian religion was introduced in that part in 530 A.D. At first, Jewish tribes around Mecca and Medina entertained opinions favourable to Mohammed as an Arabian chief, but when Islam began to threaten their own faith, and even existence, they rose in arms against its founder. Mohammed proved the stronger: he subdued the Chaibar tribes in 627 A.D., and the Arabian J. were finally dispossessed of their territories, and removed to Syria. The spread of Mohammedanism through Asiatic Turkey, Persia, Egypt, Africa, and the south of Spain was, nevertheless, on the whole advantageous to the Jews. Excepting accidental persecutions, such as those in Mauritania (790 A.D.) and in Egypt (1010 A.D.), they enjoyed, under the califs and Arabian princes, comparative peace. In Moorish Spain their numbers greatly increased, and they became famous for their learning as well as for trade. They were counsellors, secretaries, astrologers, or physicians to the Moorish rulers; and this period may well be considered the golden age of Jewish literature. Poets, orators, philosophers of highest eminence arose, and not isolated, but in considerable numbers; and it is a well-established fact, that to them is chiefly due—through the Arab medium—the preservation and subsequent spreading of ancient classical literature, more especially philosophy, in Europe. There are some medical works belonging to ancient Greece even now extant only in their Arabic translations, the originals being probably lost for ever. Different from their fate under Moslem rule was that which they had to endure in Christendom about this period. Only few and far between were those Christian monarchs who rose above the barbarism of the churches. About the beginning of the 11th c., the Byzantine emperor, Basil II., renewed the persecution; from quite different causes, the same thing had already begun in Babylonia, where the califate had passed into the hands of rulers hostile to the J.; and before the close of the 11th c., the Prince of the Captivity had perished on the scaffold, the schools were closed, the best of the community had fled to Spain, and those that remained were reduced to an abject condition, from which they have never risen. In Italy, their position was made tolerable by considerable pecuniary sacrifices. Here and there, at intervals, a spirit of Christian intolerance might break out, but they enjoyed for the most part the protection of the popes.

More favourable was their lot during the 8th and 9th centuries in France, especially in Paris, Lyon, Languedoc, and Provence. At the court of *Louis le Débonnaire*, they were actually all-powerful. After 877 A.D., however, when the weak Carlovingians had begun to rule, and the church was advancing with imperious strides, a melancholy change ensued—kings, bishops, feudal barons, and even the municipalities, all joined in a carnival of persecution. From the 11th to the 14th c., their history is a successive series of massacres. All manner of wild stories were circulated against them: it was said that they were wont to steal the host, and to contemptuously stick it through and through; to inveigle Christian children into their houses, and murder them; to poison wells, &c. They were also hated for their excessive usury, though there can be no doubt that more blame is attachable to those whose tyranny, by depriving them of the right to possess land, had compressed their activity into the narrower channels of traffic. Occasionally, however, their debtors, high and low, had recourse to what they called Christian religion as a very easy means of getting rid of their obligations. Thus, Philippe Auguste, under whose rule the Jews seem to have held mortgages of enormous value on the estates of church and state dignitaries, simply confiscated the debts due to them, forced them to surrender the pledges in their possession, seized their goods, and banished them from France; but the decree appears to have taken effect chiefly in the north; yet in less than 20 years, the same proud but wasteful monarch was glad to let them come back and take up their abode in Paris. Louis IX., who was a very pious prince, among other religious acts, cancelled a third of the claims which the J. had against his subjects, 'for the benefit of his soul.' An edict was also issued for the seizure and destruction of their sacred books; and we are told that, at Paris, twenty-four carts filled with copies of the *Talmud*, &c., were consigned to the flames. In the reign of Philippe the Fair, they were again expelled from France (1306 A.D.) with the usual accompaniments of cruelty; but the state of the royal finances rendered it necessary, in little more than a dozen years, to recall them; and they were allowed to enforce payment of the debts due to them, on condition that two-thirds of the whole should be given up to the king! But a religious epidemic, known as the Rising of the Shepherds, having seized the common people in Languedoc and the central regions of France (1321 A.D.), they signalised themselves by horrible massacres of the detested race; so horrible, indeed, that in one place, Verdun, on the Garonne, the J., in the madness of their agony, threw down their children to the *Christian* mob, from the tower in which they were gathered, hoping, but in vain, to appease the demoniacal fury of their assailants. In the following year, the plague broke out, and the wildest crimes were laid to their charge. One shudders to read of what followed; in whole provinces, every Jew was burned. *At Chinon, a deep ditch was dug, an enormous pile raised, and* 160 *of both sexes burned together!* Yet Christianity never produced more resolute martyrs; as they sprung into the place of torment, they sang hymns as though they were going to a wedding. Finally, in 1395, they were indefinitely banished from the middle of France.

Their first appearance in England dates from the period of the Saxons. They are mentioned in the of York, 740 A. D.; they are also named in a charter to the monks of Croyland, 833 A. D. William the Conqueror and his son, William Rufus, favoured them; the latter, on the occasion of a public debate between them and the Christians, even swore with humorous profanity, that if the rabbins beat the bishops, 'by the face of St Luke,' he would turn a Jew himself. The same reckless monarch carried his contempt for the religious institutions of his kingdom so far, that he actually farmed out the vacant bishoprics to the J.; and at Oxford, even then a seat of learning, they possessed three halls—Lombard Hall, Moses Hall, and Jacob Hall, where Hebrew was taught to Christians as well as to the youths of their own persuasion. As they grew in wealth, they grew in unpopularity. On the day of the coronation of Richard the Lion Heart (1189 A. D.), some foreign J. being perceived to witness the spectacle, from which their nation had been strictly excluded, a popular commotion against them broke out in London; their houses were pillaged and burned; and though Sir Richard Glanville, the chief-justiciary of the realm, acting under the orders of the indignant king, partially succeeded in arresting the havoc, and even in bringing some of the mob to justice (three were hanged), yet the barbarous bigotry of priests and people prevented anything like just or salutary punishment. Similar scenes were witnessed at Norwich, Edmundsbury, Stamford, and York; in the last of these towns, most of the J. preferred voluntary martyrdom (*Kiddush Hashem*) in the synagogue to forced baptism. When Richard returned from Palestine, their prospects brightened a little; though still treated with great rigour, yet their lives and wealth were protected—for a consideration! John *Lackland* at first covered them with honour, but the popular and priestly hatred only became the stronger; and on a sudden, the vacillating and unprincipled king turned round on his protégés, after they had accumulated great wealth, and imprisoned, maltreated, and plundered them in all parts of the country. Under Henry III., they were mulcted enormously. Accused of clipping the coin of the realm, they had, as a penalty, to pay into the royal exchequer (1230 A. D.) a third of their movable property. To this reign belongs the now exploded story of the crucifixion of the Christian boy, *Hugh of Lincoln*. The accession of Edward did not mitigate their misery; some efforts, indeed, were made to induce them to give up their profession of usury, as was also done in France and elsewhere during the same period, but the fact is, that they were so heavily taxed by the sovereigns or governments of Christendom, and at the same time debarred from almost every other trade or occupation—partly by special decrees, partly by the vulgar prejudice—that they could not afford to prosecute ordinary avocations. The attempt made by the Dominican friars to convert them, of course, failed utterly; and in 1253, the J.—no longer able to withstand the constant hardships to which they were subjected in person and property—begged of their own accord to be allowed to leave the country. Richard of Cornwall, however, persuaded them to stay. Ultimately, in 1290 A. D., they were driven from the shores of England, pursued by the execrations of the infuriated rabble, and leaving in the hands of the king all their property, debts, obligations, and mortgages. They emigrated for the most part to France and Germany. Their number is estimated at about 16,000.

In Germany, they were looked upon as the special property of the sovereign, who bought and sold them, and were designated his *Kammerknechte* their appearance in that region almost as early as the time of Constantine. About the 8th c., they are found in all the Rhenish towns; in the 10th c., in Saxony and Bohemia; in the 11th, in Swabia, Franconia, and Vienna; and in the 12th, in Brandenburg and Silesia. The same sort of treatment befell them in the empire as elsewhere; they had to pay all manner of iniquitous taxes—body-tax, capitation-tax, trade-taxes, coronation-tax, and to present a multitude of gifts, to mollify the avarice or supply the necessities of emperors, princes, and barons. A raid against the J. was a favourite pastime of a bankrupt noble in those days. The Crusades kindled a spirit not in Germany only, however, but through all Christendom, hostile to the 'enemies of Christ.' Treves, Metz, Cologne, Mainz, Worms, Spires, Strasburg, and other cities, were deluged with the blood of the 'unbelievers.' At such epochs, the passions of the populace and of the lower clergy could not be restrained. The word *Hep* (said to be the initials of *Hierosolyma est perdita*, Jerusalem is taken) throughout all the cities of the empire became the signal for massacre, and if an insensate monk sounded it along the streets, it threw the rabble into paroxysms of murderous rage. The J. were expelled—after being plundered and maltreated—from Vienna (1196 A. D.), Mecklenburg (1225 A. D.), Breslau (1226 A. D.), Brandenburg (1243 A. D.), Frankfurt (1241 A. D.), Munich (1285 A. D.), Nürnberg (1390 A. D.), Prague (1391 A. D.), and Ratisbon (1476 A. D.). The 'Black Death,' in particular, occasioned a great and widespread persecution (1348—1350 A. D.). They were murdered and burned by thousands, and many even sought death amidst the conflagrations of their synagogues. The race almost disappeared from Germany; only, however, to return, for their services were indispensable. Only here and there, however, they possessed the rights of citizens, or were allowed to hold unmovable property; in general, they were permitted to prosecute only commerce and usury, and the law turned on them its harshest aspect. Repeatedly, too, the emperors gratified at once their piety and their greed by cancelling their pecuniary claims. In many places, they were compelled to live in certain parts of the town, known as the *Judenstrasse* (Jews' Streets).

Switzerland, whither they came at a comparatively late period, commenced to persecute them about the middle of the 14th century. In the course of the 15th c., they were expelled from Schaffhausen, Zürich, Geneva, Thurgau, and other places.—Their treatment was more humane in Poland and Lithuania. As early as 1264 A. D., they enjoyed in these countries certain important privileges. Favoured by Casimir III., their numbers were swelled, after 1348 A. D., by fugitives from Germany and Switzerland.—Russia and Hungary, like most other countries of Christendom during the middle ages, received, persecuted, and banished them.

In Spain, the condition of the J. was long highly favourable. The horrible persecutions of the Gothic princes in the 6th and 7th centuries, made it, of course, absolutely inevitable that the first gleam of a Moorish scimitar on the coast would turn them into allies of the invaders. During the whole of the brilliant period of Moorish rule in the Peninsula, they enjoyed, indeed, what must have seemed to them, in comparison with their common fate, a sort of Elysian life. They were almost on terms of equality with their Mohammedan masters, rivalled them in civilisation and letters, and probably surpassed them in wealth. The Spanish J. were consequently of a much higher type than their brethren in other parts of Europe. They were not reduced to the one degrading occupation of usury, though they followed that too; on the contrary, they were husbandmen, landed proprietors, physicians, financial administrators, &c.; they enjoyed special privileges, and had courts of justice for themselves. Nor was this state of things confined to those portions of Spain under the sovereignty of the Moors; the Christian monarchs of the north and middle gradually came to appreciate the value of their services, and we find them for a time protected and encouraged by the rulers of Aragon and Castile. But the extravagance and consequent poverty of the nobles, as well as the increasing power of the priesthood, ultimately brought about a disastrous change. The estates of the nobles and (it is also believed) those attached to the cathedrals and churches, were in many cases mortgaged to the J.; hence it was not difficult for 'conscience' to get up a persecution, when goaded to its 'duty' by the pressure of want and shame. Gradually, the J. were deprived of the privilege of living where they pleased; their rights were diminished, and their taxes augmented. In Seville, Cordova, Toledo, Valencia, Catalonia, and the island of Majorca, outbursts of priestly and popular violence took place (1391—1392 A. D.); immense numbers were murdered, and wholesale theft was perpetrated by the religious rabble. Escape was possible only through flight to Africa, or by accepting baptism at the point of the sword. The number of these enforced converts to Christianity is reckoned at 200,000. The fate of the J. in Spain during the 15th c., however, beggars description. Persecution, violent conversion, massacre, the tortures of the inquisition—we read of nothing but these! Thousands were burned alive. 'In one year, 280 were burned in Seville alone.' Sometimes the popes, and even the nobles shuddered at the fiendish zeal of the inquisitors, and tried to mitigate it, but in vain. At length the hour of final horror came. In 1492 A. D., Ferdinand and Isabella issued an edict for the expulsion, within four months, of all who refused to become Christians, with the strict inhibition to take neither gold nor silver out of the country. The J. offered an enormous sum for its revocation, and for a moment the sovereigns hesitated; but Torquemada, the Dominican inquisitor-general, dared to compare his royal master and mistress to Judas; they shrank from the awful accusation; and the ruin of the most industrious, the most thriving, the most peaceable, and the most learned of their subjects—and consequently of Spain herself—became irremediable. This is perhaps the grandest and most melancholy hour in their modern history. It is considered by themselves as great a calamity as the destruction of Jerusalem. 300,000 (some even give the numbers at 650,000 or 800,000) resolved to abandon the country, which a residence of seven centuries had made almost a second Judæa to them. The incidents that marked their departure are heartrending. Almost every land was shut against them. Some, however, ventured into France; others into Italy, Turkey, and Marocco, in the last of which countries they suffered the most frightful privations. Of the 80,000 who obtained an entrance into Portugal on payment of eight gold pennies a head, but only for eight months, to enable them to obtain means of departure to other countries, many lingered after the expiry of the appointed time, and the poorer were sold as slaves. In 1495 A. D., King Emanuel commanded them to quit his territories, but at the same time issued a secret order that all Jewish children under 14 years of age should be torn from their mothers, retained in Portugal, and brought up as Christians. Agony drove the Jewish mothers into madness: they destroyed their children with their own hands, and threw them into wells and rivers, to prevent them from falling into the hands of their persecutors. The miseries of those who embraced Christianity, but who, for the most part, secretly adhered to their old faith (*Onsim*, *Anussim*—'yielding to violence, forced ones'), were hardly less dreadful, and it was far on in the 17th c. before persecution ceased. *Autos da Fé* of suspected converts happened as late as 1655 A. D.

The wanderers appear to have met with much better treatment in Italy and Turkey than anywhere else. During the 15th and 16th centuries, they are to be found—except at intervals, when persecution applied its scourge—in almost every city of Italy; pursuing various kinds of traffic (nearly the whole trade of the Levant, for instance, was in their hands), but chiefly engaged in money-lending, in which they rivalled the great Lombard bankers. Abrabanel, perhaps the most eminent Jewish scholar and divine of his day, rose to be confidential adviser to the king of Naples. In Turkey, they were held in higher estimation than the conquered Greeks; the latter were termed *Teshir* (slaves), but the Jews, *Monsaphir* (visitors); they were allowed to re-open their schools, to establish synagogues, and to settle in all the commercial towns of the Levant.

The invention of printing, the revival of learning, and the Reformation, are generally asserted to have been beneficial to the J., but this can be regarded as true only in a certain sense. When the J. began to use the presses at their earliest stage for their own literature, sacred and otherwise, the Emperor Maximilian was urged—chiefly by converts—to order all Hebrew writings to be committed to the flames; and but for the strenuous exertions of Reuchlin (q. v.), ignorance, treachery, and bigotry might have secured a despicable triumph. Luther, in the earlier part of his career, at least, looked with no unfavourable eye on the adoption of violent means for their conversion; and, on the other hand, we find at least one distinguished Roman Catholic, Pope Sextus V., animated by a far more wise and kindly spirit towards them than any Protestant prince of his time. In 1588, he abolished all the persecuting statutes of his predecessors, allowed them to settle and trade in every city of his dominions, to enjoy the free exercise of their religion, and, in respect to the administration of justice and taxation, placed them on a footing with the rest of his subjects. That the Reformation itself had nothing to do with subsequent ameliorations in the condition of the J., is only too plain from the fact, that in many parts of Germany, Protestant as well as Catholic, their lot became actually harder than before. They were driven out of Bavaria (1553 A. D.), out of Brandenburg (1573 A. D.), and similar treatment befell them elsewhere. They also excited numerous popular tumults (as late even as 1730 A. D. in the Protestant city of Hamburg); and, in fact, during the whole of the 17th and the first part of the 18th c., the hardships inflicted on them by the German governments positively became more and more grievous. What really caused the change in their favour was the great uprising of human reason that marked the middle of the 18th century. Among the writers who distinguished themselves in Germany by pleading the cause of the J., we may specially mention Lessing (q. v.), Mendelssohn (q. v.), and Dohm.

Holland, as we know, was one of the first countries in modern times to rise out of the barbarism of the middle ages. Its active, energetic, intelligent inhabitants appreciated the business qualifications of the J., and as early as 1603 A. D., permitted them to settle and trade, though they did not acquire the rights of citizenship till 1796 A. D. In England,

J. to obtain a legal recognition in that country was during the Protectorate of Cromwell in 1655 A. D. Cromwell himself was favourable to their admission; so were the lawyers; but the nation generally, and particularly the emphatically religious portion of it, were strongly hostile to such a proceeding; and the wearisome, controversial jangling of the divines appointed to consider the question, prevented anything from being done till the reign of Charles II., who, standing much and frequently in need of their services, permitted them quietly to settle in the island. In 1723 A. D., they acquired the right to possess land; in 1753 A. D., they obtained the right of naturalisation. Since 1830, civic corporations, since 1833, the profession of advocates, and since 1845, the office of alderman and of lord-mayor, have been opened to them. The last and crowning triumph of the principle of toleration was achieved in 1858 by the admission of J. into parliament.

Some of the relics of that mighty host of exiles that left Spain and Portugal found their way into France, where they long lingered in a miserable condition. In 1550 A. D., they were received into Bayonne and Bordeaux; they were also to be found in considerable numbers in Avignon, Lorraine, and Alsace. In 1784, the capitation-tax was abolished. In 1790, while the French Revolution was still in its pristine vigour, and animated by a sincere humanitarianism, the J. presented a petition to the national representatives claiming equal rights as citizens. Mirabeau was among their advocates, and their cause could not, therefore, be unsuccessful. From this time, their technical designation in France has been *Israelites*. In 1806, the Emperor Napoleon summoned a 'Sanhedrim' of J. to meet at Paris, to whom a variety of questions were put, mainly with a view to test their fitness for being French citizens. Their answers were satisfactory, and they were allowed to reorganise their religious institutions in the most elaborate manner. Since then, no material change has taken place in the laws regarding them; and they are since then found not only in the highest offices of the civil administration—very frequently in the ministry (e. g., Crémieux, Goudchaux, Fould)—but they also fill some of the chief places in the army and navy. We may add here, that their surpassing bravery in the field has been the subject of frequent remark, more especially since among the vices with which a brutal prejudice loved to brand them, in spite of all historical evidence, was also that of cowardice.—In Denmark, since 1814 A. D., they have been on a footing of equality as citizens with native Danes.—In Sweden, they did not obtain admission till 1776 A.D., and then only into Stockholm and three other towns. Citizenship is still conferred as a favour.—Norway forbade them to touch its soil till 1860 A. D.—Admitted into Russia Proper by Peter the Great, they were expelled—to the number of 35,000—by the Empress Elizabeth in 1743. Readmitted by the Empress Catharine II., they were further protected by the Emperor Alexander I., who in 1805 and 1809 issued decrees, insuring them full liberty of trade and commerce; but of the liberties which he conferred upon them, they were deprived by the late emperor, Nicholas. Since 1835, a scheme of gradual emancipation has been under contemplation.—Poland, however, has become their principal residence. There they are more numerous than in any other part of the world. They owed their first humane reception in the 14th c. to the love which King Casimir the Great bore for a Jewish mistress. For many years, the

century, however, they were much persecuted, and sank into a state of great ignorance, and even poverty; but education—in spite of the severity and barbarism of Russian intolerance—has, since the French Revolution, made progress among them.—Frederick the Great, king of Prussia, shewed himself singularly harsh towards the J.; in fact, his legislation, it has been said, almost throws us back into the middle ages. All manner of iniquitous and ridiculous taxes were laid upon them; only a certain number were allowed to reside in the country, and these were prohibited both from the most honourable and the most lucrative employments. This shameful state of matters was ended by the Prussian edict of toleration (1812 A. D.), by which J. were placed almost in an equal position as citizens with other Prussians. Since then, the tendency, on the whole, had been to enlarge their 'liberties'—until the Revolution of 1848 finally gained them their full emancipation, although, owing to the subsequent periods of reaction, it has not as yet been entirely carried out.—In the smaller German states, their full rights have likewise—gradually and grudgingly—been conceded to them at last; and the first German National Assembly held in Frankfurt in 1848 and 1849 contained many prominent Jewish members, among whom was the vice-president, Riesser.—In Austria, the Emperor Joseph II. distinguished himself by passing an act of toleration, 1782 A. D. This act was extraordinarily liberal in its provisions for the Jews. Not till 1860, however (and even then under certain restrictions), did they acquire the right to possess land.—In Hungary and Transylvania, they have long enjoyed important privileges, and have been protected by the nobility. As a consequence, in the late Hungarian insurrection, they were patriotic to a man.—Spain began to tolerate them again in 1837 A. D., and they can follow trade or agriculture like other Spaniards; but few J. have as yet cared to venture back to a land that fills them with the most mournful recollections.—Portugal, where they enjoy no civic rights, has only a few German Jews.—Switzerland long treated them harshly, and only of late years have a few cantons taken a step in the right direction.

In other countries, their condition must be merely referred to. In Turkey, they are very numerous, and have thriven in spite of the exactions of pashas, the insolence of Janizaries, and the miseries of war. Their communities in Constantinople, Adrianople, Saloniki, Smyrna, Aleppo, and Damascus, are considerable; in Palestine, their ancient home, they are said to be rapidly increasing, but they are still, in spite of the many efforts on the part of their European brothers to ameliorate their condition, very poor. Their numbers in Arabia are not very large, yet they enjoy some independence. Those in Persia have sunk into ignorance through oppression, yet it is touching to find that they are not hopeless. 'Heavy,' they say, 'is our slavery; anxiously we wait for redemption.' They exist in Afghanistan, and carry on a trade between Cabul and China; in India and Cochin-China, where they are both agriculturists and artisans; in Surinam, there is a flourishing colony; in Bokhara, where they possess equal rights with the other inhabitants, and are skilled in the manufacture of silks and metals; in Tartary and China, where, however, they are very insignificant both in numbers and position. They are also found all along the North African coast, where, indeed, they have had communities for perhaps more than a thousand years, which were largely reinforced in consequence of the great and Marocco, though they are not always free from the perils of Mohammedan fanaticism. In Egypt and Nubia, they are few; in Abyssinia, more numerous; and it is ascertained that they have even made their way into the heart of Africa; they exist in Sudan, and are also found further south. America, too, has invited their spirit of enterprise. In the United States, as in Great Britain, they enjoy absolute liberty. They have been in Brazil since 1625, and in Cayenne since 1639, and are also settled in some parts of the West Indies.

The entire number of J. in the world is reckoned variously between 3½ and 15 millions. A recent estimate gives their number at about 5,000,000, of which upwards of 3,500,000 are assigned to Europe; about 205,000 to Asia; about 750,000 to Africa, and about 105,000 to America. There are in Germany, inclusive of the whole of Austria and Prussia, about 1,440,000, of whom 1,049,871 are in Austria, and 260,751 in Prussia. According to the Russian census of 1867, the number of J. in European Russia was 2,612,179.

Language and Literature.—*Language.* Among the Semitic family of languages, the Hebrew (called in the Old Testament, the speech of Canaan; in the later portions of the same book, the speech of Judæa; and first in the Chaldee targums, the Sacred Language, or rather the language of the Sanctuary and things connected with it—as the law [Mishna], the prayers, &c.) is one of the oldest, and in regard to strength, refinement, and elaborate completeness of grammatical structure, one of the most remarkable. (Its chief characteristics will be found noticed under Semitic Languages.) Yet it is neither the oldest of Semitic dialects, nor, as was long believed, the first of all human languages. Once identical with the Phœnician, it was adopted by Abraham and his family in Palestine. The peculiar religious and moral notions of the Hebrews could not but impress upon it by degrees a distinct character, and thus Hebrew became a distinct dialect. Although the Sacred writings are the oldest Semitic works which we possess, there is yet, except a few archaisms, hardly any trace of the primitive state of the Hebrew language preserved in them; they belong to periods when it was nearly as fully formed and developed as in the time of the exile. The differences in style, manner, and idiom in the different books, must rather be traced to the individualities of the various writers. In general, we distinguish two distinct periods—the golden age, up to the Babylonian exile, when, except a few Egyptian words, no foreign admixture mars the purity of the language; the second from the exile downwards, when Persian and Aramaic elements had largely been introduced. As we find it in the Bible, the Hebrew is a poor language enough; yet there is a sublime grandeur, and, in the provinces of religion and agriculture, also a richness inherent in it which surpasses almost every ancient and modern language. It is hardly to be presumed, in the absence of distinct traces, that there should have been, within the small compass of Palestine, room for several dialects. The different pronunciation of the *Shin* alluded to in Judges xii. must have been only a solitary peculiarity of the Ephraimites, as, at a later period, the Galileans, and also the inhabitants of Jerusalem, were known for their faulty pronunciation, as shewn in several passages of the New Testament and the Talmud. The Hebrew character still universally employed in writing, and called *square*, Assyrian or Babylonian character, first takes the place, at an uncertain period after the exile, of the older national alphabetic character, which was common the old Phœnician.

A grammatical treatment of Hebrew first commenced after the language ceased to be spoken by the people. The vocalisation and accentuation of the text originated in the 6th and 7th centuries after the time of Christ (see Masora). The J. made the first attempt at a system of grammar about the dawn of the 10th c., after the example of the Arabians, and originally even in the Arabian language. Rabbi Saadia Gaon (died 942 A. D.), Jehuda Chajug (*circa* 1050 A. D.), Abraham-ben-Esra (*circa* 1150 A. D.), and David Kimchi (*circa* 1190—1200) are held in classic repute as grammarians. The Hebrew dictionary of the latter was long considered the best that had been executed. The founder of the study of Hebrew among Christians was the famous Johann Reuchlin (died 1522 A. D.), who, however, like the grammarians of the next age, Buxtorf and others, strictly adhered to the Jewish tradition and method. A new era began when the study of the other members of the Semitic family of languages, the Syriac, the Arabic, and the Ethiopic, enlarged the Hebraist's field of view; the heralds of this era were the German scholars, Alb. Schultens (died 1750) and Nik. W. Schröder (died 1798), who sought to remedy the one-sided defective method into which the so-called Dutch school fell by its too exclusive regard for Arabic. Gesenius, especially, along with a comprehensive and due consideration of all the allied languages, devoted his attention to the critical observation and exposition of the individual grammatical facts, and a more just and harmonious explanation of them. Since then, Ewald (q. v.), who treats the Hebrew language as an organism after the historico-genetic method, has carried the study still further, and in some measure superseded Gesenius. Ewald's *Grammatik der Hebr. Sprache* (Leip. 1844); Gesenius, *Hebräische Grammatik* (Leip. 1813), the 16th edition by Rödiger (Leip. 1851); are the best known grammars. The most comprehensive Hebrew dictionary is that by Gesenius, entitled *Thesaurus Linguæ Hebraicæ* (Leip. 1829—1842); the best of the smaller lexicons are Gesenius's *Hebr. und Chald. Handwörterbuch über das Alte Testament* (2 vols. Leip. 1810—1812; 4th ed. 1834); Winer's *Lexicon Manuale Hebraicum et Chaldaicum* (Leip. 1828); and Fürst's *Hebr. und Chald. Handwörterbuch* (Leip. 1857—1861).

Literature.—The extraordinary influence which the religion of the Hebrews has exercised on Christian and Mohammedan nations, has given a universal significance to their ancient literature. In antiquity and credibility, in the religiousness of its form and the vigour of its poetry, it surpasses the literature of any other pre-Christian people, and thus constitutes both the most remarkable monument and the most authentic source of the early history and spiritual development of the human race. It is true, however, that only a comparatively scanty portion of it has come down to the present day, and even the contents of what *is* extant have by no means remained unaltered in the lapse of ages. It is quite certain that the Hebrews, in the earliest times, only engraved or cut out on stone, metal, or wood what is said to have been executed *in writing;* nor is there any trace of a material adapted for the record of lengthened compositions before the period of David, and even then the writing of books was still a matter of rare occurrence. Besides, several writings of the Hebrews, held to be of ancient date, are believed to betray a later origin than is assigned to them by their contents, their mode of representation, and the character of the language; so that, in truth, we possess nothing which, in its original shape, reaches further back than the must recognise not only the internal arrangement, but a good deal also of the contents of the Hebrew writings, as a later elaboration. That criticism has discovered, as it believes, here and there traces of much later hands than those to whom tradition ascribes the authorship of the particular works, does not necessarily always throw discredit on the incidents narrated, nor destroy the value of that peculiar spirit by which they are characterised.

The composition of the extant works in *Hebrew Literature* proper would, on this view, extend over a period of nearly 900 years—viz., from the times of David to those of the Maccabees. This period was preceded by a preparatory one of sagas, songs, fragmentary historical notices, inscriptions, laws, and probably also priestly registers. The nature and contents of the particular writings are determined by the changing fortunes of the people, who were at first strong and flourishing; then disrupted and weakened; then held in subjection by Assyrian, Egyptian, Babylonian, Persian, Greek, and Syrian rulers; and, finally, once more independent under native princes. Nevertheless, the prevalent idea—the basis, so to speak, of the whole Hebrew literature, looked at from the merely human point of view—is a passionate enthusiasm for independence, and for the preservation of a nationality founded on their law and history; hence its patriotism is of a profoundly religious character. The law and the doctrine are the 'word of God;' the Hebrews are the 'people of God,' his 'chosen people;' their fortunes are, in quite a special sense, 'providences;' and their poetry has God or the nation for its constant theme. In a certain sense, therefore, as we might expect, all the productions of the Hebrew muse shew a marked similarity to each other; still they can be arranged, according to form and contents, under the five heads—law, prophecy, history, lyric poetry, and speculation. (For a special account of these, see the articles on the separate books of the Old Testament; also BIBLE, PENTATEUCH, &c.) The same epoch in which took place the transition from Hebraism to Judaism—the epoch of the captivity—was also that which marked the commencement of *Jewish* literature, properly so called. Founded on the earlier and more creative Hebrew, and for the most part written in the same language, it is yet qualified by the presence of religious conceptions borrowed from the Persians, of Greek wisdom, Roman law, and, at a later period, of Arabic poetry and philosophy, and of European science; though everything is strictly subordinated to the great ideas of the ancient faith. Since the return from exile, the Jewish—also, but erroneously, called the *Rabbinical*—literature has, without the slightest external encouragement, actively taken part in the cultivation of the human mind; and in the results of this activity, which are still far from being duly appreciated, there lie concealed the richest treasures of centuries. Jewish literature has been divided chronologically into nine periods.

The *first* period extends to 143 B. C. After the return from exile, the Jewish people naturally enough became animated by an intense nationality of feeling: they had nearly lost name, country, life; and now that these were restored again, they strenuously resolved never more to place them in jeopardy. Guided by Ezra, the intellect of the nation began to exhibit surpassing reverence for the Pentateuch and the Prophets. Expositions and additions to the earlier history (*Midrashim*), as well as Greek translations, were executed, and several of the Hagiographa—such as particular psalms, the so-called Proverbs of Solomon, Ecclesiastes, the Books of Chronicles, portions of Ezra and Nehemiah belong the uncertain performances of the Great *Synagogue* (q. v.), a body the existence of which has, as indicated above, been doubted by some early critics, but which is now established beyond any doubt. To this the work of completing the canon of the Old Testament is chiefly ascribed. Towards its close (190—170 B. C.), several writers appear *in propriâ personâ*, as, for instance, Sirach and Aristobulus. The doctors of whom the Great Synagogue chiefly consisted were called *Soferim* (Scribes), and the Aramaic finally became the popular dialect of Palestine.

The *second* period extends from 143 B. C. to 135 A. D. The *Midrash* (q. v.), or the inquiry into the meaning of the sacred writings, was divided into *Halacha* (q. v.) and *Hagada*: the former considered the improvement of the law, with a view to practical results; the latter, the essence of the religious and historical interpretations. At first, both were the oral deliverances of the Soferim, but gradually written memorials made their appearance. The public interpretation of the Scripture in schools and synagogues, the independence of the sanhedrim, the strife of sects, and the influences of Alexandrian culture, furthered this development. To this period also belong various Greek, but not, as is still erroneously supposed by some, the *written* Targums or Aramaic Versions of the Bible (see TARGUMS), which sprang at a much later period from oral translations of the Pentateuch in the synagogues instituted after the return from the exile; further the whole of the Apocrypha (q. v.), and the earliest Christian writings, which are at least the productions of men nurtured in the principles of Judaism, and which contain many traces of Judaistic culture, feeling, and faith. It was also characterised by the drawing up of prayers, scriptural expositions, songs, and collections of proverbs. The poet (not the prophet) Ezekiel, the author of the first book of the Maccabees, Jason, Josephus, Philo, Johannes (see above), are names specially worthy of mention; so also are the doctors of the oral law—Hillel (q. v.), Shamai, Jochanan-ben-Saccai, Gamaliel, Eleazar-ben-Hyrcan, Joshua-ben-Chananja, Ishmael, Akiba, and others of like eminence. *Rabbi* (Master), *Talmid Chacham* (Disciple of Wisdom), were titles of honour given to those expert in a knowledge of the law. Besides the Maccabean coins, Greek and Latin inscriptions belonging to this period are extant.

The *third* period reaches from 135 to 475 A. D. Instruction in the Halacha and Hagada now became the principal employment of the flourishing schools in Galilee, Syria, Rome, and since 219 A. D., in Babylonia; the most distinguished men were the masters of the *Mishna* (q. v.) and the *Talmud* (q. v.)—viz., Eleazar-ben-Jacob, Jehuda, Jose, Meir, Simeon-ben-Jochai, Jehuda the Holy, Nathan, Chija, Rab, Samuel, Jochanan, Hunna, Rabba, Rava, Papa, Ashe, and Abina. Besides expositions, additions to Sirach, ethical treatises, stories, fables, and history were also composed; the prayers were enriched, the Targum to the Pentateuch and the Prophets completed, and the calendar fixed by Hillel the second, 340 A. D. After the suppression of the academies in Palestine, those of Persia—viz., at Sura, Pumbeditha, and Nehardea—became the centre of Jewish literary activity. On Sabbaths and festal days, the people heard, in the schools and places for prayer, instructive and edifying discourses. Of the biblical literature of the Greek J., we have only fragments, such as those of the versions of Aquila and Symmachus. With this period terminates the age of direct tradition.

The *fourth* period (from 475 to 740 A. D.). By this time, the J. had long abandoned the use of of whatever country they happened to dwell in. During the 6th c. the Babylonian Talmud was concluded, the Palestinian Talmud having been redacted about a hundred years before. Little remains of the labours of the Jewish physicians of the 7th c., or of the first *Geonim* or presidents of the Babylonian schools, who first appear 589 A.D. On the other hand, from the 6th to the 8th centuries, the Masora was developed in Palestine (at Tiberias); and, besides a collection of the earlier Haggadas (e.g., *Bereshith rabba*), independent commentaries were likewise executed, as the *Pesikta*, the *Pirke of Eliezer* (700 A.D.), &c. See MIDRASH; HAGGADA.

In the *fifth* period (from 740 to 1040 A.D.), the Arabs, energetic, brilliant, and victorious in literature as in war, had appropriated to themselves the learning of Hindus, Persians, and Greeks, and thus excited the emulation of the oriental J., among whom now sprung up physicians, astronomers, grammarians, commentators, and chroniclers. Religious and historical Haggadas, books of morality, and expositions of the Talmud, were likewise composed. The oldest Talmudic compends belong to the age of Anan (*circa* 750 A.D.), the earliest writer of the Karaite Jews. The oldest prayer-book was drawn up about 880 A.D.; and the first Talmudic Dictionary about 900 A.D. The most illustrious *Geonim* of a later time were Saadia (died 941 A.D.), equally famous as a commentator and translator of Scripture into Arabic, a doctor of law, a grammarian, theologian, and poet; Scherira (died 998), and his son Hai (died 1038), who was the author, among other things, of a Dictionary. From Palestine came the completion of the Masora and of the vowel-system; numerous *Midrashim*, the Hagiographical Targums, and the first writings on theological cosmogony, were also executed there. From the 9th to the 11th c., Kairwan and Fez, in Africa, produced several celebrated Jewish doctors and authors. Learned rabbins are likewise found in Italy after the 8th c.—e.g., Julius in Pavia, &c. Bari and Otranto were at this time the great seats of Jewish learning in Italy.. After the suppression of the Babylonian academies (1040), Spain became the central seat of Jewish literature. To this period belong the oldest Hebrew codices, which go back to the 9th century. Hebrew rhyme is a product of the 8th, and modern Hebrew prosody of the 10th century.

The *sixth* period (from 1040 to 1204 A.D.) is the most splendid era of Jewish medieval literature. The Spanish J. busied themselves about theology, exegetics, grammar, poetry, the science of law, astronomy, mathematics, philosophy, rhetoric, and medicine. They wrote sermons, and ethical and historical works. The languages employed were Arabic, Rabbinical Hebrew, and ancient or classical Hebrew. We can only mention here the great doctor, Samuel Halevi (died 1055), &c.; and lastly, the renowned *Maimonides* (q. v.), whose death closes this epoch. The literature of the French rabbins was more national in its character, and kept more strictly within the limits of the Halacha and Haggada. In Provence, which combined the literary characteristics of France and Spain, there were celebrated Jewish academies at Lunel, Narbonne, and Nîmes, and we find Talmudists, such as Berahja Halevi, Abraham-ben-David, &c. The fame of the Talmudists of Germany, especially those of Mayence and Ratisbon, was very great. Among the most illustrious Jewish writers of this period, belonging to that country, are Simeon, the compiler of *Yalkut*, Joseph Kara, Petachja, &c. Only a few names belong to Greece and Asia; still the Karaite J. had a very able writer in Juda Hadassi (1148). completed before Maimonides. Many of the works, however, produced between 740 and the close of this period are lost.

The *seventh* period (from 1204 to 1492 A.D.) bears manifest traces of the influence exercised by Maimonides. Literary activity shewed itself partly in the sphere of theologico-exegetic philosophy, partly in the elaboration of the national law. With the growth of a religious mysticism, there also sprung up a war of opinions between Talmudists, Philosophers, and Cabbalists. The most celebrated J. of this period lived in Spain; later, in Portugal, Provence, and Italy. To Spain belongs (in the 13th c.) the poet Jehuda Charisi, &c. In the 15th c., a decline is noticeable. Books written in Hebrew were first printed in Spain at Ixar in Aragon (1485), at Zamora (1487), and at Lisbon (1489).—During this epoch, the chief ornaments of Jewish literature in Provence were Moses-ben-Abraham, David Kimchi, Jeruham, Farissol, Isaac Nathan, the author of the Hebrew Concordance.—In Italy, Jewish scholars employed themselves with the translation of Arabic and Latin works. Works of an æsthetical character were written by Immanuel-ben-Solomon, the author of the first Hebrew sonnets; Moses de Rieti, who wrote a Hebrew *Divina Commedia*, &c.—While France could shew only a few notable authors, such as the collectors of the Tosafot, Moses de Coucy, and Jehiel-ben-Joseph, the poet and exegete Berachja, Germany produced a multitude of writers on the law, such as Eleazar Halevi, Meyer from Rothenburg, Asher, Isserlin, Lippmann. The most of the extant Hebrew MSS. belong to this period; but a great part of medieval Jewish literature lies unprinted in Rome, Florence, Parma, Turin, Paris, Oxford, Leyden, Vienna, and Munich.

The *eighth* period (1492 to 1755 A.D.) is not marked by much creative or spiritual force among the Jews. In Italy and the East (1492), in Germany and Poland (1550), in Holland (1620), Jewish scholars worked printing-presses, while numerous authors wrote in Hebrew, Latin, Spanish, Portuguese, Italian, and Judæo-German. Some of the most eminent theologians, philosophers, jurists, historians, mathematicians, poets, commentators, lexicographers, grammarians, &c., of this period were Isaac Abravanel, Elia Misrachi, I. Arama, J. Chabib, Elia Levita, Obadio Seforno, Joseph Cohen, Gedalja Jahia, Sal. Usque, Asaria de Rossi, David de Pomi, David Gans, Isaac Troki, I. Luria, J. Karo, M. Alshech, M. Jafe, J. Heller, J. Aboab, Manasse b. Israel, Dav. Conforte, Leo de Modena, B. Musaphia, J. Eybeschütz, D. Oppenheimer, J. Emden, M. C. Luzzatto, &c.

The *ninth* period extends from 1755 A.D. to the present time. Encouraged by the spirit of the 18th c., Moses Mendelssohn (q. v.) opened, to his co-religionists, a new era, which, as in the middle ages, first manifested itself in the national literature. Its character, contents, expression, and even its phraseology, were changed. Poetry, language, philology, criticism, education, history, and literature have been earnestly cultivated. The sacred books have been translated by them into the languages of modern Europe, and foreign works into Hebrew; and many of this once proscribed and detested race have taken an important part in the public and scientific life of Europe. Among the many illustrious names of this last period we can select only a few, like Ezechiel Landau, Elia Wilna, J. Berlin, Mendelssohn, Maimon, Bendavid, Mendez, Beer, Euchel, Bensev, S. Dubno, Creizenach, Zunz, Jost, Geiger, Rappoport, Dukes, Zedner, Fürst, Sachs, Steinschneider, Munk, Salvador, Reggio, &c.

To enumerate names of those who were and are illustrious in general literature, in law, philosophy, medicine, philology, mathematics, belles lettres, &c., we cannot even attempt, since there is not one country in Europe which does not count J. among the foremost and most brilliant representatives of its intellectual progress. Of Germany—considered to be in the vanguard of European learning—Bunsen says that the greater part of the professors at its universities and academies are Jews or of Jewish origin (Neander, Gans, Benary, Weil, Benfey, Stahl, Dernberg, Valentin, Lazarus, Herz, &c., &c.)—certainly a most startling fact. Another extraordinary and well-authenticated fact is, that the European press, no less than European finance, which means the freest development of all the resources of soil and science for the gigantic enterprises of our day, are to a great extent in their power; while, on the other hand, names like Heinrich Heine, B. Börne, R. v. Ense, Berthold Auerbach, Henrik Herz, Jules Janin; Felix Mendelssohn-Bartholdy, Halévy, Meyerbeer, Moscheles, Joachim, Ernst, Rubinstein, Wieniawski, Grisi, Braham, Giuglini, Czillag, Costa; Rachel, Davison, Rott, Dessoir; Bendemann, &c.; besides hosts of others less familiar to English ears, who shine in all branches of art: music, sculpture, painting, the drama, &c., shew plainly how unjust is the reproach of their being an 'abstract' people, without sense for the bright side of life and the arts that embellish it. Briefly—they are, by the unanimous verdict of the historians and philosophers of our times, reckoned among the chief promoters of the development of humanity and civilisation. What has been their reward we have seen. Terrible has been the punishment for sins and shortcomings, real or imaginary, over which both Christians and Mohammedans have thought good, at different periods, to constitute themselves judges; and the most hideous spot in the history of the last 2000 years is the systematical but futile endeavour to sweep the 'chosen race' from off the face of the earth. 'If there is a gradation in sufferings, Israel has reached the highest acme; if the long duration of sufferings, and the patience with which they are borne, ennobles, the Jews defy the high-born of all countries; if a literature is called rich which contains a few classical dramas, what place deserves a tragedy lasting a millennium and a half, composed and enacted by the heroes themselves?' With these grand words of Zunz (*Synagogale Poesie*) we conclude our brief sketch: proudly pointing to the final triumph of humanity which belongs to our own day and generation.

JEWS, in point of law, are now, if natural-born subjects, on nearly the same footing as English subjects, the following peculiarities only being noticeable. By the 8 and 9 Vict. c. 52, they were allowed to hold offices in municipal corporations, on condition of signing a declaration (in place of the usual oaths) not to exercise their influence so as to injure or weaken the Protestant Church. By the act 34 and 35 Vict. c. 48, they are placed, as regards their schools and places of worship, of education and charities, on the same footing as Protestant dissenters. Before 1845, doubts had prevailed whether the marriages previously celebrated in England among the J., according to their own usages, were valid, and the statute 10 and 11 Vict. c. 58 put an end to such doubts, by declaring all such marriages valid, provided both the parties married had been persons professing the Jewish religion. But now, as then, though it is competent for J., like other dissenters, to superadd any

trar of the district of such marriage being about to take place, the only exemption being that the marriage may be celebrated in the synagogue, and not, as in the ordinary case, in the superintendent registrar's office, or a registered building. A licence may also be procured from the superintendent registrar, and the secretaries of the respective synagogues are recognised as the persons to keep the register books of the Jewish marriages. In Scotland, there is no peculiar legislation affecting Jewish marriages. Lastly, by the statute 31 and 32 Vict. c. 72, which substituted one oath for the oaths of allegiance, supremacy, and abjuration, an extension of the 8 and 9 Vict. c. 52 was made, to suit the case of the J. in all cases where the declaration set forth by 9 Geo. IV. c. 17 required to be taken. The result is, that not merely as regards municipal offices, but all other offices where the same declaration is required, a Jewish subject is entitled to be admitted with a declaration or without any oath. Moreover, the complete emancipation of the J. may be said to have been attained by the statute 21 and 22 Vict. c. 49, which enables either House of Parliament, when a Jew would be entitled, but for the oath of allegiance, to sit and vote in the House, to modify that oath by omitting the words, 'and I make this declaration upon the true faith of a Christian.' When these words are omitted, a Jew has no longer any conscientious objection to take the oath, and so is practically admitted, like other subjects, to become a member of either House of Parliament. It is, however, still in the discretion of either House to refuse to make the resolution to omit those words, so that J. have not an absolute right to admission, though practically it is not likely that the admission will in future be refused, at least by the House of Commons. The same act specially excludes J. from holding or exercising the office of guardians and justices of the United Kingdom, or of Regent of the United Kingdom, or of Lord High Chancellor, Lord Keeper or Lord Commissioner of the Great Seal of Great Britain or Ireland, or the office of Lord Lieutenant or deputy, or other chief governor or governors of Ireland, or Her Majesty's High Commissioner to the General Assembly of the Church of Scotland. Whenever a Jew holds any office in the gift of Her Majesty, to which office shall belong any right of presentation to any ecclesiastical benefice, such right of presentation shall devolve upon the Archbishop of Canterbury for the time being.

JEWS-HARP (Fr. *jeu*, a toy?), a very simple musical instrument, made of metal. When played on, it is held between the teeth, and the sound is produced by the inhaling and ejecting of the air from the lungs, while at the same time an elastic tongue or spring, which is fixed in the middle of the frame, is set into vibration by being twitched by the finger. It is a pretty old invention, and is mentioned by Prätorius in his *Organographia*, in 1619, under the name of Crembalum. The best Jews-harps are made in Riva, a town in the Italian Tyrol. The first performer of any celebrity on the Jews-harp was a Prussian soldier, under Frederick the Great, called Koch. In modern times, Kunert, Amstein, and others, were famous for using a variety of harps, all differently tuned; and their performances were so wonderful, that, like other artists, they travelled over Europe, and appeared at public concerts with great success.

JEWS' MALLOW. See CORCHORUS.

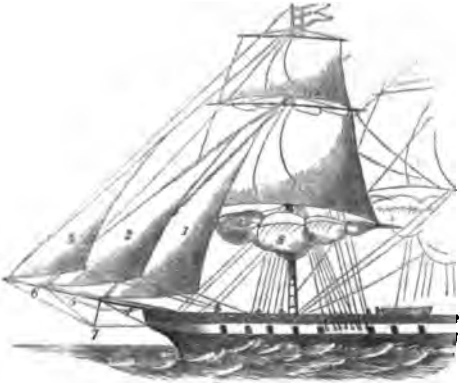
JEWS' THORN. See JUJUBE and PALIURUS.

JEYPOO'R, capital of the protected state of the same name, and perhaps the handsomest and most about [illegible] miles to the north-west of Calcutta, in lat. 26° 56′ N., and long. 75° 55′ E. The place is a rectangle of two miles by one, being subdivided by parallel streets in both directions into small rectangular blocks, the palace and gardens occupying the centre. There are numerous temples and mosques, an arsenal, an observatory, and an English and oriental school, with a medical school.—The *state* of J. is in Rajpootana; area, 15,251 sq. m.; pop. 2,000,000.

JHA'NSI, a fortified town in Bundelcund, stands in lat. 25° 28′ N., and long. 78° 38′ E. It carries on a considerable trade, being on the main route between the Deccan and the Doab. During the revolt of 1857, the native garrison murdered all the Europeans, men, women, and children, not leaving one to tell the tale. In the following April, the place was recovered, with enormous loss on the part of the insurgents, by a detachment of the Bombay army under Sir Hugh Rose. The *province* of J., one of the north-west provinces, has an area of 5109 sq. miles, and a pop. (1871) of 934,747.

JHE'LUM, the ancient Hydaspes, one of the rivers of the Punjab. It rises in Cashmere, which forms its upper basin, and is navigable within that country for about 70 miles. On emerging from the Himalaya through the Baramula Pass, it again becomes practicable for small craft. After a course of 490 miles, it joins the Chenab, in lat. 31° 10′ N., long. 72° 9′ E., and forms with it what is sometimes called the Trimah or Trimab. The banks of this river were the scene of the battle between Alexander the Great and Porus. The river waters the towns of Islamabad, Shahabad, Srinagur, Jelalpur, and Pind Dadun Khan.

JIB, a triangular sail borne in front of the foremast in all vessels. It has the bowsprit for a base in schooners and vessels of a smaller class, and the jib-boom in larger vessels, and exerts an important effect, when the wind is a-beam, in throwing the ship's head to leeward. The flying jib has the flying jib-boom for a base. When a fore-course is not used, an additional jib-shaped sail, called the foresail, is spread on the fore-stay.



Jib:

1, fore-topmast staysail, set on fore-topmast stay; 2, jib; 3, flying jib; 4, bowsprit; 5, jib-boom; 6, flying jib-boom; 7, martingale, or dolphin-striker; 8, fore-course.

JIB-BOOM, an extension of the bowsprit of a ship towards the front, running out beyond it, by a cap and irons, as does the topmast above the lower-mast. It gives greater spread for jib-sails, and a more extended base for the top-gallant-mast-stay. In large vessels, a flying jib-boom is run out in a similar manner beyond the jib-boom.

JIDDAH, or JEDDAH, a trading town of the Hedjaz, Arabia, is situated on an eminence rising from the eastern shore of the Red Sea, about 60 miles west of Mecca, of which city it is the port. J. is an unhealthy town; it suffers greatly from want of water, and is surrounded by a desert. It has, however, long been the great commercial centre of Arabia. It imports corn, rice, butter, and other natural productions from Egypt and Abyssinia, manufactures from India, and slaves from the Malay Archipelago. Coffee is largely exported. It is inhabited by a fanatical population, and its religious enthusiasm is never allowed to wane, owing to the numbers of pilgrims to Mecca who are constantly pouring through it. On the 15th June 1858, the inhabitants rose against the Christians resident among them, and massacred a considerable number of them. In August of the same year, the town was bombarded by the British, and satisfaction rendered. The population fluctuates between 10,000 and 20,000 and upwards.

JIG. See Gigg.

JIGGER. See Chigoe.

JIGGER, on board ship, an apparatus consisting of a strong rope with a block at one end, and a sheave at the other, used in maintaining the tension of—or, technically, in 'holding on' to—the cable as it is thrown off from the capstan or windlass, round which it only takes two or three turns.

JIHU'N. See Oxus.

JI'NA. See Jainas.

JITOMI'R, chief town of the government of Volhynia, in European Russia, is situated on the river Teterev, an affluent of the Dnieper, in lat. 50° 15′ N., long. 28° 40′ E.; distance from St Petersburg, 802 miles; pop. in 1867, 37,640. Its foundation is traced back as far as the 10th c., and it was at one time an important stronghold against the invasions of the Cossacks. In 1642, it was nearly destroyed by the Cossack chief Khmelnitzky. In 1793, it was annexed to the Russian empire, as chief town of the government of Volhynia. The town carries on a trade in leather, wax, honey, and tallow, has four annual fairs, carries on iron and glass works, and extensive cloth manufactures.

JOAN, Pope, the name of a supposed female occupant of the papal chair in the 9th century. The popular story represents this singular personage as of English parentage, but educated at Cologne, Rome, and ultimately Athens, in all which places in the assumed character of a man, and under the name of *Joannes Anglicus*, 'John of England,' she is alleged to have attained great distinction as a scholar. The narrative adds, that having come in the end to Rome, she had ability and adroitness enough to carry the deception so far as to obtain holy orders, and to rise through various gradations to the papal sovereignty itself; but that being nevertheless of immoral life, the fraud was at length discovered, to the infinite scandal of the church, by her becoming pregnant, and being seized with the pains of childbirth on occasion of a public procession. The story had obtained currency, certainly, in the latter part of the 13th century. It was inserted, though discredited, by Platina in his *Lives of the Popes*, but the statement does not appear to have been much discussed until the 16th c., when the commentator of Platina, Panvinius, inserted a note in refutation of it. Later Roman Catholic historians of course have published replies to the objections against the papal succession which their adversaries drew from the story of the female pope; but it is curious that the most complete and the historical groundlessness of the story. He was followed on the same side by Leibnitz; and although attempts have been made from time to time by a few writers to maintain the tale, it has been all but universally discarded, its latest patron being Professor Kist of Leyden, who, but a few years since, devoted an elaborate essay, *Verhandeling over de Pausin Joanna*, to the subject. A few words will suffice to explain the state of the historical evidence. The place assigned to the supposed papess is between the historical popes Leo IV. and Benedict III., the latter of whom died March 10, 858. It is alleged that the Joan of the story occupied the papal chair for two years and five months. Now, according to all the chroniclers, with the doubtful exception of Marianus Scotus, Leo IV. did not die till July 10, 855, so that the interval between his death and that of Nicholas I., the successor of Benedict III., would be entirely filled up by the two years and five months of the papess, and no room would be left for the undoubted pontificate (of two and a half years) of Benedict III. Further, Hincmar of Rheims, a contemporary, in his 26th letter to Nicholas I., states that Benedict III. succeeded Leo IV. immediately. It is proved, moreover, by the unquestionable evidence of a diploma still preserved, and of a contemporary coin which Garampi has published, that Benedict III. was actually reigning before the death of the Emperor Lothaire, which occurred towards the close of 855. The earliest authorities for the story of Pope J., not reckoning a more than doubtful MS. of Marianus Scotus, are Martinus Polonus, a writer of the latter part of the 12th c., and a writer named Stephen de Bourbon, who wrote about 1225.—See Gieseler's *Kirchengeschichte*, th. ii. b. ii. s. 5; also Wensing, *Over de Pausin Joanna*—in reply to Kist—(S'Gravenhage, 1845); and Bianchi Giovini's *Esame Critico degli atti relativi alla Papessa Giovanna* (Milan, 1845).

JOAN OF ARC (Fr. JEANNE DARC), the MAID OF ORLEANS, was the daughter of respectable peasants, and was born in 1412, in the village of Domremy, in the department of Vosges, France. She was taught, like other young women of her station in that age, to sew and to spin, but not to read and write. She was distinguished from other girls by her greater simplicity, modesty, industry, and piety. When about thirteen years of age, she believed that she saw a flash of light, and heard an unearthly voice, which enjoined her to be modest, and to be diligent in her religious duties. The impression made upon her excitable mind by the national distresses of the time, soon gave a new character to the revelations which she supposed herself to receive, and when fifteen years old, she imagined that unearthly voices called her to go and fight for the Dauphin. Her story was at first rejected, as that of an insane person; but she not only succeeded in making her way to the Dauphin, but in persuading him of her heavenly mission. She assumed male attire and warlike equipments, and with a sword and a white banner, she put herself at the head of the French troops, whom her example and the notion of her heavenly mission inspired with new enthusiasm. On 29th April 1429, she threw herself, with supplies of provisions, into Orleans, then closely besieged by the English, and from the 4th to the 8th of May, made successful sallies upon the English, which resulted in their being compelled to raise the siege. After this important victory, the national ardour of the French was rekindled to the utmost, and Joan became the dread of the previously triumphant English. She conducted

him as king. She now wished to return home, deeming her mission accomplished; but Charles importuned her to remain with his army, to which she consented. Now, however, because she no longer heard any unearthly voice, she began to have fearful forebodings. She continued to accompany the French army, and was present in many conflicts, till, on 24th May 1430, she threw herself, with a few troops, into Compiègne, which the Burgundian forces besieged; and being driven back by them in a sally, was taken prisoner, and sold by the Burgundian officer to the English for a sum of 16,000 francs. Being conveyed to Rouen, the headquarters of the English, she was brought before the spiritual tribunal of the Bishop of Beauvais as a sorceress and heretic; and after a long trial, accompanied with many shameful circumstances, she was condemned to be burned to death. She recanted her alleged errors at the stake, and expressed penitence, in the hope of having her punishment commuted into perpetual imprisonment. But this did not accord with the views of those in whose power she now was. Words which fell from her when subjected to great indignities, and her resumption of male attire when all articles of female dress were carefully removed from her, were made grounds of concluding that she had relapsed, and she was again brought to the stake, on 30th May 1431, and burned. Her family, who had been ennobled upon her account, obtained, in 1440, a revisal of her trial; and in 1456, she was formally pronounced to have been innocent.

Few facts in history seem better authenticated than the death of 'the Maid' at Rouen in 1431, and yet grave doubts have been raised on the point. There was a popular belief at the time that some one had been executed in the place of Joan; and many pretended Maids appeared, who, however, were punished as impostors. But a Father Vignier, in the 17th c., found among the archives of Metz a paper purporting to be written at the time, and giving an account of the arrival at Metz, on the 20th May 1436, of the Maid Jeanne, who was at once recognised by her two brothers, and was subsequently married to a Sieur de Hermoise. Vignier afterwards found in the family muniment-chest of a M. des Armoise, in Lorraine, a contract of marriage between 'Robert des Armoise, Knight, with Jeanne D'Arcy, surnamed the Maid of Orleans.' In addition to this, there was found, in 1740, among the archives of the Maison de Ville of Orleans, under the dates 1435, 1436, a record of certain payments to a messenger bringing letters from Jeanne the Maid, and also to her brother John du Lils or Lys. (De Lys was the name by which the family of Darc was ennobled.) A subsequent entry, 1st August 1439, records a gift on the part of the council of the city for services rendered by her at the siege. M. Delepierre, who has discussed the subject in his *Doute historique* (privately printed, 1855), adduces various other facts tending to the same conclusion.

JŌB [Heb. *Jyob*, derived by Gesenius from *ayab*, 'to be an adversary;' hence (passive) 'one who has an adversary,' or 'a persecuted one'], the leading personage in one of the canonical books of the Old Testament, which is called after him. He is said to have lived in the land of Uz (Sept. *Ausitis*, cf. Ptol. v. 19. 2), a locality somewhere between Idumea, Palestine, and the Euphrates. Whether Job was a real or a fictitious personage, has been discussed with superfluous animation by critics. The Talmud (Baba Bathra, xv. 1) holds that 'Jjob *never was, and never was created*, but is an allegory.'

Book of Job is a great dramatic poem, built on a basis of historical tradition. Job is a real person in precisely the same sense as the Hamlet of Shakspeare is a real person; i. e., for each there is a certain genuine groundwork of antique fact; but some of the incidents, together with the sentiments and speeches recorded, are purely imaginative. Who was the author, and when he lived, cannot be, or at any rate has not been, determined with exactitude. Some critics make him anterior to Moses; the LXX. identifies him with 'Jobab, king of Edom' (Postscr. to Job); others, among whom are many of the Talmudical authorities, regard Moses himself as the author. The Mosaic *period* is claimed for it by Saadia, many of the church fathers, Michaelis, Jahn, Hufnagel, &c. A nearer approximation to what would seem to be the truth is the view held by Gregory Nazianzen, Luther, Döderlein, and others, who assign the work—which shews a certain affinity with the Proverbs—to the age of Solomon, when Hebrew poetry was in its full bloom, and a broad catholic spirit pervaded the nation; some have even given Solomon himself the credit of its composition. The reference to the gold of Ophir seems at least conclusive against any hypothesis that would place its composition earlier; and while certain passages in Ezekiel, Jeremiah, Isaiah, Amos, which point to an acquaintance with it, go far to prove its comparatively early existence, Rénan, a recent French critic, considers that it belongs to the first half of the 8th c. B. C.; Ewald pronounces for a later period, and assigns the poem to the beginning of the 7th century. This date is also advocated by Dr Samuel Davidson in his *Introduction to the Old Testament* (Lond. 1862). Others, again—among whom Clericus, Grotius, Gesenius, Umbreit, Knobel, De Wette, &c.—place it in the period of the exile; Hartmann, Vatke, Reier, and others, in the 5th Christian century.

The earlier German scholars, Herder, Eichhorn, &c., looked upon the author as an Edomite—not a Hebrew at all; but this view is now generally, if not entirely, abandoned. The poem is a genuine product of the Hebrew muse, not, however, standing on narrow national ground—the very scene being laid in a foreign country—but on the broad ground of a universal humanity:—it is the attempt of a Hebrew thinker, of enlarged mind, to vindicate the Divine government of the world.

Our space will not allow us to enter minutely into a consideration of the design of the poem, or to discuss the various theories which have been advanced. According to Dr Davidson, it was 'to demonstrate the insufficiency of the current doctrine of compensation.' It condemns the notion that there is a *necessary* connection between sin and suffering, and without explaining the *cause* of the latter in the case of a good man, displays the most sublime trust in the wisdom of the Divine Providence. It exhibits a noble spirituality; and in several places, the mysterious contradictions of life seem to awaken in the soul of the writer thoughts of another life beyond the grave, in which God will vindicate the righteousness of His ways. As a work both of genius and art, it occupies well-nigh the first rank in Hebrew literature, and is unsurpassed in sublimity of imaginative thought by any poem of antiquity. The language is elaborate and artificial in the highest degree, yet grandly simple withal, betokening not a primitive period in Jewish history, but one highly advanced. The dramatic construction of the poem indicates the same thing. It has a prologue and epilogue; the dialogues are arranged into three series, or, as they may be termed, *acts;* each of these, again, consists by Job himself, which, by a little stretch of fancy, we may describe as separate *scenes.* The poem (properly so called) opens and closes with a monologue by the author of the piece. The different character of the persons introduced is skilfully observed; their words have a rhythmic flow; and the dialogues are even strophically divided (see Ewald, *Das Buch Jjob übersetzt und erklärt, Zweite Auflage,* 1854). The integrity of the poem in its present form has been strongly questioned by many critics; the inferiority (in a literary and poetic point of view) of the passages containing the speeches of Elihu (xxxii.—xxxvii.), no less than the nature of the prologue and epilogue, are thought to indicate that these passages are the work of a later hand. Compare the commentaries of Schultens, Bertram, Eichhorn, Rosenmüller, Ewald (with translation), Umbreit, De Wette, Hirzel, Stickel, Schlottmann, Rénan (with an admirable translation into French), Lee, &c.

JOB'S TEARS (*Coix lachryma*), a corn-plant of India. It is a grass, sometimes rising to the height of eight feet, with the stout habit of maize, to which also it is botanically allied; but the male and female flowers grow close together in spikelets, which are produced in axillary clusters. The name is derived from the tear-like form of the hard, shining, bluish-white seeds, which are sometimes made into bracelets and necklaces, and are also an article of food. This plant is cultivated to some extent in many parts of India, but it is one of the worst of the cereals. It has become almost naturalised in Spain and Portugal, and flour made from it is there used, but it is chiefly a resource of the poor in times of scarcity.

JODELN, a peculiar manner of singing with the falsetto voice in harmonic progressions, which exists only among the Tyrolese and the Swiss.

JO'EL (Jehovah is God), the son of Pethuel, one of the twelve Minor Prophets, who delivered his predictions, according to some, in the days of Joash; others, however, place him variously, in the time of Hezekiah, Manasseh, Josiah, Uzziah, &c. Concerning the circumstances of his life, absolutely nothing is known. The occasion of his prophecy was an extraordinary plague of locusts, accompanied by an extreme drought, which consumed the land. After describing these judgments, the prophet calls upon his countrymen to repent, and assures them that God is ready to forgive. Extraordinary warmth and tenderness of feeling, together with an enthusiastic belief in the glory of the future destiny of the people, run through the whole of the book. Some of the passages have been understood by theologians as predictive of the blessings of the Messianic age, and one is actually applied by the apostle Peter to the events which transpired on the day of Pentecost (Acts, ii. 16—21). The style of J., always vivid and eloquent, sometimes sublime, is perhaps the very finest of any of the writers of the Old Testament. One of the most elaborate works on J. is Credner's *Der Prophet Joel.* Compare also Ewald, Umbreit, Henderson, &c.

JO'GGLE, in Masonry, is a notch or curve in the joints, adopted in fitting stones together, so as to prevent them from slipping. Fig. 1 is a common

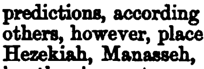


Fig. 1.

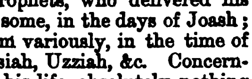


Fig. 2.

arches for this purpose, as in fig. 2. Joggles are also used where very tight joints are required to resist water, &c. Sometimes the joggle consists of a piece of hard stone let into a groove cut in both the stones forming the joint (see fig. 3).

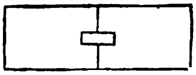


Fig. 3.

JOHA'NNA, one of the Comoro Islands (q. v.).

JOHN, the Apostle and Evangelist, was the son of Zebedee, a fisherman of the Sea of Galilee, and of Salome. He was born at Bethsaida, and, till he was called by Jesus to be his disciple, seems to have followed his father's occupation. The events of his life, from this time to the ascension of Christ, are to be learned from the gospels. After the outpouring of the Spirit on the day of Pentecost, he appears to have laboured for the spread of the Gospel first in Jerusalem and Samaria, and afterwards to have had his residence chiefly in Ephesus. During the reign of the Emperor Domitian, he was driven by persecution to the isle of Patmos, but returned to Ephesus under Nerva, and died there at a great age. The dates assigned to this event range from 89 to 120 A.D., and in any case he must have long survived his brother apostles. It is believed that he was the only one of our Lord's apostles who died a natural death. Tradition accounts for this by representing his life as miraculously preserved. He is represented in Scripture as of a peculiarly affectionate nature, 'the disciple whom Jesus loved;' and tradition makes his last words to have been, 'Little children, love one another.' The works attributed to him are the Gospel, the three Epistles of St John, and the book of Revelation. The first is generally believed to have been written by the apostle at Ephesus about 78 A.D., but attempts have been made by modern writers to disprove both its Johannine authorship and its early origin. The Tübingen school, headed by Baur, place its composition in the middle of the 2d c., and assert that it obviously rose out of the conflicts of opposing teachers. This view, however, is rejected by the greatest critics and scholars of Germany, and its Johannine origin is now admitted. The three so-called Epistles of St John do not stand on exactly the same footing. It is highly probable that the First proceeded from the same writer who composed the Gospel. In style, language, and doctrine, it is identical with it, and from the earliest times it was quoted as a work of the Apostle John's; but the Second and Third are classed by Eusebius among the *Antilegomena* (Scriptures of doubtful genuineness), and were suspected by the most learned and critical of the early Fathers. For an account of the Book of Revelation, see REVELATION, BOOK OF.

JOHN, the name of a long line of popes, the number of whom is variously stated by different historians, owing to some uncertainty as to the designation of two of the popes in the series—John VIII. (872—882), who is styled the IX. by some writers, who, accepting the story of Pope Joan (q. v.), reckon her as John VIII.; and John XV. (985—996), who is also called XVI. by those who place before him another John who died within a few days of his election. Without entering into this question, it will suffice to say that the last of the line of popes called John is John XXIII. The following appear to deserve some special notice.—JOHN XII. was the son of Alberico, and grandson of the notorious Marozia, who, during the pontificate of John X. (913—927), ruled with almost supreme power at Rome. John was origin-

Agapitus, in 956, being elected pope through the lawless intrigue or violence of the dominant party, when only in his 19th year, was the first in the papal line to originate the now familiar practice of changing his name. His life, according to accounts which it is impossible to discredit, was what might be expected from such antecedents, scandalous and disorderly; and although he had crowned Otho emperor and king of Italy in 962, that monarch, in 963, in a synod of the clergy, overstepping all the ordinary rules of canonical procedure and legal precedent, caused sentence of deposition for scandalous life to be pronounced against John, and Leo VIII. to be elected in his stead. John, however, re-entered Rome in the following year with a strong party, and drove out Leo; but his career was cut short by a dishonourable death. He was killed, according to Luitprand, while prosecuting an unlawful intrigue in 964. In his effeminacy or licentiousness, Panvinius and other historians find the origin of the fable of Pope Joan.—JOHN XXII. is one of the most celebrated of the popes of Avignon. His family name was James de Cahors, and he was elected pope in 1316, on the death of Clement V. Attempting to carry out, in very altered circumstances, the vast and comprehensive policy of Gregory VII. and Innocent III., John interposed his authority in the contest for the imperial crown between Louis of Bavaria and Frederick of Austria, by not only espousing the cause of the latter, but even excommunicating his rival. The public opinion, however, and the political relations of the papacy founded upon it, had already begun to change. The diet of Frankfurt refused to obey, and a long contest ensued, not only in Germany, but also in Italy, where the Guelph or papal party was represented by Robert, king of Naples, Frederick of Sicily being the chief leader of the Ghibellines. The latter was placed by John under the same ban which had already been proclaimed against Louis; but in 1327, Louis came to Italy in person, and having been crowned at Milan with the iron crown, advanced upon Rome, expelled the papal legate, and was crowned emperor in the church of St Peter's by two Lombard bishops. Immediately on his coronation, he proceeded to hold an assembly, in which he caused the pope, under his original name of James de Cahors, to be thrice summoned, to answer a charge of heresy and breach of fealty; after which he caused him to be deposed, and Peter de Corvara, a monk, to be elected pope, under the name of Nicholas V. These measures, however, were attended with little result. Louis returned to Germany, and the Guelphic predominance at Rome was restored, the papal representative resuming his authority. But John XXII. never personally visited Rome, having died at Avignon in 1334, when, although without incurring the suspicion of personal aggrandisement, he had accumulated in the papal treasury the enormous sum of 18,000,000 florins of gold. This pope is remarkable in theological history as the author of that portion of the canon law called the *Extravagantes*, and also as having held the singular opinion, that the just will not be admitted to the beatific vision until after the general resurrection. This opinion he formally retracted before his death.

JOHN, surnamed LACKLAND, king of England, and the youngest of the five sons of Henry II. by his wife, Eleanor of Guienne, was born at Oxford, 24th December 1166. His father having obtained a bull from the pope authorising him to invest one of his sons with the lordship of Ireland, J. was appointed in a council held at Oxford in 1178, and in March 1185 he went over to take the reins of united with his brothers in their rebellions against their father, and it was the sudden communication of the news of his having joined his brother Richard's rebellion that caused the death of Henry.

When Richard I. succeeded to the crown, he conferred upon his young brother earldoms which amounted to nearly one-third of the kingdom. This did not, however, prevent J. endeavouring to seize the crown during Richard's captivity in Austria. J. was, however, pardoned, and treated with great clemency, and is said to have been nominated his successor by his brother on his death-bed. J. hastened, at his brother's death, to obtain the support of the continental barons, and then started for England, and was crowned at Westminster on 26th May 1199. Arthur, the son of his elder brother Geoffrey, was lineally the rightful heir to the crown, but at this time the law of primogeniture was but imperfectly established. The claims of Arthur were supported by Anjou and the king of France, but J. bought off the latter influence. J. now obtained a divorce from his first wife, Hadwisa of Gloucester, and married Isabella of Angoulême. In the war which ensued, Arthur, who was again assisted by France, was taken prisoner, and confined in the castle of Rouen, where there is every reason to believe that he was privately put to death; but the English monarch lost Normandy, Touraine, Maine, and Anjou.

J. now quarrelled with the pope, and the kingdom was placed under an interdict; while J., in return, confiscated the property of the clergy who obeyed the interdict, and banished the bishops. Otherwise, too, he displayed considerable activity. He compelled William, king of Scotland, who had joined his enemies, to do him homage (1209), put down rebellion in Ireland (1210), and subdued Llewellyn, the independent prince of Wales (1212). The pope now, in 1213, solemnly deposed J., and absolved his subjects from their allegiance, and commissioned Philippe Auguste to execute his sentence. J., denounced by the church, and hated for his cruelty and tyranny by his subjects, found his position untenable, and was compelled to make abject submission to Rome, and hold his kingdom as a fief of the papacy. Philippe proceeded with his invasion scheme, though no longer approved by Rome; but the French fleet was totally defeated in the harbour of Damme, 300 of their vessels being captured, and above 100 destroyed. Subsequent events, however, proved more favourable to France, and at length the English barons saw the opportunity to end the tyranny of J.: they drew up a petition, which was rejected by the king, and this was the signal for war. The army of the barons assembled at Stamford, and marched to London; they met the king at Runnymede, and on the 15th June 1215 was signed the Great Charter (Magna Charta), the basis of the English constitution. The pope soon after annulled the charter, and the war broke out again. The barons now called over the dauphin of France to be their leader, and Louis landed at Sandwich on 30th May 1216. In attempting to cross the Wash, John lost his regalia and treasures; was taken ill, and died at Newark Castle, on 19th October 1216, in the 49th year of his age.

JOHN, Baptist Joseph Fabian Sebastian, Archduke of Austria, a distinguished Austrian prince and general, was born 20th January 1782, and was the sixth son of the Emperor Leopold II. His mother was the Infanta Maria Louisa, daughter of Charles III. of Spain. He early gave proof of considerable talent for military affairs; and in

career was not brilliant. He was defeated at Hohenlinden in 1800, and at Austerlitz in 1805. In the war of 1809, he advanced with an Austrian army into Italy, defeated the viceroy Eugène at Sacile, and made his way as far as the Adige, when the reverses of the Austrian forces at Landshut, Eckmühl, and Ratisbon compelled him to retire. His love of natural science, for which he manifested an early predilection, continued undiminished amidst all the vicissitudes of his life; and Austria is indebted to him for many valuable scientific institutions and enterprises. Living in political retirement, he shewed a warm interest in every improvement and public work, and became exceedingly popular; so that when the German national congress assembled after the commotions of 1848, he was called by a great majority of voices, on the 29th of June of that year, to be Vicar or Regent of the Germanic empire. The fall of Metternich had also, in the meantime, released him from his political isolation in Austria; and the Emperor Ferdinand had placed him at the head of affairs there, and intrusted to him the opening of a constitutional assembly in Vienna. In his high office as Regent, the archduke acted on strictly constitutional principles; but the progress of events being unfavourable to the Austrian interests, he resigned his office on 20th December 1849, and returned to Grätz, where he lived, as formerly, in retirement till his death, May 10, 1859.

His marriage was one of an unusually romantic kind. Late on a January evening in 1827, he had occasion to require the services of the postmaster of Aussee, a mountain-village in the vicinity of Grätz. The postmaster was from home; but his daughter, Anna Plochel, volunteered to drive him over the hill to his destination. The conversation and spirit of this maiden seem to have charmed the archduke, and within three weeks he married her. The titles of Countess of Meran and Baroness of Brandhof were subsequently conferred upon this lady. See Morganatic Marriages.

JOHN, Prester ('Priest John'), the supposed Christian king and priest of a medieval kingdom in the interior of Asia, the locality of which was vague and undefined. In the 11th and 12th centuries, the Nestorian missionaries penetrated into Eastern Asia, and made many converts among the Keraeit or Krit Tartars, including, according to report, the khan or sovereign of the tribe, Ung (or Ungh) Khan, who resided at Karakorum, and to whom the afterwards celebrated Genghis Khan was tributary. This name the Syrian missionaries translated by analogy with their own language, converting *Ung* into 'Jachanan' or 'John,' and rendering *Khan* by 'priest.' In their reports to the Christians of the West, accordingly, their royal convert figured as at once a priest and the sovereign of a rich and magnificent kingdom. Genghis Khan having thrown off his allegiance, a war ensued, which ended in the defeat and death of Ung Khan in 1202; but the tales of his piety and magnificence long survived, and not only furnished the material of numberless medieval legends (which may be read in Assemani's *Bibliotheca Orientalis*, III. ii. 484), but supplied the occasion of several of those missionary expeditions from Western Christendom, to which we owe almost all our knowledge of medieval eastern geography. The reports regarding Ung Khan, carried to Europe by the Armenian embassy to Eugene III., created a most profound impression; and the letters addressed in his name, but drawn up by the Nestorian missionaries, to the pope, to the kings of France and Portugal, and to the Greek emperor, impressed all with a lively hope of the are printed in Assemani's *Bibliotheca Orientalis.* The earliest mention of Prester John is in the narrative of the Franciscan Father, John Carpini, who was sent by Pope Innocent IV. to the court of Batû Khan of Kiptchak, the grandson of Genghis Khan. Father Carpini supposed that Prester John's kingdom lay still further to the east, but he did not prosecute the search. This was reserved for a member of the same order, Father Rubruquis, who was sent as a missionary into Tartary by St Louis, and having reached the camp of Batû Khan, was by him sent forward to Karakorum, the seat of the supposed Prester John. He failed, however, of his hope of finding such a personage, the Khagan of Karakorum, Mangû, being still an unbeliever; and his intercourse with the Nestorian missionaries, whom he found established there, satisfied him that the accounts were grievously exaggerated. His narrative, which is printed in Purchas's *Collection*, is one of the most interesting among those of the medieval travellers. Under the same vague notion of the existence of a Christian prince and a Christian kingdom in the East, the Portuguese sought for traces of Prester John in their newly-acquired Indian territory in the 15th century. A similar notion prevailed as to the Christian kingdom of Abyssinia, which, in the hope of finding Prester John, was visited so late as the reign of John II. of Portugal (1481—1495) by Pedro Covilham and Alfonzo di Payva, the former of whom married and settled in the country. See Gieseler's *Kirchengeschichte*, III. iii. 43; Ritter's *Erdkunde*, th. ii. b. i. 256—283.

JOHN, St, the commercial capital and largest city of New Brunswick, stands on the north or left bank of the estuary of the river of its own name, in lat. 45° 14′ N., and long. 66° 3′ W. Pop. (1871) 28,805. The harbour, which is protected by batteries, is good, and accessible to the largest vessels at all seasons of the year. Ship-building and the timber-trade are the chief branches of industry. The value of the exports in 1869—1870 was £708,220; of imports, £1,081,260.

JOHN, St, the most considerable river of New Brunswick, in British North America, rises in a lake of the same name in the state of Maine, and after a south-east course of 450 miles, the last 225 of which are within British territory, it falls into the Bay of Fundy by an estuary five miles in width. Near the sea, it is navigable for large vessels; while for craft of 120 tons it is practicable as far as Fredericton, which is 80 miles from its mouth, and the seat of the colonial government. The stream is of some historical interest in connection with the long-contested adjustment of the international boundary. Through most of its upper course, it separates Maine from Canada.

JOHN III. (John Sobieski), king of Poland, 1674—1696, one of the greatest warriors of the 17th c., was born in 1624, or, according to others, in 1629, and educated with the utmost care, along with his brother Mark, by his father James Sobieski, Castellan of Cracow, a man of virtuous character and warlike spirit. The brothers travelled in France, England, Italy, and Germany. Their father's death recalled them home in 1648. The Poles were defeated by the Russians in the battle of Pilawiecz. The Sobieskis took up arms to restore the fortunes of their country. Mark fell in battle on the banks of the Bog; John distinguished himself by his valour, and became the admiration of his countrymen and the dread of November 1673, defeated the Turks in the great battle of Choczim, in which they lost 28,000 men; after which he was, on 21st May 1674, unanimously elected king of Poland, and was crowned in Cracow along with his wife, Maria Casimir Louisa, daughter of the Marquis Lagrange d'Arquien, and widow of the woiwode John Zamoiski. When the Turks besieged Vienna in 1683, John hastened thither with 20,000 Poles, and, along with the German auxiliaries who had also come up, raised the siege by the victory of 12th September of that year. In this battle, he took the banner of Mohammed, which he sent to the pope. On his entrance into Vienna, he was received with unbounded enthusiasm by the inhabitants. His subsequent undertakings against the Turks were not equally successful. He died of apoplexy on 17th June 1696. John Sobieski was not only a statesman and warrior, but a lover of science, and a man of gentle disposition and agreeable manners; but his constant wars prevented that attention to the internal condition of Poland which its critical situation urgently required, and this oversight on his part helped to hasten the downfall of Poland.

JOHN OF AUSTRIA, or **DON JUAN D'AUSTRIA**, was a natural son of the Emperor Charles V., and was born at Regensburg, on 24th February 1546. It is uncertain who his mother was. He was early brought to Spain; and after the death of his father, he was acknowledged by his half-brother, Philip II.; honours and an annual allowance were bestowed upon him, and he was educated along with the Prince of Parma and the Infant Don Carlos. He was intended for the church; but his own inclination was for military employment, and in 1570 he received the command of an army sent against the rebellious Moors in Granada, whom he completely rooted out of the country—signalising himself at once by valour and by cruelty. In 1571, he was appointed to the command of a maritime expedition—in which the forces of Spain, the pope, and Venice were united against the Turks—and defeated the Turks in a great battle near Lepanto (October 7). Discord breaking out among the allies, Don Juan separated himself from the rest, took Tunis, and conceived the design of forming a kingdom for himself in the north of Africa. But Philip, jealous of this design, sent him to Milan, to observe the Genoese; and afterwards, in 1576, as viceroy to the Netherlands. In this capacity, he sought to win the favour of the people by mildness; but being left unsupported by Philip, he was hard pressed for a time, till the arrival of the Prince of Parma with troops enabled him to restore the fortunes of Spain by the victory of Gemblours over William the Silent, in 1577. But Philip was now apprehensive that Don Juan might make himself king of the Netherlands; and the untimely death of the latter in his intrenched camp at Namur, on 1st October 1578, was not without suspicion of poison. See Dusmenil's *Histoire de Juan d'Autriche* (2d ed., Paris, 1828).

JOHN O' GROAT'S HOUSE (or, more correctly, it would seem, Johnny Groat's House), on Dungansby Head, the north-eastern extremity of the mainland of Scotland, has been long widely known as marking one of the limits of that country, as in Burns's line:

> Frae Maidenkirk to Johnny Groat's.

It stood on the beach at the mouth of the Pentland Firth, and was probably built for the reception of travellers crossing the ferry to the Orkneys. Tradition gives a more romantic origin. In the reign of

Malcolm, Gavin, and John Groot or Grot—supposed to be Hollanders, settling in Caithness, acquired the lands of Warse and Dungansby. When their descendants had so multiplied that they were eight families, disputes arose as to precedency at a yearly festival which they were wont to keep. John Groat settled the controversy by building an eight-sided house, with a door and a window in each side, and an eight-sided table within, so that the head of each of the eight families of Groats might enter by his own door, and sit at his own head of the table. Whatever credit may be due to this legend, there can be no doubt as to the existence of John Grot. In the year 1496, 'John Grot, son of Hugh Grot,' had a grant of a penny-land in Dungansby from William, Earl of Caithness. In 1525, 'John Grot in Dongasby,' as his name is written, chamberlain and bailie of John, Earl of Caithness, gave seisin to the Trinity Friars of Aberdeen, of a yearly payment from the island of Stroma, in the Pentland Firth. He died soon afterwards, and was succeeded by his son William, or his grandson John. In 1540, there was a payment from the Scottish treasury of £20 'to John Grote, for freight of his ship sent by the queen's grace, from St Andrews to Orkney, to the king's grace with writings.' In 1547, John Grot had a pardon from Queen Mary for helping the Earl of Caithness to storm the Earl Marischal's castle of Akirgill. About 1741, Malcolm Groat sold his lands in Dungansby, with the ferry-house, to William Sinclair of Freswick. The family of Groat still exists; but a small green knoll is all that now remains of John o' Groat's House. The shell *Cypræa Europæa*, which abounds in the neighbourhood, has received the name of 'John o' Groat's bucky.'

JOHN (ST) OF JERUSALEM, KNIGHTS OF, otherwise called KNIGHTS OF RHODES, and afterwards OF MALTA, the most celebrated of all the military and religious orders of the middle ages. It originated in 1048 in an hospital dedicated to St John the Baptist, which some merchants of Amalfi were permitted by the calif of Egypt to build for the reception of the pilgrims from Europe who visited the Holy Sepulchre. The nurses were at first known as the Hospitaller Brothers of St John the Baptist of Jerusalem. The Seljuk Turks, who succeeded the Egyptian and Arabian Saracens in Palestine, plundered the hospice, and on the conquest of Jerusalem by the crusaders under Geoffroy de Bouillon in 1099, the first superior, Gérard, was found in prison. Released from durance, he resumed his duties in the hospice, gave material aid to the sick and wounded, and was joined by several of the crusaders, who devoted themselves to the service of the poor pilgrims. By advice of Gérard, the brethren took vows of poverty, chastity, and obedience before the Patriarch of Jerusalem. Pope Pascal II. gave his sanction to the institution in 1113. Raymond du Puy, the successor of Gérard in the office of superior, drew up a body of statutes for the order, which was confirmed by Pope Calixtus II. To the former obligations was afterwards added those of fighting against the infidels and defending the Holy Sepulchre. Various hospices, called *commanderies*, were established in different maritime towns of Europe as resting-places for pilgrims, who were there provided with the means of setting out for Palestine. The order having become military as well as religious, was recruited by persons of high rank and influence, and wealth flowed in on it from all quarters. On the conquest of Jerusalem by Saladin in 1187, the Hospitallers retired to Margat in Phœnicia, whence the progress of infidel arms drove them first, in 1285, to Acre, and afterwards, in

assigned them a residence. By the statutes of Raymond, the brethren consisted of three classes, Knights, Chaplains, and Serving Brothers; these last being fighting squires, who followed the knights in their expeditions. The order was subsequently divided into eight languages—Provence, Auvergne, France, Italy, Aragon, England, Germany, and Castile. Each nation possessed several Grand Priories, under which were a number of commanderies. The chief establishment in England was the Priory at Clerkenwell, whose head had a seat in the Upper House of Parliament, and was styled First Baron of England.

In 1310, the knights, under their grand-master, Foulkes de Villaret, in conjunction with a party of crusaders from Italy, captured Rhodes and seven adjacent islands from the Greek and Saracen pirates, by whom it was then occupied, and carried on from thence a successful war against the Saracens. In 1523, they were compelled to surrender Rhodes to Sultan Solyman, and retired first to Candia and afterwards to Viterbo. In 1530, Charles V. assigned them the island of Malta, with Tripoli and Gozo. The knights continued for some time to be a powerful bulwark against the Turks; but after the Reformation a moral degeneracy overspread the order, and it rapidly declined in political importance; and in 1798, through the treachery of some French knights and the cowardice of the grand-master, D'Hompesch, Malta was surrendered to the French. The lands still remaining to the order were also about this time confiscated in almost all the European states; but though extinct as a sovereign body, the order has continued during the present century to drag on a lingering existence in some parts of Italy, as well as in Russia and Spain. Since 1801, the office of grand-master has not been filled up: a deputy grand-master has instead been appointed, who has his residence in Spain. The order at first wore a long black habit, with a pointed hood, adorned with a cross of white silk of the form called Maltese on the left breast, as also a golden cross in the middle of the breast. In their military capacity, they wore red surcoats with the silver cross before and behind. The badge worn by all the Knights is a Maltese cross, enamelled white, and edged with gold; it is suspended by a black ribbon, and the embellishments attached to it differ in the different countries where the order still exists.

JOHN OF LEYDEN (properly, JOHN BOCKELSON or BOCKOLD) was born at Leyden in 1510. He was the son of a bailiff in the Hague, and of a Westphalian bondwoman. He wandered about for some time as a journeyman tailor, and then settled in Leyden, but was fonder of amusements than of his trade. He possessed some poetic genius, and was noted for his abilities as an actor. Adopting the opinions of the Anabaptists (q. v.), he became one of their wandering prophets. In 1533, he came to Münster, was the chief supporter of Matthiesen or Matthys there, and when Matthiesen lost his life in 1534, became his successor. He set aside the ancient constitution of the city, set up in Münster 'the kingdom of Zion,' appointed judges, and applied in an extravagant manner the principles of the Old Testament theocracy. He himself became king of Zion. It is impossible to account for his conduct, and the extraordinary influence which he exercised, without the supposition of real fanaticism; but sensuality, vanity, and bloodthirstiness were intimately combined with it. He introduced polygamy, and displayed a great love of kingly pomp. The city was the scene of horrid excesses. In June 1535, it was taken by the Bishop of Münster. John and his chief accomplices suffered death with circumstances of fearful cruelty (January 26, 1536), and his body was suspended in a cage from a high tower. He attempted to save his life by confession and submission.

JOHN OF NEPOMUK (more properly, POMUK), a popular Bohemian saint of the Catholic Church, and honoured as a martyr of the inviolability of the seal of confession. He was born at Pomuk, a village in the district of Klatau, about the middle of the 14th century. Having entered into orders, he rose rapidly to distinction, being created a canon of the cathedral of Prague, and eventually vicar-general of the diocese. The queen, Sophia, the second wife of Wenzel or Wenceslaus IV., having selected him for her confessor, Wenceslaus, himself a man of most dissolute life, conceiving suspicions of her virtue, required of John to reveal to him what he knew of her life from the confessions which she had made to him. John steadfastly refused, and the king resolved to be revenged for the refusal. An opportunity occurred soon afterwards, when the monks of the Benedictine abbey of Kladran having elected an abbot, in opposition to the design of the king, who wished to bestow it upon one of his own dissolute favourites, John, as vicar-general, at once confirmed the election. Wenceslaus, having first put him to the torture, at which he himself personally presided, had him tied hand and foot, and flung, already half dead from the rack, into the Moldau, in March 1393. His body, according to the tradition, being discovered by a miraculous light which issued from it, was taken up, and buried with the greatest honour. His memory was cherished with peculiar affection in his native country, and he was eventually canonised as a saint of the Roman Catholic Church, his feast being fixed for the 20th of March. By some historians, two distinct personages of the same name are enumerated: one, the martyr of the confessional seal; the other, of his resistance to the simoniacal tyranny of Wenceslaus; but the identity of the two is well sustained by Palacky, *Geschichte von Böhmen*, iii. 62.

JOHN THE BAPTIST, the forerunner of Christ, was the son of the priest Zacharias and Elizabeth, the cousin of Mary, the mother of our Lord. John and Christ were therefore second-cousins. The wonderful circumstances attending the conception and birth of the former, are recorded in the 1st chapter of St Luke's gospel. After a life devoted to preparing his countrymen for the coming of the Messiah, he was thrown into prison, and afterwards executed by Herod Antipas. J.'s followers existed as a separate body till long after the spread of Christianity, and a sect still exists in the East professing to be his disciples.—J. the B. was, from an early date, regarded in England as the patron saint of the common people, and on this account, apparently, great masonic festivals are held on St John's Day, the day dedicated to him, which is the 24th of June.

JOHN THE PARRICIDE, commonly called JOHN OF SWABIA, son of Rudolf II., and grandson of Rudolf I. of Austria, was born in 1289. On attaining his majority, he applied to his uncle, Albert I. of Austria, to resign to him the whole or a part of his patrimony, which consisted of Kyburg and some estates in Swabia; but this Albert refused to do. After making many other abortive attempts to gain his end, J. formed a conspiracy with others who had cause to complain of Albert's rapacity, and determined to assassinate the emperor; seizing the opportunity when Albert was riding alone, on the bank of the Reuss, near the castle of Hapsburg, they attacked and murdered him, 1st May 1308. The conspirators fled in different directions, J. betaking himself to Italy, where he led a wandering life, and died in obscurity.

JOHN'S, EVE OF ST, one of the most joyous festivals of Christendom during the middle ages, was celebrated on midsummer eve. From the account given of it by Jakob Grimm in his *Deutsche Mythologie* (Bd. i. pp. 583—593), it would appear to have been observed with similar rites in every country of Europe. Fires were kindled chiefly in the streets and market-places of the towns, as at Paris, Metz, &c.; sometimes, as at Gernsheim, in the district of Mainz, they were blessed by the parish-priest, and prayer and praise offered until they had burned out; but, as a rule, they were secular in their character, and conducted by the laity themselves. The young people leaped over the flames, or threw flowers and garlands into them, with merry shoutings; songs and dances were also a frequent accompaniment. At a comparatively late period, the very highest personages took part in these festivities. In England, we are told (see R. Chambers's *Book of Days*, June 24), the people on the Eve of St John's 'were accustomed to go into the woods and break down branches of trees, which they brought to their homes, and planted over their doors, amidst great demonstrations of joy, to make good the prophecy respecting the Baptist, that many should rejoice in his birth. This custom was universal in England till the recent change in manners. Some of the superstitious notions connected with St John's Eve are of a highly fanciful nature. The Irish believe that the souls of all people on this night leave their bodies, and wander to the place, by land or sea, where death shall finally separate them from the tenement of clay. It is not improbable that this notion was originally universal, and was the cause of the widespread custom of watching or sitting up awake on St John's night, for we may well believe that there would be a general wish to prevent the soul from going upon that somewhat dismal ramble. In England, and perhaps in other countries also, it was believed that, if any one sat up fasting all night in the church porch, he would see the spirits of those who were to die in the parish during the ensuing twelve months come and knock at the church door, in the order and succession in which they were to die. We can easily perceive a possible connection between this dreary fancy and that of the soul's midnight ramble.' The kindling of the fire, the leaping over or through the flames, and the flower-garlands, clearly shew that these rites are essentially of heathen origin, and of a sacrificial character. They are obviously connected with the worship of the sun, and were doubtless practised long before the Baptist was born. In old heathen times, Midsummer and Yule (q. v.), the summer and winter solstices were the two greatest and most widespread festivals in Europe. The church could not abolish these; it could only change their name, and try to find something in the history of Christianity that would justify the alteration.

JOHN'S, ST, a city of the West Indies, capital of the island of Antigua (q. v.), and the residence of the governor-in-chief of the Leeward Islands, is situated at the western side of that island, close to the shore. Pop. 8515. The town is well laid out, having spacious streets, of which the principal run east and west, being so arranged in order to obtain full advantage of the refreshing easterly or trade winds, which prevail here from April to August. The harbour is comparatively shallow, and there is a bar across the mouth of it, so that vessels heavily laden are obliged to drop anchor outside. The cathedral, the court-house, and the new market-

and in long dry seasons the inhabitants suffer greatly from the want of it. Wells have been sunk in the town, but the water obtained is brackish, so that rain-water collected in iron and other cisterns forms the only supply of this invaluable element. The maximum heat is 96°; the minimum, 62°. The average fall of rain is said to be 45 inches.

JOHN'S, St, the chief town of Newfoundland, stands on the east coast of the island, in lat. 47° 33′ N., and long. 52° 43′ W. It has an excellent harbour, which is well fortified. Pop. (1869) 22,553. Being the nearest port in America to Europe (distance 1665 miles), and connected with continental America by telegraph, St John's has recently acquired importance in the commercial and political world in connection with steam-navigation between the two continents. It has suffered severely from repeated conflagrations; in 1846, it was more than half destroyed.

JOHN'S, St, a town of Canada, in the province of Quebec, is situated on the left bank of the river Richelieu, opposite the town of St Athanase, with which it is connected by a bridge, and 21 miles south-east from Montreal. It contains glass-works, potteries, foundries, saw-mills, &c., and carries on a considerable trade in lumber, firewood, horses, and grain. Pop. (1871) 3022.

JOHN'S COLLEGE, or the College of St John the Baptist, Oxford, succeeded an older institution, founded by Archbishop Chichele in 1456, for monks of the Cistercian order. Sir Thomas White procured a licence from King Philip and Queen Mary, and in 1555 founded a college, dedicated 'to the honour of God, the Virgin Mary, and St John the Baptist,' on the site of Archbishop Chichele's College. The foundation consists of a president, 50, fellows and scholars, and a choir. Six of the fellowships are founders' kin; two from Coventry, two from Bristol, two from Reading, and one from Tunbridge Schools; all the rest are from Merchant Taylor's School. In 1854, four fellowships were added by the will of Dudley Fereday, Esquire. These are open, with a preference, however, first, to founder's kin, and second, to natives of Staffordshire. This college presents to 30 benefices. In 1873, there were about 430 names on the books. The arrangements of this college were not altered by the commissioners under 17 and 18 Vict. 81. The commissioners of 1852, indeed, proposed extensive changes, which the commissioners under the act were disposed to carry out, but the college succeeded in baffling their endeavours. Similar changes, however, to those recommended by the commissioners — involving, among other points, the throwing open of 18 fellowships—having been subsequently introduced by the authority of the Privy Council.

JOHN'S COLLEGE, St, Cambridge, was founded in 1511 by Lady Margaret, Countess of Richmond, and mother of Henry VII.; but her death happening before the design was completed, her executors, one of whom was Fisher, Bishop of Rochester, carried her intentions into effect. The site of the college had been long before devoted to pious uses, but three times was the disposition of the property altered—1st, when Neal, Bishop of Ely, founded here a hospital for Canons Regular in 1134; 2dly, when Hugh de Balsham made it into a priory, dedicated to St John the Evangelist; 3dly, when Lady Margaret's executors converted it into a college. The foundation is for a master, who is elected by the Society, fifty-six fellows, sixty scholars, and nine proper sizars. There are also numerous exhibitions of considerable value, and

tition for students who have not yet commenced residence in the university. Amongst names of interest may be mentioned William Grindal, tutor to Queen Elizabeth; Roger Ascham; Cecil, Lord Burleigh; Richard Bentley (who became master of Trinity College); Kirke White, the poet; Henry Martyn, &c. For full particulars, see Cooper's *Memorials of Cambridge*.

JOHNSON, Samuel, son of Michael Johnson, was born at Lichfield, on the 18th September 1709. He received his early education in his native town, from a man named Hunter; of whom he has recorded that 'he beat me very well'—adding, 'without that I should have done nothing.' In 1728, he went to Pembroke College, Oxford, having been engaged for the two previous years of his life in learning his father's business of bookseller. The *Short Account of Lichfield*, 1819, says that books of his binding are still extant in that city. At Oxford, J. spent probably the most unhappy period of his unhappy life. Overpowered by debts, difficulties, and religious doubts, he became a prey to the morbid melancholy of his constitution. Poverty prevented him from taking his degree. In 1731, his father died insolvent. In the same year he went to Bosworth as usher of a school. Finding the drudgery of this situation unbearable, he soon gave it up, gaining a meagre livelihood by working for booksellers in Birmingham. In 1736, he married Mrs Porter, a widow: she brought him £800. He then set agoing a school, which having no success, he repaired (1737) to London in the company of his celebrated pupil, David Garrick. Here he formed a connection with Cave, the editor of the *Gentleman's Magazine*, to which periodical he became a contributor. In the following year he published *London*, a poem in imitation of the Third Satire of Juvenal, which was very favourably received, Pope, in particular, being warm in its praise. But for many years he was miserably remunerated for his work, and had great difficulty in keeping the wolf of hunger from his door. Little is known respecting J.'s life from this period till he was turned of fifty. We may form, however, some guess of the measure of its unhappiness, when we consider the character and constitution of the man, and what was the position of the majority of men of letters at that time—for literature, 'a dark night between two sunny days'—when the day of patrician patronage was at its close, and that of public patronage had not yet dawned. After 1740, he began to 'report' (if we may be allowed to misuse this word) the parliamentary debates for Cave's Magazine. These 'debates' were drawn up by J. himself, after he had ascertained the order in which the different speakers rose, and the drift of their arguments. One can readily believe that statesmen were surprised at the splendour and pomp of their own eloquence when they saw it in print. In 1744, J. published his interesting *Life of Richard Savage;* in 1749, his best poem, *The Vanity of Human Wishes*, an imitation of the Tenth Satire of Juvenal; and in 1750 commenced *The Rambler*, a periodical which he conducted for two years, and the contents of which were almost wholly his own composition. His *Dictionary*, a noble piece of work, entitling its author to being considered the founder of English lexicography, appeared in 1755, after eight years of solid labour; *The Idler*, another periodical, was begun by J. in 1758, and carried on for two years also; and in 1759 occurred one of the most touching episodes of his life—the writing of *Rasselas* to pay the expenses of his mother's funeral. It was written, he tells us, 'in the evenings of a week.' At last he emerged from obscurity. In 1762, a pension of £300 a year was conferred on him by Lord Bute; and in the following year occurred an event, apparently of little moment, but which has had a lasting influence upon his fame: this was his introduction to James Boswell, whose *Life of Dr Johnson* is probably more imperishable than any of the doctor's own writings. In 1764, the famous Literary Club was instituted, and the following year began his intimacy with the Thrales. In the same year appeared his edition of Shakspeare. In 1773, he visited the Highlands with Boswell. In 1781, appeared his *Lives of the Poets*, his last literary work of any importance. He died on 13th December 1784. He was buried in Westminster Abbey, close by the grave of Garrick.

Strength, or at least force of mind, a certain sage solemnity in the treatment of moral themes, a sharp eye for the observation of character as it manifests itself in society, and a great power of caustic wit, are the chief qualities noticeable in Johnson. He had little aptitude for abstract thinking, and no great vigour of imagination—hence he was neither a philosopher nor a poet; but he had good sense, a solid judgment, and a serious thoughtful nature—hence we find scattered through his numerous works a multitude of valuable remarks on books and men and manners. His written style is very sonorous, inflated, and antithetic; the language is frequently grander than the thought, but his conversational style, as reported by Boswell, is terse, robust, and felicitous in the highest degree.

JOHNSTON, ALEXANDER KEITH, LL.D., F.R.S., the most distinguished name in British cartography, was born near Edinburgh, December 28, 1804. The elegance of design that characterises all his productions, and which, in spite of their purely utilitarian aim, gives them a right to rank as specimens of fine art, was probably acquired or developed during his apprenticeship as an engraver. His first important work, the *National Atlas* (fol.), was published in 1843. Its merits received immediate recognition, and J. was appointed Royal Geographer for Scotland. Five years later, appeared his far-famed *Physical Atlas of Natural Phenomena*, the publication of which was the signal for a shower of honours from the geographical societies of Europe—that of Paris, in particular, pronouncing the work 'one of the most magnificent monuments that has yet been raised to the scientific genius of our age.' A second edition, greatly improved, was issued in 1856. In 1850, appeared a very useful *Dictionary of Geography*, better known as 'Johnston's Gazetteer' (3d ed. 1859; 4th ed. 1867). His *Royal Atlas of Geography* (Edin. Blackwood and Sons, 1861), is probably the most beautiful and minutely accurate atlas ever executed. J. also published, in conjunction with other savants, Hind, Murchison, and Nicol, atlases of Astronomy and Geology; besides a great number of very valuable educational atlases, physical, general, and classical, which have obtained a wide circulation. He died 9th July 1871.

JOHNSTONE, a manufacturing town of Scotland, in the county of Renfrew, was founded in 1781, and is situated on the Black Cart, about three miles west of Paisley. It contains several cotton factories, a flax-mill, brass and iron foundries, and machine-shops. It has a spacious square in its centre, and a good market-place. The pop. in 1871 was 6882.

JOHNSTONE, JAMES T. W., an eminent chemist, was born at Paisley in 1796, and died at Durham in 1853. He was of humble parentage, and was for the most part self-educated. In 1825, he removed to Durham, where he opened a school, which he continued till 1830, when, having married a lady of considerable fortune, he resolved to carry out the plan which he had long desired, of devoting himself to the study of chemistry. He accordingly repaired to Stockholm, and became the pupil of Berzelius, the most celebrated chemist of the time; and his reputation rose so rapidly, that in 1833, while still pursuing his studies abroad, he was invited to take the readership in chemistry and mineralogy in the newly-established university of Durham. For some time after his return from the continent, he resided in Edinburgh, and held the post of chemist to the Agricultural Society; but shortly after its dissolution, he took up his permanent residence at Durham. It is as an agricultural chemist that he is chiefly known. His *Catechism of Agricultural Chemistry and Geology* has gone through more than fifty editions, and has been translated into almost every European language; and his *Lectures on Agricultural Chemistry and Geology* are held in high esteem. The last of his works was his *Chemistry of Common Life*, which originally appeared in *Blackwood's Magazine*, and has since gone through two editions. In the summer of 1853, while travelling on the continent, apparently in his usual health, he was seized with spitting of blood, which terminated in a rapid decline.

JOIGNY (anc. *Joviniacum*), an old walled town of France, in the department of Yonne, about 90 miles south-east of Paris, noted for its red wines and extensive trade in wool. Pop. (1872) 5400.

JOINERY, the art of joining or framing together the wooden finishings of buildings, such as the doors, windows, shutters, stairs, &c. See CARPENTRY.

JOINT AND SEVERAL, a legal phrase in England and Ireland, meaning that a contract or obligation is made by, or in favour of, each of several parties, independently as well as jointly with the others. The general rule of law is, that a contract of several persons is joint, and not several—that is to say, if it is sought to be enforced against them, they must all be sued together, and an action cannot be brought against one. Thus, for example, if A, B, and C jointly accept a bill, or make a promissory-note, without saying, 'we jointly *and severally* promise, &c.,' the whole of them must be sued on such bill. If, however, any one pay the whole debt, he can sue his co-contractors for their respective contribution or proportion—namely, one-third from each. If, on the other hand, the parties had, by express words, jointly *and severally* made the promissory-note, or bound themselves, then the creditor could sue any one of them he pleases, without taking any notice of the rest. Whichever of them, however, first paid the debt, would be equally entitled to sue his co-debtors to contribute their fair proportions. So, if a contract is made in favour of two or more persons, the general rule is, that all of them must join in any action brought to enforce the contract. But in some cases, when a contract is capable of being separated into distinct interests, it is not necessary that all of the creditors should sue. Much depends on the nature of the contract, the situation and relations of the parties, and who paid the price or consideration. In Scotland, the phrase conjunctly and severally is more frequently used than jointly and severally, though the meaning is the same. There are, however, some differences between the laws of England and Scotland on the subject. In Scotland, the general rule is the reverse of what it is in England. When a contract is joint, each is concerned and liable only for his share; but when it is expressly stated to be a conjunct contract, each is liable for the whole. Moreover, where one of several debtors is discharged without an express reservation of the remedy against the rest, this operates in England as a discharge to the whole; whereas in Scotland it operates only as a discharge of that one.

JOINT-FIR. See SEA-GRAPE.

JOINT OWNER is, in English Law, a person who is one of several owners of property. The property may be either personal or real, goods or land. One of the characteristics of this ownership is, that if one of the parties dies, his interest accrues to the others, and does not go to the deceased co-owner's heirs or representatives. Thus, if A and B are joint owners of a horse, and A dies, the horse then belongs entirely to B. So it is with real property, such as houses, lands, and estates. This is called the doctrine of survivorship. Sometimes in wills and deeds it is not clearly expressed whether the property was given to A and B as joint tenants or owners, or as tenants in common. The chief difference between these two descriptions of owners is, that if one tenant in common dies, his share does not go to the other tenants in common, but belongs to his representatives or heirs. Hence, in doubtful cases, a court of equity generally inclines to hold that a tenancy in common was meant rather than a joint tenancy, for the former is the more fair of the two kinds of ownership. In all cases, however, it is in the power of a joint owner to convert his joint tenancy into a tenancy in common, by simply executing a deed of partition or alienation, if the property consist of land; or selling his share, if it consist of personalty. And there is an exception as to the survivorship in the case of a firm of partners, for in that case, when one partner dies, his share does not accrue to his co-partners, but belongs to his own personal representatives. This is said to be an exception to the general rule of joint ownership, created for the benefit of trade, so that, in the case of a firm, the ownership is an ownership in common, and not joint ownership. In Scotland, the general rule is different from what prevails in England, and joint property is there always equivalent to what is called in England property held in common, and not joint in the above sense. It requires express words in Scotland to make the property be held so as to be equivalent to what is joint property in England.

JOINT-STOCK COMPANY, an association of individuals who unite to carry out a particular object of a private nature by each taking and paying for shares in the common stock. The object of the association may be to manufacture some species of article, to conduct some branch of trade or commerce, the business of banking or insurance, or in general to do whatever work of a private nature any individual can do; but when the object is to execute a public undertaking, such as a railway, a canal, harbour, or other work of importance, the company is not called a joint-stock company, but a public company, and a special act of parliament is required in order to establish it and regulate its proceedings. In many respects, the proceedings of railway, canal, and public companies resemble those of what are called joint-stock companies. In ordinary circumstances, the capital or stock of a joint-stock company is beyond what any single individual, however wealthy, would be able or inclined to adventure; it is mainly on this account that the joining of parties together to undertake risks is expedient and unavoidable; though there may be instances, as in the case of Co-operation (q. v.), where a union of small sums by a large number of persons is for peculiar reasons recommendable. Joint-stock companies are of comparatively modern origin, and they can exist with a chance of success only in a community possessing good business notions and habits, along with a spirit of enterprise, and where there is that degree of mutual confidence which will give stability to the concern. Accordingly, from a concurrence of favourable circumstances, Great Britain has taken the lead in this kind of undertakings, which, however, have also been carried to maturity on a comprehensive plan in the Netherlands and United States. In France, this method of commercial association is of more recent growth, and appears still to require the fostering care of the state.

The usual process of commencing a joint-stock company is to issue a prospectus, detailing the object of the undertaking, inviting the subscription of shares, and specifying the probable profits. As the proposed company necessarily requires a paid secretary, who is in effect to be its constructer and future *attaché*, it too frequently happens that in periods of ease in the money market, scheming solicitors and others devise projects of this kind, and induce inexperienced capitalists to take shares; the result often being a collapse of the company, to the loss of all concerned, the projector alone excepted. On this account, scrupulous care is necessary in making such investments, to see that the proposed companies are of genuine worth, and to be administered by persons of thorough integrity.

Every joint-stock company sets out on certain rules of management, which receive the approval of the shareholders, who name a chairman and board of directors, and these, on being appointed, choose subordinate officials. Whatever be the rules, and also the implied responsibilities, the practice is to allow considerable latitude to the chairman and other directors in conducting the affairs of the company, for they alone are in a position to form a correct judgment on points deeply concerning the character and welfare of the association. As, with the best intentions, they may fall into error, and thereby incur heavy losses of capital, it is reasonable to hold them blameless, unless chargeable with fraud in their representations and general dealings. Ordinarily, and with reckless imprudence, shareholders ask no questions, and experience no suspicions as long as they are getting satisfactory dividends—an indifference to consequences which sometimes suffers a severe retribution.

Joint-stock companies are at best a clumsy and often not very satisfactory method for accomplishing a particular purpose. Conducted by directors or managers with whatever dexterity, they fall immeasurably behind as regards the energy, breadth of calculation, vigilance, and promptitude with which a business may be conducted by a single individual, or by two or three active partners, ready on the instant to take advantage of every important turn in the market. Unless, therefore, in the exceptional circumstances referred to, and also in gigantic concerns which no single individual or ordinary copartnery would undertake, joint-stock companies are economically inexpedient.

The legislature has on different occasions interposed to regulate the principles of joint-stock companies, and protect the public against the injuries which they may recklessly inflict. The safest undertakings are those of a public nature, and which are therefore incorporated by special act of parliament, for besides that their rules have been scrutinised by committees of the Commons and Lords in terms of certain standing orders, the liability of shareholders is limited expressly to the amount of their respective stocks. Railway companies are of this category. Where there is no such limitation by statute, any single shareholder incurs a responsibility equal to the whole debts of the concern, and he can seek relief only against his brother shareholders conjointly or severally. The appalling nature of this responsibility, and the necessity for as far as possible averting it, have induced the legislature to empower the organisation of companies on a method of limited responsibility; in this respect copying a plan which had worked successfully in the United States. To participate in the benefit of this limitation, companies need to be publicly registered according to certain statutory obligations, by which means all have an opportunity of judging of their character. We add a brief analysis of the laws affecting joint-stock companies without and with limited liability.

Numerous statutes have been passed during the last 20 years in England, Scotland, and Ireland, to regulate the constitution and proceedings of joint-stock companies, and there were separate statutes for each kingdom, and also for different kinds of companies in each kingdom. The principle of limited liability was first introduced in 1856. All these separate statutes, which led to much confusion, have been now repealed, and replaced by one consolidated statute, called the Companies' Act, 1862, 25 and 26 Vict. c. 89, which, amended by 30 and 31 Vict. c. 131, constitutes the code of joint-stock companies now applicable to the United Kingdom. This general act contains provisions for enabling existing companies previously registered to register themselves under the new act. The same formalities are made applicable, with slight variations, to all joint-stock companies, whether limited or unlimited. The grand distinction between limited and unlimited companies is, that whereas formerly, if a company contracted debts, no matter how large, every member was liable, if his co-members proved to be unable to pay their proportions, to pay the whole of these debts, even to the last shilling of his fortune—a result which proved ruinous to the richer members: now, on the other hand, if the company is limited, though it contract debts however large, yet each member can in no event be called on to pay more than he expressly guaranteed; thus he knows at the outset the worst that can befall him. Hence it follows that if a limited company contract excessive debts beyond what the members are bound to pay, it is the creditors alone who will chiefly suffer; but they have such ample means of satisfying themselves beforehand about the position and capabilities of the company, by reason of the publicity and access to books now provided, that they can only blame themselves if they credulously give too large credit.

It may be also noticed, before stating the details more particularly, that no partnership of bankers which consists of more than ten persons shall be formed in future unless it is registered and conducts its business under the Companies' Act, 1862; and other partnerships consisting of more than 20 persons, are in like manner compelled to register as a company, unless they are already registered, or are formed by some act of parliament or letters-patent.

The subject will be most conveniently noticed under certain heads.

1. *Constitution and Incorporation of Companies and Associations.*—Any seven or more persons associated for any lawful purpose may subscribe a memorandum of association, and may define their liability as follows. They may limit their liability either to the amount, if any, unpaid on their shares, or to such amount as they may respectively undertake to contribute to the assets of the company, in the event of its being wound up. If the liability is limited by shares, then the word 'limited' must be added to the name of the company; and the amount of capital, object, place of business, and declaration of the limit, must be defined in the memorandum of association. If the liability is limited by guarantee, the word 'limited' must also be added, and the amount of guarantee defined, so as to extend to all liabilities incurred while the party is a member, and within one year after. If the company is formed on the principle of no limit being placed on the liability of its members, the declaration of any limit is omitted, and it is called an unlimited company. The memorandum of association is to be stamped and signed by each subscriber in presence of one witness, and when registered, it binds the company and members. A company in general cannot alter this memorandum of association, unless where it is a company limited by shares, and wishes to increase its capital or shares. A limited company may, however, have directors and managers, and managing director with unlimited liability. Besides the memorandum of association, there must be articles of association, also signed by the subscribers, stating the rules of the company; or if the company is limited by shares, and has no such articles, then the rules stated in schedule A to the act occupy their place. The articles of association must be printed. The memorandum and articles must be delivered to the registrar of joint-stock companies, who shall register the same, and grant a certificate of incorporation. Each member is entitled, on request, and payment of 1*s.*, to have forwarded to him a copy of the memorandum and articles of association, otherwise, the company forfeits a penalty of £1 in each case. Companies are prohibited from adopting the same name as another company, and in some cases they cannot, without leave of the Board of Trade, hold more than two acres of land.

2. *Distribution of Capital and Liability of Members.*—The interest or share of each member is part of his personal, and not real estate. A member is entitled to have his name entered on the register of members, which contains the name and address of each, his date of entry, his shares, &c. An annual list is to be made out of all members, with the names, addresses, and occupations of each, as well as the amount of capital, shares, calls, &c., possessed and paid by each, and this list is to be sent to the registrar of joint-stock companies for inspection. Every member is entitled to inspect at the office of the company the register of members gratis, and any other person is also entitled to do so on payment of 1*s.*, or such member or person may demand a copy on payment of 6*d.* for every 100 words. If the name of a person is without cause entered or omitted in the register, he can set the matter right by application to the court. When a company is wound up, every member past and present must contribute towards the assets enough to pay the debts of the company, subject to the following qualifications: 1. No past member shall be liable who has ceased for one year to be member; 2. No past member is liable to contribute to any debt contracted after he ceased to be member; 3. No past member shall be liable to contribute, unless the existing members are unable to pay the debts; 4. In case of a limited company, no member is bound to pay more than the amount unpaid on shares, or the amount guaranteed by him to be paid, according to the memorandum of association. In insurance companies, if the policy or contract makes the funds alone liable, such contract will remain good. If, at the winding up, any dividend is due to a member, this is to be deemed part payment of his contribution. The result, therefore, is, that in all unlimited companies, while one rich member may be liable to his last shilling to pay the whole debts of the company, in the event of his co-members not being able to bear their shares of these debts; in limited companies, each member can never be liable to pay more than the maximum share or guarantee, whatever be the amount of the

pay their shares or not.

3. *Management and Administration of Companies.*—Each company must have an office where its business is carried on, and give notice thereof to the registrar. If the company is limited, it must have its name painted up in a conspicuous place outside its office, and its name must, under a penalty, be printed or engraved on all its notices, advertisements, bills of exchange, cheques, receipts, &c. Every limited company must also keep a register of mortgages affecting its property, which any member or creditor is entitled to inspect at all reasonable times. Some companies—viz., limited banking, insurance, deposit, provident or benefit societies—must also each year make out and suspend in their offices a statement of their debts and assets. Every company not having a capital divided into shares, must keep at its office a register of its directors and managers. No company is to carry on business when the number of members is less than seven, otherwise each such member, if cognizant of the fact, shall be liable for the whole debts of the company. A general meeting of the company must be held once at least every year. The company may in general meeting alter its regulations by special resolution, passed by not less than three-fourths of the members, and a copy thereof must be sent to the registrar, and given to each member. The Board of Trade may appoint one or more inspectors to examine and report on the affairs of the company on the following application: 1, in case of a banking company having a capital divided into shares, on the application of members holding one-third or more of the shares; 2, in the case of any other company with shares, on the application of members holding one-fifth or more of the shares; 3, in the case of any company not having a capital divided into shares, on the application of one-fifth or more of the members. The reasons of the application must, however, be supported by satisfactory evidence. The expenses of such examination shall fall on the members requiring it, unless the Board of Trade order them to be paid out of the company's funds. The company itself may also by special resolution appoint inspectors to report on the company's affairs.

4. *Winding up of Companies.*—A company may be wound up whenever it passes a special resolution to that effect; also, whenever it does not commence business within a year after incorporation, or suspends its business for a whole year; also, whenever its members are reduced to less than seven; also, whenever it is unable to pay its debts; and lastly, whenever the court thinks it is just and equitable that it should be wound up. A company is in the above sense deemed to be unable to pay its debts whenever a creditor to whom the company owes a debt above £50 has formally demanded in writing payment of such debt, and the company for three weeks have neglected to pay, or secure, or compound for it. Other tests of being unable to pay its debts are, when the company allows execution to issue for a debt, &c. Application may be made to wind up the company by petition presented by any creditor or contributory of the company. And whenever an order is made by the court for winding up, all actions and suits are to be stayed, and the remedy of winding up then becomes the exclusive remedy. In the process of winding up, the court is to have regard to the wishes of the creditors or contributories. In order to conduct the proceedings in winding up, and to assist the court, official liquidators may be appointed by such court, and the liquidators are thereupon invested with full powers to bring and defend actions, sell property, and do all things necessary for winding up the company's forming these duties. The court, also, after an order to wind up, settles a list of contributories, i. e., of all persons who are bound to contribute to pay the debts of the company, also makes calls on such contributories, and may summon suspected persons who have property of the company. Besides a compulsory winding up of a company, there is also a power of voluntary winding up, whenever a special resolution has been passed to that effect, or when the company has found its liabilities too great to allow it to go on. Liquidators are then appointed with the same powers as in the other case. There is also a third mode of winding up, which is called a winding up subject to the supervision of the court. The liquidators have power to compromise calls and liabilities to calls, as well as debts present or future, upon such terms as may be reasonable. And where directors have misapplied moneys, or been guilty of breach of trust, the court, notwithstanding he is criminally responsible, may compel him to repay moneys so misapplied. The court may also order directors or officers of the company to be prosecuted, and the costs to be paid out of the assets.

5. *Registration.*—The appointment of registrars of joint-stock companies is made by the Board of Trade, and there must be at least one office for registration in each of the three kingdoms. Every person is entitled to inspect the documents kept by the registrar on paying a fee not exceeding one shilling, and he may require a copy or extract of documents at a fee not exceeding sixpence for each folio.

Moreover, as regards other remedies, it is now a criminal offence for directors of companies to declare and publish fraudulent accounts; and not only are directors personally liable to third parties buying shares on the faith of such false reports, and suffering loss, but even the officials who knowingly contribute to these false reports, are also personally liable in damages.

JOINT TENANCY, in English Law, the ownership of land or goods along with one or more other persons. See JOINT OWNER.

JOINT TRADE, or **ADVENTURE**, means a partnership limited as to a particular undertaking, and not, as in the usual case, for a series of years or a definite period of time. Hence the parties so joining have not the same liabilities as ordinary partners of a firm. Thus, a partnership of this kind may be limited to the working of a patent. In all such cases, the rights and liabilities of the parties are much less extensive than those of ordinary partnerships; but everything depends on the particulars of the contract made between them.

JOINTRESS, in English Law, means a lady who has a Jointure (q. v.) secured to her.

JOINTS, in Anatomy. A joint or articulation may be defined to be the union of any two segments of the skeleton of an animal body, through the intervention of a structure or structures of a different nature. The textures which enter into the formation of the more complex joints are bone, cartilage, fibro-cartilage, ligaments, and synovial membrane. Bone forms the fundamental part of all joints; ligament, in various modifications, is employed as the bond of union between the bony segments; while the three remaining textures chiefly occur in those joints in which there is free motion. The joints vary in the degree of motion from almost perfect immobility to the greatest amount and extent of motion that are compatible with the maintenance of the bony segments in their proper relation with each other.

Joints have been divided by anatomists into two great classes, to which the terms *Synarthrosis* and

Diarthrosis are applied. In synarthrosis, the parts are continuous—that is to say, there is no synovial sac intervening between the bones; and the joints belonging to this class are so very limited in their motion as to be considered by some as immovable; while in diarthrosis, the articular surface of each of the bones is covered with cartilage, and between these cartilaginous plates is a synovial sac; and mobility is the distinguishing feature of this class of joints. In briefly describing the leading varieties of these two classes of joints, we shall, as far as possible, avoid the barbarous terms which have been introduced into this department of anatomy.

In synarthrosis, the articulation is said to be by *suture* when the bones seem to grow somewhat into one another, and to become interlocked and dovetailed together, each bone having a jagged or serrated margin, or when there is a degree of bevelling of one bone, so that it is overlapped by the other. Both these kinds of suture are at once seen in the human skull, the serrated suture being well seen in the union of the two parietal bones, the bevelled suture being shewn in the overlapping of the temporal bone above the side of the parietal, and a combination of the two being exhibited by the coronal suture between the frontal bone and the anterior edges of the parietal bones. In all these there is a thin ligamentous membrane interposed between the bones, which disappears as the growth of the cranium becomes completed.

When a slight amount of motion of one bone upon another is required to be combined with great strength, the contiguous surfaces of the bones are united by a thick and strong layer of fibro-cartilage, with which a little elastic tissue is intermixed. This is an intermediate variety between the two classes of joints, but approximates most nearly to synarthrosis. As examples of this kind of joint, may be mentioned the articulation between the bodies of the vertebræ and that between the two pubic bones at what is termed the symphysis. See PELVIS.

In diarthrosis, the degree and nature of the motion are very various. There may be merely a little *gliding* motion between the ends of the bones, as, for example, in the articulations between the various bones of the carpus and tarsus. See HAND and FOOT. In these cases, the surfaces are plane, or one is slightly concave, and the other slightly convex; and the motion is limited in extent and direction by the ligaments of the joint, or by some projecting point of one of the bones. In some cases, instead of a slight concavity and convexity, one bone presents a cup-like depression, while the termination of the other assumes a hemispherical, or more or less globular shape. Hence the name of *ball and socket* that is applied to such joints. The best example of this variety is the Hip-joint (q. v.), and the next best is the shoulder. In these joints, the ball is kept in apposition with the socket by means of what is termed a *capsular* ligament, which may be described as a barrel-shaped expansion of ligamentous structure, attached by its extremities around the margin of the articular surfaces composing the joint, and forming a complete investment of it, but not so tight as materially to restrict its movements. This species of joint is capable of motion of all kinds, as any one may readily test for himself, especially in the shoulder-joint.

Another important variety of articulation is the hinge-joint, in which the contiguous surfaces are marked with elevations and depressions, which exactly fit into each other, so as to restrict motion to one direction. The elbow and ankle joints, and the joints of the fingers and toes, are the best examples of this variety. The knee-joint is a less perfect example, because in certain positions it is capable of a slight rotation. These hinge-joints are always provided with strong lateral ligaments. The shells of bivalve molluscs are united by a very strong and perfect hinge-joint.

The last kind of joint requiring notice is that which admits only of rotatory motion. A pivot and a ring are the essential parts of this joint, the ring being generally formed partly of bone and partly of ligament. The best example of this articulation is that between the atlas (the first vertebra) and the odontoid or tooth-like process of the axis (the second vertebra). See HAND.

Diseases of the Joints.—Formerly, all the severer forms of diseases of the joints were vaguely designated under the one general term *white swelling;* but during the last half century, thanks to the labours of modern surgeons, amongst whom the name of the late Sir Benjamin Brodie stands prominently conspicuous, the diseases of the joints are tolerably well understood, and can be discriminated from one another with very considerable accuracy.

In diseases of the joints, we may have one or more of the following textures affected: (1), the synovial membrane; (2), the cartilage; and (3), the bones themselves.

The synovial membrane may undergo either acute or chronic inflammation, giving rise to the serious affections known as acute and chronic Synovitis (see SYNOVIAL MEMBRANES AND FLUID).

Loose substances of a fibrous structure, and usually resembling a small bean in size and shape, sometimes occur in joints, especially in the knee-joint. They commence as little pendulous growths upon the synovial membrane, which after a time become detached. When they get between the ends of the bones, which they are apt to do during exercise, they cause a sudden and often a most excruciating pain, which is often followed by inflammation, and arrest all motion of the joint. These symptoms are not relieved till, by gentle flexion and manipulation, the loose cartilage (as it is usually termed) has been removed to a position in which it ceases to give annoyance. When the displacement of the loose body is only occasional, and does not cause intensely severe pain, the treatment should be limited to the application of an elastic bandage or a tightly fitting knee-cap, which should be constantly worn, with the view of restraining the loose body to a position in which it is inoffensive. If, however, this palliative treatment fails, the offending body must be removed by sub-cutaneous incision, which avoids the danger of a direct wound into the joint.

The cartilage may be affected in various ways. There may be (1) simple destruction of cartilage; (2), scrofulous destruction of cartilage; (3), hypertrophy of cartilage; (4), atrophy of cartilage, and other modified forms of disease of this texture, all of which, especially the second, are of a very serious character, but not of a nature that admits of popular explanation.

The most important diseases of the osseous structures of the joints are (1) ulcer and (2) caries. These diseases often, but not always, begin with the disorganisation of cartilage, and then extend to the bones. Sometimes, however, they commence in the bones. The consideration of the symptoms and general treatment of these diseases would be out of place in these pages, but a reference to one very important mode of treating articular caries will be found in the article RESECTION OF JOINTS. Several of the preceding diseases, even when the result of our treatment may be regarded as satisfactory, leave a certain amount of stiffness of the joint (sometimes extending to perfect immobility), to which the term *Ankylosis* (q. v.) is applied.

JOI'NTURE, in English Law, means an estate or some interest for life or a longer period in an estate settled upon a wife, in the event of her surviving her husband. The jointure was at first adopted as a substitute for Dower (q. v.), and dower is barred if a jointure is provided. The requisites of a jointure are: 1. That it must commence and take effect immediately on the husband's death; 2. It must be for the wife's life, or for some greater estate; 3. It must be given to the wife herself, and not merely to trustees for her; 4. It must be expressed to be made in satisfaction of her whole dower; 5. It must be made before marriage. The mode of giving a jointure is usually by way of a rent-charge on the husband's real estate, the effect of which is to allow her to remain in possession of the estate, or part of it, after the husband's death, so long as she lives. If a jointure be created out of an estate before marriage, the husband cannot sell the estate afterwards, so as to defeat the jointure. A jointure is not lost by the treason or felony of the husband, nor by the elopement and adultery of the wife.

In Scotland, the word jointure is also frequently used in a similar sense to denote a conventional provision to a widow, consisting either of an annuity to her or of a liferent assignation of rents, or of a liferent of lands, called a locality. In whatever way the jointure is constituted, it also excludes the widow's terce, unless it is otherwise expressed.

JOINVILLE, JEAN, SIEUR or **SIRE DE**, one of the earliest French historians, whose works possess much interest or value, was born about 1224, of an old family, in Champagne, and held high offices under Thibaut IV., king of Navarre. In 1248, he joined Louis IX. of France with nine knights and 700 armed men in his crusade; shared that monarch's captivity; and returning to France in 1254, was frequently at his court, but declined to accompany him in his second crusade. After the death of Louis IX., the Sieur de J. wrote his *Histoire de St Louis*, one of the most valuable works in the whole literature of the middle ages, combining an excellence of style then very rare with a most interesting exhibition of individual character in the minute record of events. He died about the year 1318. The *Histoire de St Louis* was first published at Poitiers in 1546; the latest edition is that of F. Michel (Paris, 1858).

JOISTS, horizontal timbers (of lighter scantlings than the beams) used to support floors. See FLOORS.

JO'LIBA. See NIGER.

JOLLY-BOAT (Dutch, *jolle*, a yawl), a small boat kept on board ship for the purpose of communicating with the shore. It is a broad, safe boat, and is specially devoted to the use of the steward and to the conveyance of his purchases from shore.

Jolly-Boat.

JOMINI, HENRI, BARON, born 6th March 1779 at Payerne, in the canton de Vaud, began his military career in a Swiss regiment in the French service, and afterwards, chiefly through the friendship of Ney, was raised to high military rank by the Emperor Napoleon. In 1804, he began the publication of his *Traité des Grandes Operations Militaires.* He distinguished himself in active service during the retreat from Russia, but offended at the treatment which he received from Napoleon, he passed over to the allies after the armistice of Plaeswitz, and entered the service of Russia. In 1828, he took an active part in the military operations at Varna; and in 1855 he settled at Brussels. Besides the work already mentioned, his *Histoire Critique et Militaire des Campagnes de la Révolution* (5 vols. Paris, 1806), his *Vie Politique et Militaire de Napoleon* (4 vols. Par. 1827), and his *Tableau Analytique des Principales Combinaisons de la Guerre* (Petersb. 1830) are of great value to the military student.

JO'NAH (Heb. *Yonah*, a 'dove;' Gr. *Jonas*), a Hebrew prophet, son of Amittai, was, as we learn from 2 Kings xiv. 25, a native of Gath-hepher, a town of Galilee in Zebulun, and not far from Phœnicia. He appears to have flourished about the second half of the 8th c. B. C., in the reign of Jeroboam II., and was probably, therefore, the earliest of those prophets whose writings are extant. It has been urged by Rosenmüller and other critics, that the miracle recorded in the book known under his name is not to be regarded as an historical fact, but only as an allegory, founded on the Phœnician myth of Hercules rescuing Hesione from the sea-monster by leaping himself into its jaws, and for three days and three nights continuing to tear its entrails. The design of the author in incorporating this myth with the *actual* voyage of J., and the conversion of the heathen Ninevites, was, it is suggested, to bring out more vividly the truth, that God will not permit his merciful intentions to be frustrated by the disobedience even of a prophet. On the other hand, it has been thought by orthodox theologians generally, that the language of Christ (Matt. xii. 39—41; xvi. 4; Luke xi. 29), and the manner in which it is mentioned in Josephus and the Apocrypha, preclude the possibility of our supposing this miracle to be other than strictly historical. J. has been supposed by early authorities to have been the son of the widow of Sarephet (1 Kings xvii. 24), also to have been the pupil of Elisha. J.'s tomb is shewn at Nebi-Yunus (Prophet Jonah), near Mosul. Leusden, *Jonas Illustratus* (Traj. 1692); Friedrichsen, *Kritischer Ueberblick der Ansichten vom Buch Jonas* (Altona, 1817); Rosenmüller, *Proleg. in Jonam;* also *Notes on the Prophecies of Jonah and Hosea*, by the Rev. W. Drake (Cambridge, 1853).

JONES, INIGO, a well-known English architect, was born in London in 1572. Of his early history, little is known till the time when the Earl of Pembroke, attracted by his great aptitude at drawing, sent him abroad for four years to study the master-pieces of architecture in France, Germany, and Italy. While in Venice, he paid particular attention to the works of Palladio, whose style he introduced into England, whence we sometimes hear J. designated as the English 'Palladio.' In 1605, he was employed by James I. in arranging the scenery, &c., for the masques of Ben Jonson, which were at that time the chief amusement of the court. Jonson afterwards satirised his fellow-labourer in *Bartholomew Fair.* In 1612, J. revisited Italy, still further to improve his style, and on his return to England was appointed surveyor-general of the royal buildings. J. was at this time accounted the first architect of England, and according to some, the first of the age. He died in 1653. The state of architecture in England during J.'s time was an excellent foil to his genius, as the praise bestowed upon his works shews, but still in any age he would have ranked high as an architect. His masterpiece is considered to be the Banqueting House at Whitehall. Other works of his are the church of St Paul, in Covent Garden, Ashburnham House, and Surgeons' Hall, which, however, are very mediocre.

JONES, John Paul, born at Arbigland, in the stewartry of Kirkcudbright, Scotland, 6th July 1747, was the son of a gardener named John Paul. He became a sailor, was for a short time engaged in the slave-trade, and afterwards settled in Virginia, assuming the name of Jones. He ardently embraced the cause of the American colonies. When the Congress, in 1775, resolved to fit out a naval force, he offered his services; and visiting the British coast in a brig of 18 guns, performed some remarkably bold exploits, and took advantage of his familiarity with the scenes of his boyhood to make a hostile visit to the shores of the Solway Firth. In 1779, he was appointed to the command of a small squadron of French ships displaying the American flag, with which he again visited the British coasts, causing great alarm, and taking some prizes. The king of France made him a chevalier of the order of Military Merit. After the war was ended, J. attempted, along with John Ledyard, to establish a fur-trade between the north-west coast of America and China, but failed. In 1787, he accepted an appointment in the Russian service, and the command of a fleet at the mouth of the Dnieper, with which he took an active part in the Turkish war, but soon left the Russian service. He died at Paris, 18th July 1792. His funeral was attended by a deputation of the Legislative Assembly.

JONES, Sir William, was born in London, 28th September 1746, and was sent to Harrow in 1753, where he soon eclipsed all his fellows, particularly in classical knowledge. In 1764, he was entered at University College, Oxford, where he was enabled to gratify that desire for a knowledge of the oriental languages which had shewn itself during the last two years of his residence at Harrow. In 1765 he left Oxford, to become tutor to the eldest son of Earl Spencer, with whom he remained five years. In 1770 he published, at the request of the king of Denmark, a *Life of Nadir Shah*, translated into French from the Persian; in the following year, a *Persian Grammar*, republished some years ago, with corrections and additions, by the late Professor Lee; and in 1774, his *Commentaries on Asiatic Poetry*, republished by Eichhorn at Leipsic, in 1776. In 1780, he completed a translation of seven Arabic poems, known as the *Moallákat*, which obtain their collective name from being 'suspended' in the temple at Mecca; wrote an essay *On the Legal Mode of Suppressing Riots*, and another, entitled *Essay on the Law of Bailments*, and two or three odes. In March 1783, J. obtained a judgeship in the Supreme Court of Judicature in Bengal, and landed at Calcutta in September. He at once set about the acquisition and promulgation of the knowledge of oriental languages, literature, and customs. He established the Royal Asiatic Society, 'for investigating the history, antiquities, arts, sciences, and literature of Asia,' of which he was the first president. To the volumes of the *Asiatic Researches*, Sir William contributed largely. Besides these, he wrote and published a story in verse, called *The Enchanted Fruit, or the Hindu Wife;* and a translation of an ancient Indian drama, called *Sacontala, or the Fatal Ring*. A translation by him of the Ordinances of Menu (q. v.) appeared in 1794. He was busily employed on a digest of the Hindu and Mohammedan laws, when he was attacked with an inflammation of the liver, which terminated fatally on the 27th April 1794. J. was one of the first linguists and oriental scholars that this country has produced. The East India Company erected a monument to his memory in St Paul's Cathedral, and a statue in Bengal. A complete edition of his works, in 6 vols. 4to, was published by Lady Jones in 1799; and another appeared, in 13 vols. 8vo, in 1807, with a life of the author by Lord Teignmouth.

JONE'SIA, a genus of trees of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*, having a two-leaved calyx, a funnel-shaped, 4-fid corolla, seven stamens attached to a ring which springs from the tube of the corolla, a scimitar-shaped pod. The leaves are abruptly pinnate. The Asoca of Sanscrit poetry (*J. Asoca*) is one of the loveliest trees of the East. Its orange and crimson flowers grow in graceful racemes. Indian poetry abounds in its praises.

JÖNKÖPING, a town of Sweden, and one of the most beautiful and finely situated in the country, is capital of the læn of the same name, and stands at the southern extremity of Lake Wetter, and is backed on the south and west by pine-clad hills. It is a maritime and trading town, and contains an arsenal and a factory for arms. Pop. (1872) 11,751.

JO'NQUIL (Fr. *jonquille*, from Lat. *juncus*, a rush), a name given to certain species of *Narcissus* (q. v.) with rush-like leaves. The Common J. (*N. Jonquilla*), a native of the south of Europe, is one of the most common bulbous-rooted plants in our flower-borders. It has from two to six yellow flowers at the summit of its scape (leafless stem). The Sweet-scented J. (*N. odorus*), also a native of the south of Europe, is another species very generally cultivated. Perfumed waters are made from J. flowers.

JONSON, Ben, or Benjamin, an English dramatist, was born, according to the most reliable accounts, at Westminster, though one authority says Warwickshire, in 1574. The Scottish poet Drummond of Hawthornden, states that J. told him his grandfather was a Scotchman of Annandale, who settled in Carlisle, and his father a clergyman, who died before Ben was born. The latter received his education at Westminster school, where he had for his preceptor the illustrious Camden. Our knowledge of his career from this point until the period when he became famous as an author is very obscure. It is said that his mother took a second husband, a bricklayer (but this is doubtful), and that Ben was forced very unwillingly to assist his stepfather. The story of his residence (for a few months) at St John's College, Cambridge, may be an authentic tradition, but it really rests on no better evidence than the present of some books now in the library of that college with his name inscribed on them. If he went thither at all, he was soon forced to return home for want of means; but his antipathy to the trade of a bricklayer was so great, that he finally ran off, and served as a soldier in the Low Countries for some time. After coming back to England, he tried the profession of an actor, but did not succeed, whereupon he started as a writer for the stage. Even in this capacity he did not rapidly acquire a reputation. The first piece that procured him a name was *Every Man in his Humour* (1598). The best of his subsequent productions are *Volpone, or the Fox* (1605), *The Silent Woman* (1609), and *The Alchemist* (1610). These are comedies full of rich, dry, carefully-elaborated 'humour.' He

Catiline's Conspiracy (1611), on which he—but only he—set a high value. His *Masques*, written for the courts of James and Charles, are occasionally very graceful. For many years J. was in receipt of a pension from these monarchs, but his careless and profuse habits involved him constantly in difficulties, and he died in poverty 6th August 1637. J.'s writings are not much relished now, and never were, even in his own day. There is an air of pedantry about his happiest efforts that spoils their effect. Yet, on the other hand, he possesses a rude force, and a humour which, if heavy and saturnine, is also genuine and pungent. Occasionally, too, his lyrics shew a lightness and delicacy almost inexplicable, considering the ordinarily and cumbrous movement of his faculties. The influence which he exercised over the wits of his time is a proof of the general strength and talent of the man. Shakspeare alone was reckoned his match in those wit-combats held at the Mermaid Tavern. He was an immense drinker, and his potations do not seem to have improved either his temper or his constitution. The best edition of his works is that by Gifford, accompanied by a biographical memoir (Lond. 9 vols. 1816); the latest is that by Cunningham, published by Hotten (Lond. 1870).

JO'PPA, the name given in the Greek of the New Testament to a town called in Hebrew *Yafo;* modern, *Yafa* or *Jaffa*, i. e., beauty. It is situated on the sea-coast of Syria, about 33 miles north-west of Jerusalem, and, according to Stanley, still deserves its name. J. is a place of great antiquity. Here, according to the classical myth, it was that Andromeda was chained to the rock, and exposed to the sea-monster; a story that has been supposed to shadow out in an obscure way the early intercourse between Greece and Syria. In sacred history, it appears as the port of Jerusalem in the time of David and Solomon, and the place to which the cedars of Lebanon were floated from Tyre for the building of the temple. It was at J. that the Apostle Peter saw the vision which corrected his Jewish prejudices concerning the Gentiles and the spirit of Christianity. In the reign of Constantine the Great, J. was made a bishop's see, but it attained its highest prosperity in the times of the Crusades, when it became the principal landing-place of the warriors of Christendom. In 1799, it was stormed by the French under Bonaparte, and here was perpetrated his shameful massacre of Turkish prisoners. In 1832, Mohammed Ali made himself master of it; but the Turks, with the assistance of the British and Austrians, took it from him again in 1840. The modern Jaffa is within the pashalic of Gaza. Its wretched harbour is nearly sanded up, and it has very little trade. Pop. about 5000.

JORDAENS, Jakob, a celebrated Dutch painter, was born at Antwerp in 1594, and died in 1678. His works are exceedingly numerous, and are to be found in most European collections. They are marked by great truthfulness and vigour of portraiture, and are richly but rather glaringly coloured. Their chief defects are a want of taste and elegance in design. Among his best known works are the 'Merry-making,' the 'Satyr and Man blowing Cold and Hot,' 'Pan and Syrinx,' and 'Saturn devouring his Children.'

JO'RDAN, the principal river of Palestine, the bed of which forms a great valley, stretching from north to south in the eastern part of the country. The J., deriving its head-waters partly from the eastern branches of the Lebanon Mountains, and partly from Mount Hermon, flows south, and after small lake of El Huleh (The Waters of Merom) and the Lake of Tiberias (Sea of Galilee), it falls into the northern extremity of the Dead Sea (q. v.). The bed of the river varies much in breadth, and its banks are in some places flat; in others, steep. Where it enters the Dead Sea, it is 180 yards broad, and 3 feet deep; but a little way further up, it is only 80 yards broad, and 7 feet deep. From the Lake of Tiberias to the Dead Sea, the J. is crossed by no bridge, although in two or three places there are ruins of bridges. Above the Lake of Tiberias is a bridge called Jacob's Bridge, over which the road from Damascus to the sea-coast passes. In a number of places, the J. is fordable; in some, even when the river is in flood. The course of the J. was explored by Lieutenant Molyneux, an English officer, in August 1847, during the dry season; and by Lieutenant Lynch, with an expedition sent out by the United States' government in April 1848, when the river was in flood.

JORGENSEN, Jorgen, a Danish adventurer, who, in the beginning of the present century, made a descent on the island of Iceland, and reigned there as protector for about six weeks, was the son of a watchmaker in Copenhagen, and was born in that city in 1779. On the 21st June 1809, having previously visited the island in a ship in which he held the position of interpreter, J. arrived at Reikiavik in the *Margaret and Ann*, an armed merchantman from London, carrying 10 or 12 guns. A few days after, he surrounded the house of the governor, took him prisoner, and informed the town's-people that he should hold Iceland in possession for England, 'until such time as the English fleet should relieve him.' He then issued several proclamations, announcing 'that relations with Great Britain should be set on a firm footing, and Iceland be placed under her protection.' He also organised a 'government office,' confiscating all Danish property, with whatever else he could lay hands on, *to the state chest*, and subjecting the inhabitants to all the miseries of an unscrupulous despotism. On the 9th August, however, his brief reign was brought to a close by the arrival of a British man-of-war, the commander of which, hearing of the piratical invasion of J., immediately seized upon and imprisoned him, restoring at the same time the previous condition of affairs. J. was carried to England, but he does not seem to have been visited by the punishment he so fully merited. He afterwards lived in London for some years, was convicted of robbery in 1820, and transported to Botany Bay in 1825.

JORNA'NDES, or **JORDANES**, a historian of the 6th c., was by birth a Goth, or both of Alan and Gothic descent. He was first a notary, but afterwards adopted the Christian religion, and was made Bishop of Croton, in Italy. He wrote two historical works in the Latin language; the first, *De Regnorum ac Temporum Successione*, is a short compendium of the most important events in history from the creation down to 552 A.D.; but the work is only valuable from the accounts in it of several barbarous northern nations. His other work, *De Getarum Origine et Rebus Gestis* (Concerning the Origin and Deeds of the Goths), is a work which has obtained great renown, chiefly from its being our only source of information about the Goths and other barbarian tribes, except when they are casually mentioned by some Greek or Latin historian. The work is, however, full of inaccuracies, both of time, place, and person. There are many editions of both works.

JORU'LLO, a volcanic mountain in the Mexican Confederation, situated 150 miles west-south-west of the city of Mexico, was thrown up, in September 1759, to the height of 1375 feet from a plain, which itself was 2890 feet above the level of the sea; lat. 19° 10′ N., long. 101° 2′ W. This new creation originally consisted of a series of cones of various sizes. Many of the subordinate eminences have since disappeared altogether; some have changed their form; and few now emit vapour. The temperature of the surface has gradually declined, and much of the locality has been covered with forest trees.

JOSEPH I., Emperor of Germany, the eldest son of Leopold I., was born at Vienna 26th July 1678, was crowned king of Hungary in 1689, and king of Rome in 1690, became emperor in 1705, and died in 1711. The influence of the Prince of Salm, who had the charge of his education, and his subsequent connection with Prince Eugene, led him to embrace opinions much more liberal than those which have generally prevailed in his family, and he granted privileges to the Protestants of Hungary and Bohemia which had been refused by his predecessors. He also concluded a treaty in 1707 with Charles XII. of Sweden, by which he granted religious liberty to the Protestants of Silesia, and restored to them 120 churches which had been taken from them by the Jesuits. He was fond of courtly ceremonial, but mild and affable, and sought to improve the condition of the peasantry in his dominions by relieving them from some of the oppressions to which they were subject. He eagerly and successfully prosecuted, in alliance with Britain, the war of the Spanish Succession against France.

JOSEPH II., Emperor of Germany, son of Francis I. and Maria Theresa (q. v.), was born 13th March 1741, at a time when his mother's fortunes were in their lowest state of depression. He early gave proof of excellent abilities. After the peace of Hubertsburg, he was elected king of Rome, and after the death of his father (18th August 1765), emperor of Germany. Maria Theresa also associated him with herself in the government of the Austrian states; but for some time his actual share in it amounted to little more than the chief command of the army. On her death in 1780, he inherited all her dignities and power. He was ambitious of increase of territory, and although he failed in his object of adding Bavaria to the Austrian dominions, which he thought to consolidate by obtaining it in exchange for the Low Countries, yet he was successful in acquiring Galicia, Lodomeria, and the county of Zips, at the first partition of Poland, in 1772; and he appropriated, in 1780, great part of the bishoprics of Passau and Salzburg. He was a zealous reformer, having imbibed, like Frederick the Great, the principles of the philosophy which prevailed in that age, but he attempted his reforms too rashly, and too much by the exercise of mere authority, and was compelled to restore many things again to their former condition; the hostility of the nobles and clergy, whose power and privileges he sought to reduce, producing rebellions in various parts of his dominions. The clergy in particular regarded him with detestation. He had early shewn a dislike to them, which caused no little vexation to his mother; and as soon as he found himself in full possession of the government of Austria, he proceeded to declare himself independent of the pope, and to prohibit the publication of any new papal bulls in his dominions without his *Placet regium*. The continued publication of the bulls *Unigenitus* (q. v.) and *In cœnâ Domini* (q. v.) was also prohibited. Besides this, he suppressed no fewer than 700 convents, reduced the number of the regular clergy from 63,000 to 27,000, prohibited papal dispensations as to marriage, and on 15th October 1781, published the celebrated *Edict of Toleration*, by which he allowed the free exercise of their religion to the Protestants and Not-united Greeks in his dominions. Pope Pius VI. thought to check this course by a personal interview with the emperor, and for that purpose made a visit to Vienna in 1782; and although he was quite unsuccessful in his object, he carried away with him the conviction, that the people were utterly unprepared for the reforms which their sovereign sought to accomplish, a conviction the correctness of which the event abundantly proved. J. engaged in a war with Turkey in 1788, in which he was unsuccessful; and the vexation caused by this, and by the revolts in his own dominions, and the necessity under which he felt himself of revoking many of the edicts by which he had sought to promote the welfare of his people, hastened his death, which took place on 20th February 1790. He founded many valuable institutions, and did much to promote the progress of arts, manufactures, and commerce in Austria.

JOSEPHINE, Marie Rose, Empress of the French, was born, 23d June 1763, in the island of Martinique, where her father, Tacher de la Pagerie, was captain of the port at St Pierre. She had only an indifferent colonial education; but her qualities of mind and heart, even more than her beauty, won universal regard. When about 15 years of age, she came to France, and soon after married the Viscount Alexandre Beauharnais; of which marriage were born Eugene, viceroy of Italy, and Hortense, queen of Holland, and mother of the Emperor Napoleon III. J.'s husband having been executed during the Reign of Terror, she herself just escaped through the events of 9th Thermidor (27th July 1794). She was married, 9th March 1796, to Napoleon Bonaparte, accompanied him in some of his campaigns, and exercised a great influence in restraining him from measures of violence and severity. At Malmaison, and afterwards at the Luxembourg and the Tuileries, she attracted round her the most brilliant society of France, and contributed not a little to the increase of her husband's power. She regarded his exaltation to the throne, however, with a presentiment of evil; and from the day of her becoming empress, seemed to dread that political motives might lead him to seek the dissolution of a marriage which had proved unfruitful. After scenes of the most painful kind, this took place. The marriage was dissolved by law on 16th December 1809. J. retained the title of empress, corresponded with Bonaparte, and if the allied sovereigns had permitted, would have rejoined him after his fall. She lived near Evreux, and died, after a short illness, on 29th May 1814. Compare *Histoire de l'Impératrice Joséphine* (2 vols. Paris, 1859), by M. J. Aubenas.

JOSE'PHUS, Flavius, a celebrated Jewish historian, was born at Jerusalem, 37 A.D. He was of both royal and sacerdotal lineage, being descended, on the mother's side, from the line of Asmonean princes, while his father, Matthias, officiated as a priest in the first of the twenty-four courses. The careful education he received developed his brilliant faculties at an unusually early period, and his acquirements both in Hebrew and Greek literature—the two principal branches of his studies—soon drew public attention upon him. Having successively attended the lectures at the paramount religious schools of his time—'sects,' as he inaccurately terms them—he withdrew into the desert, to a man whom he calls Banos, and who is conjectured to have been either a follower of John the Baptist or an Essene. Three years later, he returned to Jerusalem, and henceforth belonged to the body of the 'Pharisees,' which, in fact, comprised the bulk of the people. So great was the regard for his abilities, that at the age of only twenty-six years he was chosen delegate to Nero. When the Jews rose in their last and fatal insurrection against the Romans, J. was appointed governor of Galilee. Here he displayed the greatest valour and prudence; but the advance of the Roman general Vespasian (67 A. D.) made resistance hopeless. The city of Jotapata, into which J. had thrown himself, was taken after a desperate resistance of 47 days. Along with some others, he concealed himself in a cavern, but his hiding-place was discovered, and being brought before Vespasian, he would have been sent to Nero, had he not—according to his own account, for J. is his own and his sole biographer—prophesied that his captor would yet become emperor of Rome. Nevertheless, he was kept in a sort of easy imprisonment for about three years. J. was present in the Roman army at the siege of Jerusalem by Titus; and after the fall of the city (70 A. D.), was instrumental in saving the lives of some of his relatives. After this, he appears to have resided at Rome, and to have devoted himself to literary studies. The exact period of his death is not ascertained. All we know is, that he survived Agrippa II., who died 97 A. D. He was thrice married, and had children by his second and third wives. His works are: *History of the Jewish War*, in 7 books, written both in Hebrew and Greek (the Hebrew version is no longer extant); *Jewish Antiquities*, in 20 books, containing the history of his countrymen from the earliest times down to the end of the reign of Nero (the fictitious Hebrew *Josippon*, which for a long time was identified with J.'s *Antiquities*, dates from the 10th c. A.D.); a treatise on the *Antiquity of the Jews*, against Apion, in 2 vols., valuable chiefly for its extracts from old historical writers; and an *Autobiography* (37—90 A.D.), in one book, which may be considered supplementary to the *Antiquities*. The other works attributed to him are not believed to be genuine.

The peculiar character of J. is not difficult to describe. He was, in the main, honest and veracious; he had a sincere liking for his countrymen, and rather more pride and enthusiasm in the old national history than he could well justify; but the hopelessness of attempting to withstand the enormous power of the Romans, and an aversion to martyrdom, caused him to side with the enemy:—perhaps in the faint hope of being thus of some use to the national cause. The influence of Greek philosophy and learning is visible in all his writings, and, as far as biblical history is concerned, infused into it a tone of 'rationalism.' He speaks of Moses as a human, rather than a divinely inspired lawgiver; he doubts the miracle in the crossing of the Red Sea; the swallowing of Jonah by the whale; and, generally speaking, whatever is calculated to teach that there was a special miraculous Providence at work on behalf of the chosen people. His style is easy and elegant, and J. has often been called the Greek Livy. The *editio princeps* of the Greek text appeared at Basel (Froben) in 1544. Since then, the most important editions (with notes) are those of Hudson (Oxford, 1720), Havercamp (Amst. 1726), Oberthür (Leip. 1782—1785), Richter (Leip. 1825—1827), and Dindorf (Paris, 1845). J. has been frequently translated; the two best known versions in English are by L'Estrange (Lond. 1702) and Whiston (Lond. 1737).

JO'SHUA (Heb. *Yehoshua*, 'Jehovah helps'), the name of the celebrated Hebrew warrior under whose leadership the land of Canaan was conquered. He was the son of Nun, of the tribe of Ephraim, and was born in Egypt. Before the Israelites had reached Sinai, he was chosen by Moses to command the troops that fought against Amalek; and shortly before the death of the great lawgiver, he was publicly invested by the latter with the whole civil and military government of the Israelites. The vigorous and, on the whole, successful manner in which he pursued the conquest of Canaan, and distributed the land among the tribes, is minutely described in the book which bears his name. He died at the age of 110, and was buried at Timnath-Serah, in Ephraim.—The so-called Book of Joshua, in its present form, containing an account of the conquest and division of the 'Land of Promise,' was neither written by him nor by any of his contemporaries; but the compiler has certainly made copious use, especially in the earlier chapters, of documents drawn up during the period of the conquest. Such passages as that relative to the harlot Rahab—'and she dwelleth in Israel unto this day' (vi. 25)—demonstrate their own antiquity; but on the other hand, such passages as the narrative of the capture of Hebron (of which there are several), which did not take place till after the death of J.; the frequency of the expression, 'unto this day,' in connections that forbid us to suppose the interval a brief one; the allusion to Judah and Israel as distinct (xi. 21); the lateness of many of the grammatical forms, &c., clearly indicate the gradual growth of the book under successive editors, the last of whom is placed by Masius, Spinoza, Hasse, &c., after the exile, and by Ewald in the time of Manasseh; while Keil and others place the book in the time of Saul. A Samaritan Book of Joshua (*Chronicon Samaritanum*), containing a chronological narrative of events from the death of Moses down to the time of the Roman emperor Hadrian, compiled from Arabic and Hebrew sources, about 1300 A. D., is extant in Arabic, and was first edited at Leyden in 1848, by Juynboll, along with a Latin version. It differs very considerably from the canonical Book of Joshua.

JOSI'AH (Heb. *Yoshiyahu*, 'Jehovah will help'), one of the kings of Judah, was the son of Amon and Jedidah, and succeeded his father (641 B. C.) at the age of eight years. He was apparently brought up under the care of the priesthood, early manifested a pious disposition, and became a determined religious reformer, purging Judah and Jerusalem from idolatry. In like manner, it seems, he marched through the land of Israel. This statement has naturally excited much surprise. For more than a hundred years, the kingdom of Israel had been a part of the Assyrian empire; its people were, for the most part, carried into exile, and their place supplied by heathen colonists. It was in the reign of J. that Hilkiah the high-priest found the 'Book of the Torah'—by which some understand Deuteronomy, others Exodus, and others, again, the whole Pentateuch—while the workmen were repairing the temple. J. does not appear to have heard of its existence before; at least, the words of it strike him as something novel, and excite the profoundest emotions in his breast. In commemoration of the discovery, the king celebrated the feast of the Passover with a splendour never before equalled. After this, he continued his work of extirpating every trace of idolatry. Wizards, conjurors, 'all the abominations' that could be 'spied in the land,' were 'put away.' In these efforts, the monarch seems to have spent the greater part of his reign. He met his death at Megiddo, in the valley of Esdraelon, when attempting to check the advance of Pharaoh-Necho against the Assyrians. (Compare *Herod.* II. 159.) J. was the last of the good kings of Judah. In his days prophesied Jeremiah and Zephaniah.

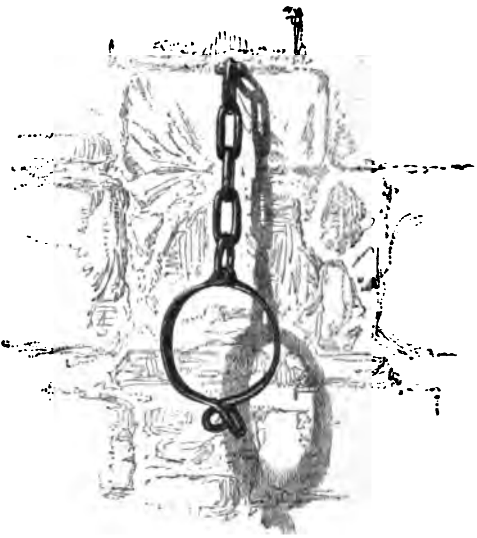
JOSIKA, Miklos (Nicholas), Baron, a very remarkable Hungarian novelist, was born of a distinguished family, 28th Sept. 1796, at Torda, in Transylvania. In his youth, he served for some time in the Austrian army, but resigned his commission in 1818, married a wealthy Hungarian heiress, and for many years devoted himself to agriculture and study. His first works appeared in 1834 under the title of *Irány* and *Vázlatok*, and were exceedingly popular. From that period till the revolution in 1848, he wrote about 60 volumes of novels, all of which were published at Pesth. The most important are *Az utolsó Bátóry* (The Last Bátóry, 3 vols. 1840), *Zrinyi a Költö* (The Poet Zrinyi, 4 vols. 1843), *A Csehek Magyarországban* (The Bohemians in Hungary, 4 vols. 1845), and *Jósika István* (Stephen Josika—one of the author's ancestors—5 vols. 1847). Involved in the Hungarian revolution, he was obliged to abandon his native country, and afterwards resided at Brussels, where he continued his literary labours. In 1864, he removed to Dresden, where he died in 1865. Among his productions written in exile, are *Egy Magyar Családa forradalom Alatt* (A Hungarian Family during the Revolution); *The Mailly Family*; and *Ezter* (Esther). J. is a thoroughly natural novelist, and drew his materials almost wholly from the history of his own land, of which he possessed a profound knowledge. He has been called the Walter Scott of Hungary.

JOST, Isaak Markus, an eminent Jewish scholar of Germany, born at Bernburg in 1793, died 1862. His principal works are *Geschichte der Israeliten* (History of the Israelites, 9 vols. Berl. 1820—1829, to which was added a tenth during 1846—1849, entitled *Neuere Geschichte der Israeliten von* 1815—1845); *Allgemeine Geschichte des Jüd. Volkes* (Universal History of the Jewish People, 2 vols. Berl. 1831—1832); a Translation (into German) of the Mishna with text and commentary (6 vols. Berl. 1832—1834); *Gesch. des Judenthums*, &c. (3 vols. Leipsic, 1857—1859). He also edited a journal entitled *Israelitische Annalen* (Fkf. 1839—1841). Besides being a savant, he was a patriot, and warmly interested himself in behalf of the social and political liberties of his countrymen.

JOUDPO'RE, or **JODHPORE**, a city in Rajpootana, Hindustan, capital of a protected state of the same name. Lat. 26° 19' N.; long. 73° 8' E. The population, not accurately ascertained, appears to amount to about 80,000. Besides several magnificent tanks, the place is remarkable for its elaborately constructed and deep wells.—The *state* of Joudpore, or Marwar, is the most extensive and populous of all the principalities of Rajpootana. Area, 35,672 sq. m.; pop. 1,783,600; army, 11,000; revenue of the rajah, £180,000. J. is chiefly within the basin of the Luni; and its central parts, being level and well watered, are highly productive, yielding wheat, opium, tobacco, and cotton.

JOUFFROY, Théodore Simon, a French philosopher, was born, 7th July 1796, at Pontets, a village of the Jura, early devoted himself to the study of philosophy, and became a teacher of it, and in 1832 a professor in the Collége de France. His bad health compelled him to resign his professorship in 1837, and he died 1st March 1842. His works consist chiefly of studies of the Scottish philosophy, and he published translations of the works of Reid and some of those of Dugald Stewart with notes and introductions. Of his original works, the most valuable is *Mélanges Philosophiques* (1833). He was also known as a political writer, and in 1824 took part in establishing the newspaper *Le Globe*. He was for some time a member of the Chamber of Deputies, and was a follower of Guizot.

JOUGS, JUGGS, or **JOGGS**, the name given in Scotland to a form of pillory which was used also in Holland, and probably in other countries. The jougs were nothing more than an iron ring or collar, fastened by a chain of two or three links to a pillar or wall in some public place, such as a market cross, a market tron or weighing post, a prison door, a church door, a churchyard gate, a churchyard tree, a tree beneath whose branches courts were held, and the like. The ring or collar opened by a hinge or joint, so as to enclose the culprit's neck, when it was secured by a loop or staple, and a padlock. The jougs were employed as a punishment as well for ecclesiastical as for civil offences. They may be traced as far back as the 16th c., and although they have not been in use for the last hundred years, they may still be found hanging at a few country churches. The accompanying wood-cut represents the jougs at the churchyard gate of the picturesque little hamlet of Duddingston, within about a mile of Edinburgh. The jougs obviously take their name from a widely-spread root, which appears in the Sanscr. *yuj*, the Gr. *zugon*, the Lat. *jugum*, the Ital. *giogo*, the Fr. *joug*, the Ger. *joch*, the Ang.-Sax. *ioca*, and the Eng. *yoke*. The Branks (q. v.) were occasionally hung on the same pillar with the jougs.



Jougs.

JOULE, James P., one of the most distinguished living experimental philosophers, was born in 1818, at Salford, near Manchester. In his youth, he had the good fortune to have for instructor in science the celebrated Dalton; and he early shewed, by constructing for himself electrical machines and other philosophical instruments, the bent of his genius. His earliest notable experiments were made with reference to electro-magnetic engines; from which he passed to quantitative determinations regarding heat, and the transformation of various forms of energy (see Force). He is justly entitled to be considered as the experimental founder of the modern theory of conservation of energy—the grandest generalisation ever made in physical science. A sketch of this principle is given in the article Force above referred to.

JOUNPU'R, a town in the North-west Provinces of India, is situated on both banks of the Gumti, which is here crossed by an ancient bridge, so strong as to be periodically submerged without injury. Lat. 25° 44′ N., long. 82° 44′ E. This structure is commanded by a fort still older than itself, a work of the latter half of the 14th century. The pop. is (1872) 25,531. J. is the capital of a district of the same name, with an area of 1555 square miles, and (1872) 1,025,869 inhabitants. Sugar is largely produced.

JOURDAN, JEAN BAPTISTE, COMTE, a French marshal, born 29th April 1762, at Limoges, where his father was a surgeon. He early entered the army, embraced with great zeal the cause of the Revolution, and soon rose to the rank of a general of division. In September 1793, he obtained the command of the Army of the North, and on 16th October gained an important victory at Wattignies. In 1794 and 1795, he commanded the Army of the Meuse and Sambre, and prosecuted the war with great vigour and success. In 1796, he pushed his way far into Germany, but was driven back by the Archduke Charles; and this discomfiture led to his resignation of his command. In 1799, the Directory intrusted him with the command of the Army of the Danube; but he was defeated by the Archduke Charles at Stockach. Although he opposed the *coup-d'état* of 18th Brumaire, the First Consul employed him, in 1800, in the re-organisation and administration of Piedmont; and on the establishment of the Empire in 1804, he was made a marshal, and a member of the Council of State. He accompanied King Joseph to Naples, and afterwards to Spain, and in his service he was actively employed as a general. He offered his services to Napoleon after his return from Elba. Louis XVIII. made him a count in 1815. In 1819, he was made a peer of France; but his republican principles led him to enter heartily into the revolution of 1830. He lived and died poor. His death took place on 23d November 1833.

JOUSTS, exercises of arms and horsemanship, performed in the middle ages by knights and nobles. In the joust, the combatants engaged one another singly, each against his antagonist, and not in a troop, as in the Tournament (q. v.). The number of courses to be run and strokes to be given was generally three, but sometimes a larger number. The weapon most in use in the joust was the lance, but sometimes the battle-axe and sword were employed. To direct the lance anywhere, but at the body of the antagonist, was reckoned foul-play. In the joust of peace, or *joute de plaisance*, a foot encounter preceded the mounted combat. In the 15th c., the usages of jousting had come to differ in different countries to such an extent, that an elaborate treatise was written in explanation of the various modes, distinguishing the characteristic differences.

JUAN, DON. See DON JUAN.

JU'AN FERNA'NDEZ, called also MAS-A-TIERRA, a rocky island in the Pacific Ocean, about 400 miles off Valparaiso, on the coast of Chili, to which it belongs. Lat. 33° 40′ S., long about 79° W. It is 18 miles long, 6 miles broad, and is for the most part covered with high rocky peaks, the highest of which, Yungu, is about 4000 feet above sea-level. There are also numerous and fertile valleys, which yield oats, turnips, apples, strawberries, melons, peaches, figs, grapes, sandal-wood, and other varieties of timber. Numbers of wild-goats wander on the cliffs. According to the latest accounts, the island was ceded in 1868 to a society of Germans, who intended to colonise it. Here Alexander Selkirk, a buccaneer, whose native place was the fishing-town of Largo, in Fifeshire, Scotland, resided in solitude for four years (1704—1708). His romantic story is supposed to have suggested the idea of the *Robinson Crusoe* of Defoe.

JUBÆ'A, a genus of palms of the same tribe with the cocoa-nut. *J. spectabilis* is a palm of 30 or 40 feet high, with a wide-spreading crown of pinnate leaves; a native of Chili, where it is called *Coquito*. The Chilians cut off the crown, and collect the sap, which flows freely for several months, a fresh slice of the top of the stem being cut off every morning. A good tree will yield ninety gallons of sap, which being boiled down to a syrup of the consistence of treacle, receives the name of *miel de palma* (palm-honey), and is an important article of the domestic economy of the country. The *Jubæa* is, in fact, the Jaggery (q. v.) palm of Chili.

JU'BILEE, THE YEAR OF (Heb. *Yobel*), a peculiar institution among the Hebrews (Leviticus xxv.), by which, every fiftieth (*not* forty-ninth) year, the land that in the interval had passed out of the possession of those to whom it originally belonged was restored to them, and all who had been reduced to poverty, and obliged to hire themselves out as servants, were released from their bondage; no less were (Jos. Ant. iii. 12. 3) all debts remitted. The jubilee forms, as it were, an exalted Sabbatical Year (q. v.), and the land was completely to be left to itself in the former as in the latter. The design of this institution was chiefly the restoration of the equilibrium in the families and tribes. It was to prevent the growth of an oligarchy of landowners, and the total impoverishment of some families; as well as to increase the fertility of the soil and the growth of the population. It was proclaimed at the end of the harvest-time, like the sabbatical year, on the tenth day of the seventh month—the day of atonement—by the yobel (a kind of horn), hence also its name. There is no trace in the whole history of the Hebrews down to the Babylonian exile that the jubilee had ever been observed: after the return, however, it appears to have been rigorously kept, like the sabbatical year, for some time at least; but, from its general impracticability, it must soon have fallen into disuse. When the sabbatical year was *de facto* repealed by Hillel's *Prosbol* (a legal document entitling the creditor to claim his debt during this period), mention is no longer made of the yobel. The speculations of modern critics on the *possibility* of the yobel, and on the date of its inauguration, cannot prevail against the undeniable fact that it has been kept, and also that it is much more in harmony with the primitive theocratic character of the Mosaic institutions—according to which all the land was held as a kind of loan from Jehovah, who alone had an absolute right over it—than with those of any later period, to which it otherwise would have to be referred.

JUBILEE, or **JUBILEE YEAR**, an institution of the Roman Catholic Church, the name of which is borrowed from that of the Jewish jubilee. The Catholic jubilee is of two kinds—'ordinary' and 'extraordinary.' The ordinary jubilee is that which is celebrated at stated intervals, the length of which has varied at different times. Its origin is traced to Pope Boniface VIII., who issued, for the year 1300, a bull granting a plenary indulgence to all pilgrim-visitors of Rome during that year, on condition of their penitently confessing their sins, and visiting the church of St Peter and St Paul, fifteen times if strangers, and thirty times if residents of the city. The invitation was accepted with marvellous enthusiasm. Innumerable troops of pilgrims from every part of the church flocked to Rome. Giovanni

Villani, a contemporary chronicler, states that the constant number of pilgrims in Rome, not reckoning those who were on the road going or returning, during the entire year, never fell below 200,000. As instituted by Boniface, the jubilee was to have been held every hundredth year. Clement VI., in obedience to an earnest request from the people of Rome, abridged the time to fifty years. His jubilee accordingly took place in 1350, and was even more numerously attended than that of Boniface; the average number of pilgrims, until the heats of summer suspended their frequency, being, according to Matthew Villani, no fewer than 1,000,000! The term of interval was still further abridged by Urban VI., and again by Paul II., who, in 1470, ordered that thenceforward each twenty-fifth year should be held as jubilee—an arrangement which has continued ever since to regulate the ordinary jubilee. Paul II. extended still more, in another way, the spiritual advantages of the jubilee, by dispensing with the personal pilgrimage to Rome, and granting the indulgence to all who should visit any church in their own country designated for the purpose, and should, if their means permitted, contribute a sum towards the expenses of the Holy Wars. The substitution by Leo X. of the fund for building St Peter's Church for that of the Holy War, and the abusive and scandalous proceedings of many of those appointed to preach the Indulgence (q. v.), were among the proximate causes of the Reformation. In later jubilee years, the pilgrimages to Rome gradually diminished in frequency, the indulgence being, for the most part, obtained by the performance of the prescribed works at home; but the observance itself has been punctually maintained at each recurring period, with the single exception of the year 1800, in which, owing to the vacancy of the holy see, and the troubles of the times, it was not held.

The extraordinary jubilee is ordered by the pope out of the regular period, either on his accession, or on some occasion of public calamity, or in some critical condition of the fortunes of the church; one of the conditions for obtaining the indulgence in such cases being the recitation of certain stated prayers for the particular necessity in which the jubilee originated.

JUDÆ'A. See PALESTINE.

JU'DAH (Heb. *Yehuda*, 'the Bepraised One') was the fourth son of Jacob and Leah, and founder of the greatest and most numerous of the twelve tribes. In the march through the wilderness, it had the post of honour—the van—assigned to it; and tradition narrates that its standard was a lion's-whelp, with the words: 'Arise, O Lord, and let thine enemies be scattered!' After the conquest of Canaan, its territories stretched from the Dead Sea on the east to the Mediterranean on the west (though the Philistines long held possession of the fertile district west of the mountains of Judah), and from Jerusalem (excluding that city) on the north to the land of the Amalekites on the south. The capital of the tribe was Hebron.

JUDAI'ZERS. See EBIONITES.

JUDAS'S TREE (*Cercis*), a genus of trees of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*. The common J. T. (*C. Siliquastrum*) is a native of the south of Europe, and of the warmer temperate parts of Asia. It has almost orbicular, very obtuse leaves. The flowers, which are rose-coloured, appear before the leaves. There is a legend that Judas hanged himself on a tree of this kind. The American J. T. (*C. Canadensis*) is very similar, but has acuminate leaves. The flower-buds of both species are frequently pickled in vinegar. The wood of both species is very beautiful, veined with black, and takes an excellent polish.

JUDE, EPISTLE OF, one of the smallest and least important books in the canon of the New Testament, was placed among the *Antilegomena* (Doubtful Writings) by the primitive church, while some even considered it spurious. It was not made use of by the Asiatic churches until the 4th c., and does not appear to have been known in the West until towards the end of the 2d. Even those who quote it do so with hesitation, such as Clemens Alexandrinus, Origen, and Jerome. At the Reformation, similar suspicions revived, and were entertained first by Luther and Calvin, and afterwards by the Magdeburg Centuriators and Grotius. In modern times, the tide of critical opinion has run strongly against its canonicity.

JUDGE is the generic descriptive name given to those who are invested with the power of judging and deciding causes in the highest courts of common law. In Great Britain—though it is otherwise in America—it is not usual to designate the highest class of judges by the epithet of judge, and British lawyers never do so. Thus, instead of saying Judge Blackstone, Judge Pollock, Judge Eldon, the proper description is—Mr Justice Blackstone, Chief Baron Pollock, Lord Chancellor Eldon, &c., according to the particular court in which they presided. In Scotland, the usual prefix to the name of a judge is Lord; and the judges there, on their appointment, often assume new titles in addition to the prefix 'Lord.' In England, the judges of the superior courts are only called lords while they sit in court, and are so addressed by counsel, but not elsewhere. The practice has long been for the crown to confer the honour of knighthood on all the judges of the superior courts of law and equity in England, but not in Ireland or Scotland. All the superior judges are appointed by the crown, and since 12 and 13 Will. III. c. 2, have held their offices during good behaviour; since 1 Geo. III. c. 23, they have also continued to hold their appointments notwithstanding the demise of the crown. They can only be removed from their office on the address of both Houses of Parliament. They are all, except the Master of the Rolls, disqualified from sitting in the House of Commons. Judges have no privileges over other persons in respect of their obeying the law, except that the common-law judges in England have the privilege of suing and being sued in their own court, though not of judging in their own cases.

The term judge has also been appropriated as the proper descriptive title of the judges of the county courts established in England in 1846.—*Judge Ordinary*, in English law, is the descriptive title of one judge only—viz., the judge of the Divorce and Probate Court. In Scotland, the phrase is often applied to all judges, superior and inferior, whenever they have a fixed and determinate jurisdiction, in contradistinction to commissioners, who have an occasional and temporary judicial authority delegated to them.

JUDGE-ADVOCATE-GENERAL, the supreme judge, under the Mutiny Act and Articles of War, of the proceedings of courts-martial. This officer is also the adviser, in legal matters, of the Commander-in-Chief and Secretary of State for War. Before confirmation, the sentences of all courts-martial, with the evidence adduced, are submitted to him; and it is for him to represent to the commander-in-chief any illegality of procedure, or other circumstance rendering it undesirable that the Queen should be advised to confirm the court's decision. The judge-advocate-general receives a salary of

£2000, and is a member of the House of Commons and of the ministry—changing, of course, with the latter. As it is essential that the judge-advocate-general should have an intimate acquaintance with the military law, as well as with the general law of the land, he is provided with an assistant or deputy, whose office is permanent, and who is selected from among barristers of eminence.

The *Deputy-Judge-Advocate* is an officer holding a temporary commission as public prosecutor in every court-martial. He must be an officer of intelligence, as it is part of his duty to examine and cross-examine witnesses, to warn the members of the court of any illegality in their proceedings, and generally to fulfil, in the limited area of the court, the functions which belong to the judge-advocate-general in regard to the whole army.

JUDGES, BOOK OF (Heb. *Shoftim*), a canonical book of the Old Testament, recording the achievements of those heroes who, at different periods in the early history of the Hebrews, before the consolidation of the government under a monarchy, from Joshua to Samuel, arose to deliver their countrymen from the oppressions of neighbouring nations, but only three of whom, Deborah, Eli, and Samuel, were *Judges* in our sense of the word. The contents of the book have given rise to much criticism. It cannot be said to be a *history*, properly speaking. The events recorded in it do not follow each other chronologically, nor is there any other order to be perceived in their arrangement. It is rather a collection of detached historical traditions from the time of the Hebrew republic—probably redacted in the commencement of the reign of David—from ancient poems and popular sagas. It exhibits (whether with a royalistic tendency, as has been supposed by some, or in order to point the moral that however deeply sunk a people—emphatically *the* people—might be in slavery or idolatry, or both, God would always send them a deliverer from either at the right time) the lawless and ungodly state of Israel during the greater part of this period, and the evil consequences their intimate connection with the idolatrous nations around them brought upon them. The book naturally falls into two portions—the first, up to chapter xvi., containing the heroic deeds of the single 'judges;' the second, from chapter xvii., the two accounts of the idol of Micah, and of the crime of Benjamin. The space of time over which the book extends has of old been hotly contested: that it comprises no less than 300 years (cf. xi. 26) is, however, almost the only point on which we can feel certain, since there is no doubt that many of the events recorded in the book did not follow upon one another, but fell in the same period: a circumstance which chronologers generally have failed to take into account. The book itself differs considerably from the other historical books of the Bible by its simplicity and originality. That most of the heroic adventures related contain—sometimes, perhaps, under a highly poetical guise—true historical facts, has been doubted by but a very small number of critics. Ancient traditions make Samuel the author, or rather redactor of the book, and there is certainly little to be said against, and much for, this supposition. Compare Ewald, Wette, Rosenmüller, Studer, Keil, &c. See JEWS.

JUDGE'S CHAMBERS means the place where a single common-law judge sits near Chancery Lane, London, in an informal manner, to hear attorneys make applications of an unimportant nature arising out of actions pending in court. If the judge refuse, or decide wrongly, there is an appeal to the court of which he is a judge. In general, a judge sits at chambers all the year round to dispose of these applications, which are chiefly matters of form, but of urgency.

JUDGMENT is, in English Law, the term usually applied to the final determination of a common-law court in an action, and when the litigation is at an end. In the courts of equity, the more usual corresponding term is a decree or order, and in criminal and Admiralty courts, a sentence. All judgments of the superior courts are, as a general rule, capable of being appealed against (see APPEAL). When a judgment is not appealed against within a certain time allowed for the purpose, then it is final, and binding on the parties. If the judgment is registered, it will have the effect of preventing the judgment debtor from selling or alienating his lands, but in general has no such effect on his goods and chattels or personal estate, except money invested in government stock. In order to make a judgment effectual in an action of debt, if the debtor refuses to pay, a further process is necessary on the part of the creditor, called Execution (q. v.). In Scotland, judgment is usually called a Decree (q. v.), and judgment by default is called a decree in absence.

JUDGMENT. This familiar word of every-day discourse has a technical meaning in Logic, to which corresponds its acceptation as the name of a faculty of the mind. A 'judgment,' in logic, is an affirmation of some kind or other, as 'snow is white,' 'man is mortal.' The contrast to it is a mere notion, as white, mountain, mortality. In a judgment, two notions must always enter, but this is not the whole; there must be some declaration coupling the two together, a function performed in all cases by a verb. A complete meaning, as expressed in a grammatical sentence, is a judgment. Other designations for the same thing are—proposition, assertion, predication.

The intellectual faculty called Judgment has reference to the logical force of the word, and means the power of forming judgments, and by implication, the further power of determining them to be true or false. This last function is perhaps what is most prominently implied in the faculty, as commonly understood.

The intellectual power of judging, when probed to its deepest foundations in the mind, resolves itself into one of two things—the discrimination of difference, or the perception of agreement in the midst of difference (see INTELLECT). A judge in a court of law finds that a case comes under, or does not come under, a certain statute; which finding constitutes his decision. A scientific man decides a theory to be true by a certain extent of coincidence with observed fact. An artist approves or disapproves a work of art by its agreeing or disagreeing with his standard, or those previous productions that have settled his conception of excellence in that species.

JUDGMENT (in Theology). The doctrine of a judgment after death has always been associated with the belief in man's immortality, and is maintained as a doctrine of natural religion on the ground of that responsibility of which conscience always more or less distinctly testifies, and of the evident absence of a due proportion of rewards and punishments to human actions in this life. This doctrine, however, as a doctrine of the Christian religion, contains many things of which there is no evidence apart from revelation. Thus, we are told of a *day* or time *of judgment*, when, in great solemnity, and in presence of an assembled universe, the judgment shall be pronounced; also, that the Lord Jesus Christ is to appear in glory as judge. As a doctrine of revelation, the doctrine of a final judgment is also brought into close connection with that of the Resurrection (q. v.) of the dead.

JUDICIAL COMMITTEE OF THE PRIVY-COUNCIL, those members of the privy-council who sit as a court of justice in the hearing of appeals, &c. See PRIVY-COUNCIL.

JUDICIAL DECLARATION, in Scotch Law, means a declaration made by one of the parties to a suit, and who has been specially ordered by the court to be examined on a particular point. It is not a statement made on oath. In England, the phrase is seldom used, though the same result is obtained by what are called admissions of the parties.

JUDICIAL FACTOR, in Scotch Law, is a person appointed by the Court of Session, on special application, as a guardian to protect the interests of minors, absent parties, and lunatics. In England and Ireland, the corresponding officers are called receivers or trustees, according to circumstances.

JUDICIAL RATIFICATION, in Scotch Law, means the declaration made by a married woman in the absence of her husband, before a justice of the peace, to the effect that a disposition or deed of alienation of her heritable property has been made without coercion or fear on the part of her husband, and voluntarily on her part. A notary and two witnesses must also be present, and the former indorses on the deed a memorandum of the ratification. The object is to remove objections which might otherwise be made to the validity of the deed. In England, a corresponding process is called an acknowledgment of a deed by a married woman.

JUDICIAL REMIT, in Scotch Law, is a reference by a court or judge of a cause, or part of a cause, to the decision of an arbiter or nominee, such as an engineer or accountant. The matter referred is generally some technical matter in which the referee is specially skilled. In England, the corresponding phrase is a reference to an arbitrator or expert to report.

JUDICIAL SEPARATION, in English Law, is the separation of two married persons by order of the Court of Divorce. Married persons may, if they please, mutually agree to live separate, and they may enter into a deed of separation for that purpose, which to some extent is recognised as valid by courts of equity. This is called voluntary separation. But, in the eye of the law, two married persons living apart are still married, and retain the status of married persons, and must sue and be sued in all respects the same as if they were still cohabiting. And a deed of separation is always revocable by the parties, though to some extent binding on each, if the other do not consent to renew the cohabitation. But when the parties have not mutually consented to separate, one of them can compel a judicial separation for certain grounds of misconduct. Thus, either party may apply on the ground of adultery, or cruelty, or desertion without cause for two years and upwards. The kind of cruelty which has been held a ground of judicial separation is difficult of definition.

The consequences of a judicial separation are as follow. The parties, not being divorced, cannot marry again; but there is no longer the duty of cohabiting. Part of the decree may consist of an award of a certain income to the wife after separation, and the court may make orders as to the custody and maintenance of children. But, irrespective of this, the wife becomes, to all intents and purposes as regards her future property, in the same position as if she were unmarried. On the other hand, the husband is no longer responsible for maintaining his wife, except so far as he may have been ordered to pay her alimony, and he is not liable for her future debts. These last consequences have been declared in England since 1857, when the law was materially improved on the subject, and a new Divorce Court established.

In Scotland, the law has also been recently changed, and now nearly coincides with the English law in many respects, this improvement being made by the Conjugal Rights' Act, 24 and 25 Vict. c. 86. By that act, whenever a decree of separation *a mensa et thoro* is obtained at the instance of the wife, all property which she may acquire, or which may devolve upon her, is held entirely separate from and independent of her husband; she can bequeath it by will as if he was dead. She can also enter into contracts, and sue and be sued in her own name, and the husband is no longer liable for necessaries or her debts, except so far as he is bound by the decree of separation to pay to her aliment. As regards the grounds of judicial separation in Scotland, they are nearly the same, being described by Mr Bell in his *Principles* thus: whenever life is endangered, or there is fair and reasonable ground of apprehension of personal violence, or there is continued annoyance, wearing out and exhausting the party, or there are adulterous practices. It will, however, be found that the grounds of divorce are more ample in Scotland than in England. See MARRIAGE.

JUDITH, the heroine of an apocryphal and fictitious book (probably of the 2d c. B. C.; Movers, Ewald, &c.) called by her name, is represented as a beautiful Jewess of Bethulia, who perils her life and chastity in the tent of Holofernes, general of Nebuchadnezzar, in order to save her native town, by the assassination of the Assyrian commander. This she achieves, and escapes with the head of Holofernes to Bethulia. Her townsmen are inspired with a sudden enthusiasm, rush out upon the enemy, and completely defeat them. The tale is not mentioned by Josephus; and has, from an early period, been held to be an allegory; but it seems more probable that it is a legend founded on some real fact. It has frequently furnished poets and painters with subjects.

JUGGERNAUT. See JAGGERNAUT.

JUGGLERS (Fr. *jongleurs*), a term now almost synonymous with conjuror, and applied to persons who perform tricks of legerdemain, originally designated the professional musicians who attended the troubadours and trouvères of Provence and the north of France, either singing their poems, or, if they sung them themselves, accompanying them with an instrument, which was reckoned beneath the dignity of the poet himself. The word is derived from the medieval Latin *joculator;* in Provençal, *joglar*, *joglador;* in old French, *jonglère* or *jongléor;* in modern French, *jongleur*. These musicians soon began to be also kept in the service of kings and princes, whence they received the name of *menestrels* or *minstrels* (Lat. *minister*, a servant). The profession was at this time an honourable one, and good endowments were devoted to the maintenance of minstrels; and when the art of the minstrel ceased to be exclusively employed for the entertainment of courts, those of this profession formed a separate guild in some towns, as in Paris. But it gradually lost respectability. Rope-dancers, and all who sought to gratify the populace by sleight of hand or feats of agility, were designated by the name jongleur, until it became restricted to its present acceptation.—The ancient Romans had their conjurors or wonder-workers (*praestigiatores*), their throwers of knives (*ventilatores*), and their players with balls and rings (*pilarii*). But the greatest proficients in everything of this kind are and have for many ages been the Hindus and Chinese.

JUGLANS AND JUGLANDACEÆ. See WALNUT.

JUGU'RTHA, king of Numidia, son of Mastanabal, who was a natural son of Masinissa, was carefully educated along with Adherbal and Hiempsal, the sons of his uncle Micipsa, who succeeded Masinissa on the throne. After Micipsa's death, J. soon caused Hiempsal to be murdered (118 B. C.), and Adherbal fled to Rome. J. succeeded in bribing great part of the Roman senate, and obtained a decision in his favour, freeing him from the charge of the murder of Hiempsal, and assigning him a larger share of the kingdom than was given to Adherbal (117 B. C.). But J. soon invaded Adherbal's dominions; and notwithstanding injunctions by the Romans to the contrary, besieged him in the town of Cirta (112 B. C.), and caused him and the Romans who were captured with him to be put to death with horrible tortures. Hereupon, war was declared against J. by the Roman people; but, by bribing the generals, J. contrived for years to baffle the Roman power. At last the consul, Q. Cæcilius Metellus, proving inaccessible to bribes, defeated him in 109 and 108 B. C., so that he was compelled to flee to the Mauritanian king, Bocchus. Marius, who succeeded Metellus in the command, carried on the war against J. and Bocchus, till at last Bocchus delivered up J. to the Romans, who exhibited him at Rome in the triumph of Marius (104 B. C.), and then threw him into prison to die of hunger. J. has obtained greater prominence in history than he deserves, on account of Sallust's having written the history of the Roman campaigns against him.

JU'JUBE (*Zizyphus*), a genus of spiny and deciduous shrubs and small trees of the natural order *Rhamnaceæ*. The species are pretty numerous. The COMMON J. (*Z. vulgaris*) of the south of Europe, Syria, &c., is a low tree, which produces a fruit resembling an olive in shape and size, red, or sometimes yellow when ripe. The fruit is dried as a sweetmeat, and forms an article of commerce. *Syrup of Jujubes* is used in coughs, fevers, &c.; but the *J. paste*, or *Pâte de J.*, of the shops of Britain is made of gum-arabic and sugar, without any of the dried jelly of this fruit.—The J. of India (*Z. Jujuba*) is a similar small tree, with round or oblong fruit, sometimes of the size of a hen's egg.—A Chinese species of J. (*Z. nitida*), has a very pleasant yellow fruit about an inch long; and other species not much inferior are found in Africa, South America, and other warm countries.—The LOTUS (*Z. Lotus*), a shrub two or three feet high, a native of Persia, the north of Africa, &c., produces in great abundance a fruit about as large as a sloe, and with a large stone, but having a sweet farinaceous pulp, which the natives of some parts of Africa make into cakes resembling gingerbread. A kind of wine is sometimes made from it.—*Z. Spina Christi*, another native of the countries near the Mediterranean, is sometimes said to be the plant from the branches of which our Saviour's crown of thorns was made, and is therefore called CHRIST'S THORN and JEWS' THORN, names which, for the same reason, are also given to *Paliurus aculeatus*. The fruit is about the size of a sloe, oblong, and pleasantly acidulous.

JU'LIAN, surnamed the *Apostate*, on account of his renunciation of Christianity, Roman emperor 361—363 A. D., was born at Constantinople 17th November 331, and was the son of Julius Constantius, the brother of Constantine the Great. His proper name was Flavius Claudius Julianus. He and his brother Gallus, who were too young to be dangerous, were spared when Constantius II., son of Constantine, massacred the rest of the imperial family. They were, however, removed to a castle in Cappadocia, where they were subjected to a system of rigorous espionage. J.'s life was very miserable, and the monkish education which he received produced no other result than a strong detestation of the religion professed by his tormentors. He was fond of literature and speculation, and he instinctively turned away from the rude asceticism, gloomy piety, and barbarous janglings of *Homoousians* and *Homoiousians*, to the cheerfulness, refinement, and pure intellectual meditativeness of the old Greek philosophers. Some of his teachers appear to have been (secretly) pagans, for the sudden change in the state religion brought about by Constantine had necessitated a great deal of hypocrisy, especially among scholars and government officials. At the age of 20, J. was at heart a disbeliever in the divine origin of Christianity. On the death of his brother Gallus, he was removed by Constantius to Milan, but was subsequently allowed to go to Athens, the home of Greek learning, where he gave himself up to philosophical pursuits, and enjoyed that cultivated society which he so highly relished. The emperor—though still jealous and suspicious—now conferred on him the title of Cæsar, and sent him to Gaul to protect it from the incursions of the Germans. J. defeated the Alemanni at Strasburg (357 A. D.), and compelled the Franks to make peace. His internal administration in Gaul was mild and judicious. His popularity, in consequence, became very great, and when Constantius ordered him to set out for the East, J.'s soldiers rose in insurrection, and proclaimed their favourite emperor, who most reluctantly acceded to their demands. The death of Constantius at Mopsocrene, in Cilicia, 3d November, 361 A. D., removed the only obstacle out of his way; and on the 11th of December he made a triumphal entrance into Constantinople. He now publicly avowed himself a pagan, but surprised both Christians and pagans by his edict of toleration. Yet he was not absolutely impartial, for he chose most of his officers from the professed followers of the old religion, and compelled the Christians to contribute to the restoration of the heathen temples. In 362 A. D., he made great preparations at Antioch, in the hope of bringing the war with the Persians to a successful termination; and in the following year advanced to Ctesiphon and across the Tigris, but want of provisions and treachery necessitated his retreat. He was followed and attacked by the enemy, who were repeatedly repulsed, but in one of the engagements he was mortally wounded by an arrow, and died 26th June 363.—J. was both a great monarch and a great man. His rule, compared with that of many of the so-called Christian emperors, was just, liberal, and humane; and though only 32 years of age when he perished, he had composed a great number of orations, letters, satires, and even poems (collected and published by Spanheim in 1696). Among his lost works are his *Refutation of the Christian Religion*, and Memoirs of his German Campaigns, and his Diary. The cause of J.'s opposition to Christianity has been already indicated. We may say further, in elucidation of this important point, that J. appears to have been more attached to philosophy than religion, and that he more readily apprehended as truth what commended itself to the intellect, than what spoke to the heart.

JULIAN CALENDAR. See CALENDAR.

JULIAN CROSS, or CROSS OF ST JULIAN, a cross crosslet placed saltire-ways.

JULIAN EPOCH. See CHRONOLOGY.

JULIAN YEAR. See YEAR.

JULIEN, STANISLAS-AIGNAN, the first Chinese scholar of his age in Europe, was born at Orleans, in France, 21st September 1799, and in 1823 became a pupil of Abel Rémusat, who had recently been appointed to deliver a course of lectures on Chinese. In less than a year, he had made himself master of the principal difficulties of the language, and actually executed (in Latin) a translation of the great Chinese philosopher, Mencius, which was published at the expense of the Asiatic Society of Paris, and pronounced faultless. From that time, his labours were chiefly directed to the languages and literature of the far East. Ancient and modern Chinese, Mantchu, Sanscrit, the Mongolian tongues, were familiar to him; although, at the same time, he is said to have known almost all the European languages. His translations (into French) embrace the most important works in all departments of Chinese literature. He has given specimens of the Chinese drama in his *Hoei-lan-ki* (The Circle of Chalk, 1832) and his *Tchao-chi-koueul* (The Chinese Orphan, 1834); of Chinese romances, by his *White and Blue, or the Two Snake Fairies* (1834), and several other pieces in *Salmigondis* and the *Constitutionnel*. J. was also the first who succeeded in translating Chinese poetry well—the constant use of allegory, and allusion to facts not known to Europeans, rendering it nearly unintelligible. But more valuable still than those purely literary productions, are his translations of the great works that enable us to understand the religion and philosophy of the Chinese, such as the *Book of Rewards and Punishments* (1835), in which are contained the doctrines of Tao-sse, the *Book of the Way and of Virtue* (1841) by Lao-tseu, written in the 6th c. B.C., and forming the oldest and most illustrious monument of Chinese philosophy; and above all, the history of the *Life and Travels of Hiouen-Tsang* (1852), a work of immense importance for the earlier history and geography of India, and the knowledge of Buddhism. But not content with these brilliant labours, J. sought to instruct us concerning the industry and arts of the Chinese, in a variety of treatises, of which we may mention his *Summary of the Principal Chinese Treatises upon the Culture of Mulberry Trees and Silk-worms* (1837), and his *Treatise on the Art of Manufacturing Porcelain* (1856). In 1869, he published the first part of the *Syntax of the Chinese Language*. On the death of Rémusat, he became his successor at the Collége de France, and in 1855 president of the college. He was also conservator of the Bibliothèque Impériale, and was specially charged with the oversight of the Chinese department. He died in February 1873.

JU'LIUS, the name of three popes, of whom the second and third deserve to be noticed.—J. II., originally Cardinal Della Rovere, a nephew of Sixtus IV., was born at Albizzola, near Savona. He was vehemently opposed during his cardinalate to the designs of Alexander VI. for the aggrandisement of his family, and one of his earliest measures on his election to the pontificate, in 1503, was to resume possession of the duchy of the Romagna, which had been bestowed upon Cæsar Borgia. J. was himself beyond all suspicion of nepotism or selfish designs of aggrandisement; but his public career during his pontificate was almost entirely devoted to political and military enterprises for the complete re-establishment of the papal sovereignty in its ancient territory—Bologna, Ferrara, &c., and for the extinction of foreign domination and foreign influence in Italy. In pursuing his designs, for the purpose of compelling from the republic of Venice the restitution of the papal provinces on the Adriatic, J. not only entered into the league of Cambray with the emperor Maximilian and Louis XII. of France, but had recourse to spiritual arms, by placing the republic under the ban of the church; and on the submission of Venice, apprehending the ambitious designs of Louis, he withdrew from the league, and entered into an opposite alliance, the 'Holy League,' to which Spain, England, and Switzerland were parties. Hence arose his bitter quarrel with Louis XII., in which the latter attempted, but ineffectually, to enlist the sympathies of the church against the pope. The Council of Pisa, which was convened under Louis's influence, was an utter failure; and the opposing council, fifth of the Lateran, assembled by J., but not brought to a close during his lifetime, completely frustrated the designs of Louis. It is alleged that, in his hatred of France, J. was desirous of drawing even the Turks into the league; but this allegation is negatived by his entire career, one of the main features of which was a design for a holy war, in which he himself should take the command. As an ecclesiastical ruler, J. has little to recommend him in the eyes of churchmen. As a political sovereign, he is described by Ranke as 'a noble soul, full of lofty plans for the glory and weal of Italy;' and Professor Leo considers him, with all his defects, as one of the noblest characters of that age in Italy. He was a liberal and judicious patron of art, and a friend of the rising literature of the time. He died February 22, 1513.—J. III., a native of Monte San Savino, near Arezzo, was known before his elevation to the pontificate as Cardinal del Monte. He was one of the four legates of the pope under whom the Council of Trent was opened; and after his election to the papacy in 1550, he himself re-opened (in 1551) that council, which had been suspended for upwards of two years. He is connected with English history as having sent Cardinal Pole to organise with Mary the reunion of the kingdom with Rome; but his general government of the church is marked by no very striking events, and his private character is sullied by the taint of nepotism. He died March 23, 1555.

JU'LLUNDER, a city of the Punjab, stands in the Doab of the same name between the Sutlej and the Beas, in lat. 31° 21′ N., and long. 75° 31′ E. Having once been the capital of the Lodi-Afghans, it is surrounded by a vast number of large and magnificent mausoleums. The soil of the neighbourhood is remarkably productive; and the place, fallen, as it is, from its former greatness, still contains (1868) 45,607 inhabitants.

JULUS, or **IULUS,** a genus of *Myriapoda* (q. v.), of the order *Chilognatha*. The whole of this order was included in the Linnæan genus *J.*, and it is still the family *Julidæ* of many naturalists. The genus J., as now restricted, contains many species, some of which are British. They are sometimes called SNAKE MILLIPEDES and GALLY-WORMS. They resemble centipedes in form; but their feet are

Julus Terrestris.

more numerous—some having 120 pair—and are so weak that the animal seems to glide along on its belly, the feet moving like a wavy fringe on each side. The body is nearly cylindrical, not flattened. On any alarm, the animal rolls itself up in a coil. The *Juli* have no poison-fangs, like centipedes. They inhabit moist and dark places, and feed chiefly on decaying vegetable substances, sometimes also on decaying animal substances.

JULY', the seventh month of the year in our calendar, fifth in the Roman calendar, where it was called Quintilis (the fifth). Originally, it contained 36 days, but was reduced by Romulus to 31, by Numa to 30, but was restored to 31 days by Julius Cæsar, in honour of whom it was named *July* (Lat. *Julius*), on account of his birth having happened on the 12th of this month. It was called *Maed-monath*, or mead-month, and *litha-aeftera*, or after-mild-month, by the Anglo-Saxons.

JUMBUSE'R, a town of British India, presidency of Bombay, is situated in the district of Broach, and 22 miles north-west of the town of that name. Pop. 10,000, who are principally employed in the cotton, grain, and coarse cloth trade.

JUMI'LLAH, a handsome town of Spain, in the modern province of Murcia, is situated in a delightful valley 35 miles north of the city of that name. Pop. 7400, who manufacture firearms, earthenware, and tiles.

JU'MNA, the principal feeder of the Ganges, is perhaps the only Indian river of the first class which has its course wholly in Hindustân—the Indus, Sutlej, Ganges, and Brahmaputra all rising in Tibet. Its source, at a height of 10,849 feet above the sea, is in lat. 31° N., and long. 78° 32' E., at the south-west base of the Jumnotri Peaks; and, after flowing 680 miles chiefly in a south-east direction, it joins the Ganges at Allahabad. After its first 100 miles, during which it receives many affluents, of which the Touse is the largest, it enters the plain of Hindustan in lat. 30° 20' N., and long. 77° 38' E., having still an altitude of 1276 feet above the sea. Below this point, it is joined by many considerable streams: the Chumbul, the Sind, the Betwa, and the Cane on the right; and the Hindon, the Seengoor, and the Rind on the left. All the way downwards, the J. is generally shallow, and, excepting as to descending rafts, unfit for navigation. By artificial means, however, its waters have been rendered doubly available both for commerce and for agriculture. From either bank, a canal has been drawn at once for the use of inland craft and for the purposes of irrigation. The one on the right side, begun in 1356, leaves the main channel a short distance below the point of its emerging from the mountains; while the one on the left side, commenced in 1824, takes its departure a little further down, near the village of Fyzabâd. Both of them rejoin the parent stream at Delhi. Historically and politically, the J. occupies a more prominent position than the Ganges itself above their junction. The former was necessarily the first to cross the path of every invader from the north-west; and hence on it were built both Agra and Delhi, the two capitals of the Mussulman conquerors of India.

JUMNO'TRI, hot springs near the source of the Jumna, in lat. 30° 59' N., and long. 78° 35' E., 10,849 feet above the sea. Their temperature is 104°·7 F., nearly that of boiling water at their elevation. They are overhung by three connected mountains known as the Jumnotri Peaks, whose altitudes respectively are 21,155, 20,916, and 20,122 feet.

JU'NCEÆ, or **JUNCA'CEÆ**, a natural order of endogenous plants, herbaceous, generally perennial, with creeping root-stock; narrow, often fistular leaves; regular flowers; the perianth 6-partite; the stamens six; the fruit a 3-valved capsule. This order is nearly allied to *Liliaceæ*, notwithstanding very great difference of aspect for rushes (*Juncus*) are the best known examples of it. The species, about 200 in number, are mostly natives of cold and temperate climates.

JUNE, the sixth month of the year in our calendar, but the fourth among the Romans. It consisted originally of 26 days, to which four were added by Romulus, one taken away by Numa, and the month again lengthened to 30 days by Julius Cæsar, since whose time no variation has taken place. The Anglo-Saxons called this month *searmonath*, or dry-month, and *midsumer-monath*.

JUNG, Johann Heinrich, generally called Jung Stilling, an author, the events of whose life and whose gifts of imagination render him worthy of notice, although at one time his merits were greatly over-estimated. He was born of poor parents at Imgrund, in Nassau, 12th December 1740, and after trying various occupations, became a student of medicine at Strasburg, where he lived in intimacy with Goethe, who conceived a great liking for him, on account of his simple, pure, affectionate nature, settled as a medical practitioner at Elberfeld, and distinguished himself as an operator for cataract. He is said to have improved the eyesight of more than 2000 persons. J. subsequently held professorships at Marburg and Heidelberg. He died at Carlsruhe, 2d April 1817. His first publication was an autobiography, *H. Stilling's Jugend, Jünglingsjahre, Wanderschaft, Lehrjahre, Häusliches Leben und Alter* (3 vols. Berlin, 1777—1778), which attracted much attention, and was followed by other publications from time to time, continuing the history of the author's career. In religion, J. represents a class by no means uncommon in Germany—viz., the *pietistic rationalists*, men who put little stress upon the (written) word of God, but are full of veneration (often degenerating, however, into a mere sentimental enthusiasm) for the spiritual truths of Christianity. J.'s collected works were published (1838) at Stuttgart in 14 vols.

JUNGERMA'NNIA, a Linnæan genus of cryptogamous plants, containing a great number of species, which some modern botanists have divided into many genera, and some have even formed into an order, *Jungermanniaceæ*, although it is more generally regarded as constituting a sub-order of *Hepaticæ* (q. v.). The distinctive characters of the sub-order are that the *spore-cases* open by four valves, and that the *spores* are mixed with *elaters*. The species much resemble mosses in appearance. Many are natives of Britain, some of them very common in moist places. The tropical species are very numerous, and some of them are to be found even on the young shoots and leaves of plants.

JU'NGFRAU (the Maiden), one of the highest mountains of the Bernese Alps, rises on the boundary-line between the cantons of Bern and Valais, and attains a height of 13,720 feet. It received its name either from the unsullied purity and dazzling brightness of the snow by which it is covered, or from the fact that until recently no traveller had ever reached its highest point. In 1828, its summit was attained by six peasants from Grindelwald; and in 1841, by M. Agassiz and Principal Forbes, accompanied by others.

JUNGLE-FOWL, the name given by the Australian colonists to a bird (*Megapodius tumulus*), which has also been called the Megapode, totally different from the jungle-fowl of India. See Fowl. It belongs to the family *Megapodidæ*. All the species are large birds, with short wings and tail, and of slow, heavy flight. They are remarkable for the thickness of their legs (*tarsi*), and their long and thick toes; and for their habit of heaping up mounds of earth, decayed leaves, &c., in which they lay their eggs, which are hatched by the heat produced by fermentation. The Australian J. makes heaps sometimes fifteen feet high, and sixty feet in circumference at the base, under the shade of thick trees or shrubs, where the heat of the sun may not evaporate the moisture. In these heaps, it makes holes of several feet in depth, in which to deposit its eggs. How the young birds emerge, is not yet known, nor if they are assisted by the parent birds. The mounds of the J. were at first supposed to be sepulchral tumuli. The J. is mostly of a brownish colour. Its size is rather less than that of the common domestic fowl. The propensity to heap up earth is very early manifested by young birds.

JU'NIPER (*Juniperus*), a genus of trees and shrubs of the natural order *Coniferæ*, sub-order *Cupressineæ*, having unisexual flowers, the male and female generally on separate plants, and the fruit a fleshy *galbule* (popularly a *berry*), containing three small nuts. The species are all evergreen, and have small, narrow, rigid leaves, which are opposite, or in whorls of three or four, or imbricated in four rows. They are natives chiefly of temperate and cold regions, and are found in Europe, Asia, Africa, and America.—The Common J. (*J. communis*) is found in all parts of Europe and the north of Asia, and in the northern parts of North America. Only in favourable circumstances does it become a tree of 15, 20, or at most 30 feet in height, and in general it is only a shrub from 2 to 6 feet high. The fruit takes two years to ripen; it is round, of a bluish-black colour, with a whitish bloom; it is of the size of a small currant, and is produced in great abundance. The little nuts or stones of the fruit have on the shell three glands, which abound, especially before ripening, in an essential oil—*Oil of J.*—present also in the wood, particularly in the young wood. The wood is yellowish red, brownish in the heart, hard, and fragrant. When of sufficient size, it is much valued by turners. It is also used for veneering. The dry twigs, roots, and berries are used for fumigation. The berries have a strong and peculiar flavour. They are much used for flavouring gin, which derives its name from them (see Gin). They also enter into several medicinal preparations, being stimulant, sudorific, and diuretic.—The bark of J. may be made into ropes, and in some parts of the Highlands of Scotland, the roots are woven into the coarse baskets which are used for potatoes, peats, &c.—Oil of J. is lighter than water; specific gravity, 0·839. It is limpid and nearly colourless. It is obtained by distilling the unripe fruit, or the twigs, with water. The medicinal properties of J. depend on it; six drops are a dose.—Spanish J. (*J. oxycedrus*) grows in arid situations in the countries around the Mediterranean Sea. Its fruit is about the size of a hazel-nut; and from its fruit and wood is procured an essential oil of disagreeable odour, called *Huile de Cade* (q. v.), which is used in veterinary practice, particularly as a cure for scab in sheep.—Virginian J. (*J. Virginiana*), the Red Cedar of North America, is an evergreen tree, often 30—50 feet high, of conical form, with horizontal branches and very small leaves; a native of North America, from Lake Champlain to the Gulf of Mexico. It grows in sandy or rocky places. It is often planted in pleasure-grounds in Europe, and succeeds well in Britain. The berries are small and bright blue. The heart-wood is of a beautiful red colour, and is valued by turners, coopers, &c. It is imported into England for making pencils. There are often found on the branches fungous excrescences called *Cedar Apples*, which have been recommended as a vermifuge.—The Bermudas Cedar (*J. Bermudiana*) is a native of the Bermudas, a lofty tree, with very fragrant reddish-brown wood, which is used for furniture, pencil-making, &c., and also for lining cabinets, its flavour preventing the attacks of moths and other insects.—The Himalaya Mountains produce several species of J., trees of considerable size, beautiful appearance, and valuable wood. The only species of J. which is a native of Britain is the Common J., and it is found chiefly in the more mountainous parts.—The Swedish J. of our shrubberies is merely a variety of the common juniper.

Common Juniper (*J. communis*):
a, branchlet with male flowers; *b*, part of branchlet with female flowers; *c*, unripe fruit.

JU'NIUS, Letters of, a famous series of political letters signed 'Junius,' which appeared in a London newspaper, *The Public Advertiser*, during the last year of the administration of the Duke of Grafton and the first two years of that of Lord North. They were 44 in number; besides which, are to be reckoned as proceeding from the same pen 15 signed Philo-Junius, 62 business-letters (mostly very short) addressed to his publisher, Woodfall, and 10 to Wilkes (privately); and in addition, 113 letters under various signatures. The first of the letters of J., published January 21, 1769, treats of the 'State of the Nation,' and may be said to strike the key-note of all the subsequent correspondence. In it, the author singles out several leading members of the ministry, and boldly denounces their inefficiency; and the last of the letters, dated January 21, 1772, closes somewhat suddenly the long indictment against ministers in the same spirit in which it had begun. No sooner did the first Junius appear, than the court-party took the alarm. An invisible and dreaded censor was evidently moving among them—one who, though as yet the days of parliamentary reports were still far off, seemed cognizant of all the proceedings of both Houses, who not only knew intimately the public career of ministers, but was fully informed regarding the follies and the crimes of their private character. Sir W. Draper, who entered into controversy with this unknown adversary, was in the end overmastered, and reduced to mere humble complaint and confession. The Duke of Bedford, Lord Mansfield, and chief of all, the Duke of Grafton, writhed beneath his lash—the last of these being more indebted for immortality to the splendid sarcasm of Junius than to any measure which it was his fortune to introduce. It cannot, however, be denied that the hatreds of Junius, though springing for the most part from his detestation of injustice, and his contempt for incapacity, were increased and imbittered by party spirit and personal dislike. The style of these letters, though perhaps occasionally somewhat stiff and formal, is of the very highest class. Occasionally rising to the loftiest eloquence, it is always remarkable for closeness of argument, felicity of illustration and allusion, and brilliant epigram. Whoever Junius was, his life depended upon his preserving his *nom de plume*. He had made too many enemies to be safe in acknowledging himself. From the day of the publication of his first letter, however, conjecture has been busy framing theories of the authorship. Burke, Lord Shelburn, Colonel Barré, Lord George Sackville, Wilkes, Horne Tooke, Thomas Lord Lyttelton, among others, were supposed in turn to be Junius; but the general opinion now is, that Sir Philip Francis (q. v.) was the author of these letters. The Franciscan theory is supported by a weight of evidence, which, although entirely circumstantial, is sufficient, Macaulay thinks, 'to support a verdict in a civil, nay, in a criminal proceeding.' The handwriting of Junius is the handwriting of Francis slightly disguised. Junius, as is evident from his letters, knew the forms of the Secretary of State's office, was intimately acquainted with the business of the War Office, attended the House of Commons in 1770, and took notes of speeches, especially of those of the Earl of Chatham; denounced the promotion of Mr Chamier in the War Office as unjust to *Mr Francis*, and was bound by some strong tie to the first Lord Holland. All these circumstances in the position and actions of Junius, the unknown author of the letters, correspond exactly with the history of Francis, and do not agree in more than two points with the history of any other public man of that period. 'If this argument,' says Macaulay, 'does not settle the question, there is an end of all reasoning on circumstantial evidence.' See *Junius, by Woodfall*, published by Bohn (2 vols. London, 1850), and Macaulay's *Essays* (Warren Hastings).

JUNK, a Chinese vessel, often of large dimensions. It has a high forecastle and poop, and ordinarily three masts. Junks, although clumsy vessels, incapable of much seamanship or speed, have proved themselves seaworthy on voyages extending even to America and Europe. The junk of Japan is considerably superior to that in use in China.

Junk.

Junk, in the British navy, is a familiar term for the salt meat supplied to vessels for long voyages—the name being probably derived from the fact that it becomes as hard and tough as old rope, pieces of which are officially styled *junk*.

JUNKSEYLO'N, or SALA'NG, an island in the Bay of Bengal, lies in lat. 7° 46′ N., and long. 98° 18′ E., near the west coast of the peninsula of Malacca, It belongs to Siam, and trades chiefly with the British settlements of Malacca, Penang, and Singapore. It yields tin, edible birds'-nests, and Japan wood.

JU'NO AND HE'RA, the Roman and Greek names of the queen of heaven, and wife of the supreme divinity. The two conceptions have unfortunately been confounded, and hence their essential dissimilarity has been lost sight of—a dissimilarity, it may be remarked, as great as that which existed between the Roman and Greek character. We shall endeavour to distinguish between the two conceptions.

Hera (meaning 'mistress'), the Greek goddess, was the daughter of Kronos and Rhea. She was the sister of Zeus, and afterwards became his wife. Her jealousy is proverbial, and was unfortunately too well founded, for Zeus was the reverse of a faithful husband. In the Homeric poems, she appears, on the whole, as an obstinate, quarrelsome shrew, whose temper is a source of frequent discord between herself and her lord, whom, however, she greatly fears. She is represented as often spitefully favouring persons who were the objects of the displeasure of Zeus, and has to be punished for her disagreeable ways. Zeus scolds and even beats her; and on one occasion, we read of his having tied her hands, and hung her up in the clouds. But she is, nevertheless, a female of majestic beauty, the grandest of the Olympian dames. As the only wedded goddess in the Greek mythology, she naturally presided over marriage and at the birth of children. She rode in a chariot drawn by two horses; and in her famous temple at Mount Eubœa, her statue, made of gold and ivory, bore a crown, symbolic of her queenly dignity. Her favourite residences were Argos, Sparta, and Mycenæ; but she had sanctuaries in many parts of Greece. The Greek artists loved to represent her as a majestic woman of middle age, possessing a maternal dignity of mien, with beautiful forehead, large eyes, and venerable expression. Homer repeatedly calls her 'the venerable ox-eyed Hera.'

Juno (the name is from the same root as Jupiter), the Roman goddess, was the queen of heaven, and, under the name of *Regina*, was worshipped in Italy at an early period. She bore the same relation to women that Jupiter did to men. Like the Greek Hera, she took a special interest in marriage, whence her name of *Juga* or *Jugalis* (the yoke-maker); but she was also a kind of female Providence, protecting the sex from the cradle to the grave. Her epithets, *Virginalis* (the goddess 'of virgins') and *Matrona* ('of mothers'), indicate this. It is a very significant feature of the Roman character, that J. was also believed to be the guardian of the national finances, watching over her people like a thrifty mother and housewife. A temple, containing the mint, was erected to her on the Capitoline as J. *Moneta* (the money-coiner). She was besides the goddess of chastity, and prostitutes were forbidden to touch her altars. She had a multitude of other surnames, which we cannot afford space to enumerate. Her great festival was called the *Matronalia*, and was celebrated on the 1st of March. Her month (June) was considered the most propitious for fruitful marriages; and even yet, after eighteen centuries of Christianity, this old Roman faith lingers superstitiously in the popular mind.

JUNOT, ANDOCHE, Duke of Abrantes, and Marshal of France, was born October 23, 1771, at Bussy-le-Grand, in Côte-d'Or, entered the army as a volunteer in 1792, and distinguished himself in the early wars of the Republic. In 1798, he followed Napoleon to Egypt, was there created general of brigade, and particularly distinguished himself at Nazareth, where, at the head of 300 cavalry, he put to flight 10,000 Turks, after a conflict of fourteen hours' duration. In 1807, he was appointed to the command of the army of Portugal. His army, after undergoing dreadful privations, reached Lisbon, and J., with the greatest expedition, made himself master of all the strong places in the kingdom, and reorganised his army. For his brilliant conduct at this time he was created Duke of Abrantes, and appointed governor of Portugal; but being defeated by Wellington at Vimieira, he concluded a convention at Cintra, returned to France, and subsequently served in Germany, Spain, Portugal, and Russia. In 1812, he was disgraced by Napoleon for a supposed want of energy, and sent to govern Illyria. This, along with other causes, produced mental derangement. He was taken to his father's house at Montbard, near Dijon, and two hours after his arrival, precipitated himself from a window (22d July 1813), and fractured his thigh-bone. Amputation was performed, but J. franticly tore off the bandages, and died some days afterwards.—His wife, LAURE PERRON, the celebrated Duchess of Abrantes, has gained a reputation in the literary world by her *Mémoires ou Souvenirs historiques sur Napoléon, la Révolution, le Directoire, le Consulat, l'Empire et la Restauration* (Paris, 1831—1835), and by several minor works.

JU'NTA, i. e., an association, the name given in Spain to a body of persons combined for any political or civil object. The term was formerly applied more exclusively to assemblies of representatives of the people meeting without authority of the sovereign, but has been extended to those of the most strictly legal character.

JUPATÍ PALM (*Raphia tædigera*), a palm which grows on rich alluvial tide-flooded lands near the mouth of the Amazon. The stem is seldom more than six or eight feet high; but the leaves are often 50 or 60 feet long, rise vertically from the summit of the stem, and bend out on every side in graceful curves, forming a magnificent plume. The leaves are perhaps the largest in the vegetable kingdom; they are pinnate, the leaflets about four feet long. The leaf-stalks, which are often twelve or fifteen feet long below the first leaflets, and four or five inches in diameter, perfectly straight and cylindrical, are almost like birds' quills in strength and lightness, when dried, of a soft substance, with a thin, hard, glossy outer covering. They are used for various purposes, as for laths, window-blinds, &c. The interior part is soft enough to be used instead of cork.

JU'PITER, or **JUPPITER**, in Roman Mythology, was the greatest of the gods. The name is a modification of *Diovis pater*, or *Diespiter* (*Diovis*, or *Dies* = *divum*, heaven), i. e., the Father of Heaven or the Heavenly Father. As such, J. had all power over the phenomena of the skies; hence his numerous epithets, such as *Pluvius* (the Rain-giver), *Tonans* (the Thunderer), *Fulminator* (the Lightning-hurler), and *Serenator* (the Weather-clearer). But he possessed still higher and diviner attributes. The future was spread out clearly before his all-seeing eye; the destinies of men were in his hands, and events were but the expression of his omnipotent will. But he was not careless of mankind. He revealed himself in a variety of ways to them, and taught men to interpret these mystic and symbolic revelations. Wonderful appearances in the sky, or unwonted circumstances happening on the earth, were the *media* of his communications; hence his surname of *Prodigialis* (the Sender of Prodigies). As the national god of the Roman people, he went with them into battle (like the Jehovah of the Hebrews), fought for them, procured them victory, and, generally speaking, was their protector at home and abroad. This conception of J. is shewn in such names as *Imperator* (the Ruler), *Victor* (the Conqueror), *Stator* (the Stayer or Stander-by). The strong sense of morality which marked the old Romans also found its expression in their view of the character of the best and greatest (*optimus maximus*) of their gods. J. was the guardian of law, justice, and virtue; oaths and all solemn engagements were made as to him ('in the sight of God,' as we say). He had temples erected to him at Rome under all his different names; but the principal one was that on the Capitol, whence he had the title of *Capitolinus*, and where, with beautiful significance, the statues of *Fides* (Faithfulness) and *Victoria* (Victory) were placed beside his own. When consuls or other magistrates entered on the duties of their office, or when the army was about to open a campaign, or a general returned victorious from war, sacrifices were solemnly offered to J., and his favour invoked. When the Romans began to know the religion and literature of Greece, they foolishly sought to identify their own noble, majestic, and gravely upright J. with the slippery, lustful, and immoral *Zeus* of the Greeks. Hence have originated much confusion and misconception. See ZEUS.

JUPITER. See PLANETS; SOLAR SYSTEM.

JUPITER SERA'PIS, TEMPLE OF. The ruins of this temple at Puzzuoli, near Naples, afford a remarkable instance of the changes which have taken and are taking place on the relative position of the land and water on the earth. Only three of the original forty-six pillars exist. They rise out of the water, the pavement of the temple being at present submerged; but they bear evidence that they have been at one time submerged to half their height, which is 42 feet. The base of the pillars as high as twelve feet is quite smooth; for the next nine feet they are penetrated by a boring shell, which is still active in the neighbouring rocks. The water must have covered this portion of the pillars, and while the molluscs were busy, the lower twelve feet must have been protected from their ravages by being buried in mud. The changes of level have been so gradual that the pillars have not been moved from their original position.

JUPON, or **JUST-AU-CORPS**, a surcoat. The name jupon is chiefly applied to the short tight form of that military garment in use in the 14th century.

JU'RA, a range of mountains, of a peculiar limestone formation, known as the Jura Limestone, extending from the angle formed by the Rhone and the Ain, in a north-easterly direction (with a gradually declining elevation), for more than 450 miles, to the upper part of the course of the Maine. The Rhine, breaking through it between Schaffhausen and Basel, divides it into two parts, the Swiss or French, and the German Jura. The loftiest peaks are Reculet de Toiry, Grand-Colombier, Credoz, Dôle (which commands a splendid view of Mont Blanc), and Mont d'Or, all of which are between 5000 and 6000 feet in height. The Swiss Jura consists of a number of parallel chains with long deep valleys between, and over it roads have been carried with great difficulty; but the German Jura is more broken up by cross valleys. In both parts of the range are numerous caves, which abound in magnificent stalactites, and in the bones of extinct animals; whilst in the Swiss Jura, there are several instances of rivers of considerable size sinking into the ground, and reappearing after some distance, as the Orbe, the Doubs, and the Creuse. The southern part of the range lies partly within the French department of Jura, to which it gives its name. Magnificent pine-forests are here a characteristic feature of the scenery.

JURA, a frontier department in the east of France, is bounded on the S. by the department of Ain, and on the E. by Switzerland. Area, 1943 square miles, of which upwards of one-third is under cultivation, and about one-fourth in wood. Pop. (1872) 287,634. Of its surface, two-thirds are covered by the Jura Mountains; the remainder is a low plain about seven miles wide, skirting the western border. Chief rivers—the Ain, the Doubs, and the Loue. The soil on the mountains is thin and stony, but yields abundant grass, upon which great numbers of horses and cattle are fed from June to October; on the plain, the soil is rich, and grain-crops are produced in great abundance and variety. The wines of Arbois, of Poligny, of Etoile, and of Salins, have some reputation; 9,000,000 gallons of wine are produced annually. The mineral wealth of the department is considerable; the working of iron is one of the chief branches of manufacturing industry. Cheese is extensively made, and there is a good trade in timber. The department is divided into the four arrondissements, Lons-le-Saulnier, Poligny, Sainte-Claude, and Dôle. Capital, Lons-le-Saulnier.

JURA, one of the Inner Hebrides, lying off the coast of the mainland of Argyle, and having the island of Islay on the south-west. It is 27 miles long, and about five miles in average breadth. A ridge of bleak and rugged mountains traverses the whole length of the island, and rises in the *Paps of Jura*, in the south, to an elevation of 2566 feet. The west coast is deeply indented by Loch Tarbert, which nearly divides the island in two. The western shores are savage and rugged; the eastern are pleasing in appearance, presenting green slopes and a belt of plain. At the northern extremity of J., and between it and Scarba, is the whirlpool of Corrievrekin (q. v.). About 600 acres are under cultivation. Oats, barley, potatoes, and flax are produced; and black cattle are reared for export. Pop. (1871) 761.

JURA'SSIC GROUP, the name given by continental geologists to the Oolitic series, because the chain of the Jura Mountains, on the north-west of Switzerland, is composed of these rocks. See OOLITE.

JURISDI'CTION, in Law, means the authority which a court or judge has to entertain a particular case and decide it. The general rule is, that if a court, which has no jurisdiction to decide a particular case, does decide it, the judgment is a mere nullity. Many nice questions often arise on the question of jurisdiction, which are too intricate to be here stated. When the objection is taken to the jurisdiction in England, it is generally called a plea to the jurisdiction. In Scotland, it is included among what are called preliminary pleas.

JURISPRU'DENCE is the science of law, which professes to discuss the principles on which legal rights should be protected and enforced; or it may be called the philosophy of law. This subject has been less cultivated in England than in continental countries, or even in Scotland; for, in England, the habits of the people and also of their lawyers are too practical to admit of spending time in discussing elementary principles which are more or less vague and speculative. In its literal sense, the term means merely knowledge of the law, and seems to have been so used in the Roman law, from which it has been borrowed. The word is often used in a popular sense in this country as synonymous with law, and it is also so used in France; but it is also and more correctly used in contradistinction to law, as implying the system or supposed methodical scheme embracing the principles on which positive law is founded. A distinction is sometimes made between general jurisprudence, which investigates the principles common to various systems of positive law, divesting these of their local, partial, and other accidental peculiarities; and particular jurisprudence, which confines itself to the particular laws of England, or France, or Scotland, as an independent system taken by itself. Jurisprudence thus embraces a wide range, as treating of all those duties which are enforced between man and man; and yet it may be safely said, that lawyers, though dealing with the results of the science every day of their lives, seldom give any attention to the latent and general principles on which these results are founded. The only writers who have devoted their attention to this speculative side of the law in this country are Bentham, whose various works abound with these discussions, and Mr Austin, whose *Province of Jurisprudence Determined* is an acute and masterly work on first principles, to whom may be added John Stuart Mill and Mr H. S. Maine.

JURY TRIAL (Fr. *juré*, sworn), is a mode of trial in the United Kingdom, by which a few citizens, selected for the purpose, are constituted the judges of the truth of the facts in suits between parties, and compelled to discharge this duty on the sanctity of their oath, but in subordination to a higher judge, who has distinct functions of control. Various theories have been adopted as to the origin and development of this characteristic feature of the administration of justice in the United Kingdom. Jury trial does not owe its existence to any positive statute, but has grown up insensibly, and has become inextricably interwoven with the people's habits. It was generally supposed, until recently, that our Anglo-Saxon ancestors had the credit of having nursed the germ of this vigorous plant of liberty; and a cartoon in the new Houses of Parliament has embodied this popular belief. Recent researches have, however, shewn that jury trial, as now known and practised, did not exist in those times, though it has been the natural development and sequence of other rudimentary forms of trial then prevailing. Indeed, the germ of jury trial is found in human nature itself, and in some phase or other, is detected in almost every form of civilisation, the essence of it being a reference of disputed facts to the impartial judgment of a few men of average understanding and of nearly the same station in life as the litigants. In ancient Rome, a criminal trial was conducted before a presiding judge and a body of *judices*, taken from a particular class, whose duty it was to determine the fact of the guilt or innocence of the accused; but they could exercise the prerogative of mercy, which does not belong to the modern jury. The result of the forms of trial usual with the Anglo-Saxons has been summed up by Mr Forsyth in his *History of Jury Trial*, and he states these conclusions. Courts were presided over by a reeve, who had no voice in the decision, and the number of persons who sat was usually twelve. The assertions of parties were admitted as conclusive, when supported by the oaths of a certain number of compurgators. The testimony of the neighbourhood was appealed to for the purpose of deciding matters of general concern. Sworn witnesses were appointed in each district, whose duty it was to attest all bargains and transactions, in order that they might be ready to give evidence in case of dispute. Every care was taken that all dealings between man and man should be as open and public as possible. It was by a gradual process of improvement that the precise functions of the jury were defined, and it would be beyond our limits to discuss the details of this progress. It will suffice to describe the institution of jury trial as it now exists, and has for centuries existed with little alteration.

In criminal cases in England and Ireland, there are two or three kinds of juries in requisition. In all cases of sudden death, homicide, or murder, the coroner of the district summons a jury of twelve men, who inquire into the circumstances of the death, and if it appear that such death was caused by the criminal misconduct of any person, the jury may find that such person was guilty of murder. This inquisition, or finding, is sufficient, without any other process, to put the alleged criminal on his trial by the petty jury; but one may proceed also against the prisoner in the ordinary manner. In most criminal cases, the grand jury is the medium of accusation. They perform the duty of public accusers; they do not try a prisoner, but the indictments are in the first instance submitted to their consideration, for the purpose of seeing whether there is enough of doubt and suspicion to make it necessary to put the accused on his trial. Accordingly, in every county and borough of England where sessions of the peace or assizes are held for criminal trials, a jury of not less than 12, nor more than 23 men, are summoned to see that there is some foundation for each indictment. The judge first charges them—that is, gives them general directions as to particular crimes, and they hear witnesses for the prosecution only and *ex parte*, finding a true bill, or ignoring the bill, according as they think there is or is not a case worthy of trial against the prisoner. See GRAND JURY. The chief duty, however, as to the trying of prisoners is discharged by the *petit* jury, which consists of twelve men, who are sworn to try the cause between the crown, as prosecutor, and the prisoner. Previous to this trial, the prisoner is not, as a matter of course, entitled, except in cases of treason, to a copy of the indictment, though in many cases he can indirectly obtain a copy, or at least is generally made acquainted with the particulars of the charge against him. Nor is the prisoner entitled, except in cases of treason, to have a list of the witnesses who are to be brought against him. The first thing is to arraign the prisoner at the bar, and ask him if he pleads guilty or not guilty. If he do not plead guilty, he is then put on his trial. He is not entitled to demand from the court to have a counsel to defend him, though practically there is little difficulty in procuring one. The jury are then sworn. The number of jurors is twelve, but a much larger number is summoned, and the prisoner is entitled to challenge those of the jury who, he has good cause to believe, will be hostile to him. He can challenge a certain number of these without giving any reason; but when he exceeds such number, he must state some valid reason. The prisoner is not, however, entitled beforehand, except in cases of treason, to have a list of jurors supplied to him. At the trial, the prosecuting counsel begins and makes a speech to the jury, commenting on the case. He then calls his witnesses, and it may be observed that it is a public duty for witnesses to attend, and they can be compelled, subject to fine and imprisonment, to attend and be examined. Each witness is first examined by the prosecuting counsel, then cross-examined by the prisoner or his counsel, and then re-examined by the prosecuting counsel. A witness testifies on his oath, and if he speaks falsely, may be prosecuted for perjury. After the prosecutor's case is closed, the prisoner or his counsel addresses the jury, and if he has any witnesses, calls them, and they are examined, cross-examined, and re-examined in like manner. If the prisoner calls witnesses, the prosecuting counsel has the right of making a speech in reply; and even where the prisoner calls no witnesses, the prosecutor can frequently insist on replying, and thus having the last word. The judge then sums up the evidence by going over it in detail, explaining any points of law that may arise; but he carefully informs the jury that it is for them exclusively to say whether, upon the evidence as laid before them, they think the prisoner was guilty or not guilty. The jury must be unanimous in their finding. If they have a difficulty in agreeing, they are locked up a reasonable time, which means generally about six hours—though no definite limit is fixed—without food, till they agree. If, after this reasonable time has elapsed, they are unable to agree, they are discharged without a verdict. The consequence is that a new jury are summoned, when the same process is repeated. If they find the prisoner guilty, it is for the judge exclusively to pronounce the appropriate sentence, and some discretion is allowed to the judge on that point. But neither the judge nor the jury can pardon the prisoner; it is for the crown alone to do so, and practically the propriety of doing so is left to the Home Secretary, whose duty it is, if any application reasonably supported by evidence is made to the crown, to inquire into it, which he does by examining the matter and consulting the judge. The settled rule is, that no new trial can be had in criminal cases, even though some error may have been made by the judge or jury. The only mode of obtaining redress is by petitioning the crown to pardon the prisoner, or commute the sentence, as the case may be; and the Home Secretary advises the crown as above.

In civil cases, the established practice in England and Ireland is for most questions of disputed fact which are material to the case to be referred to the decision of a jury. It is the only regular mode of solving the dispute which the law provides. The necessity of a jury trial is arrived at after the parties have, by their mutual pleadings, come to an issue—i.e., one party distinctly asserts some fact which the other as distinctly denies, the fact being material to the cause. A jury is then summoned, and the rule is, that all causes of action are tried in the county in which the dispute arose. The jury consists of twelve persons. Juries are either common juries or special juries: the former act compulsorily, but are not paid for their loss of time; the latter also act compulsorily, but they are selected on the ground of their supposed superior intelligence, and they are paid a small sum for their services. In most cases, the plaintiff's counsel begins, and makes a speech to the jury; then calls his witnesses, who are examined, cross-examined, and re-examined on oath; after which, if the defendant's counsel do not intend to call witnesses, the plaintiff's counsel sums up his case, and makes a second speech; but if the defendant's counsel calls witnesses, then he first makes a speech to the jury, next calls his witnesses, and lastly sums up his case in a second speech to the jury, after which the plaintiff's counsel replies; so that it depends on whether the defendant's counsel calls witnesses, whether or not he has the last word with the jury. The judge then sums up the evidence, and the jury must be unanimous in their verdict. If they do not agree after being shut up a reasonable time, they are discharged, as in criminal cases, and a new jury may be summoned. If there was any mistake of the judge, or any mistake and misconduct of the jury, the losing party may, in many cases, obtain leave to have a new trial, which is conducted in the same way before other jurors.

In both criminal and civil cases, the functions of the judge and the jury are distinct. The judge has no right to decide the fact, nor the jury to decide the law; but in some cases, the jury cannot be prevented from practically deciding both. Thus, in the case of libel, it was at one time attempted by judges to confine juries to the decision of an unimportant fact; and the practice of Lord Mansfield in so restricting the functions of juries was attacked by Junius and others, till finally Mr Fox's Act was passed, which restored the powers of juries in those cases, and made them practically judges of the law also. In other cases, however, the separation of the functions of judge and jury requires very nice discrimination, and none but experienced lawyers and judges can readily recognise these technicalities. In practice, there can be no doubt that juries can with difficulty be controlled in their decisions on all questions affecting personal and political wrongs; and it is especially to their control over the issues of the latter class of cases, often most judiciously exercised, that the great authority and permanent influence of juries are to be traced. One great advantage of jury trial, over and above the essential fairness of the principle on which it is founded, is the experience and knowledge, as well as the love of fair-play, which are thereby acquired by the people who take part in it. On the other hand, it is often complained that in a great majority of cases, whether caused by qualifications of jurors being too low, and the essential obtuseness of uneducated minds, or the capricious and wayward humours which sway them, the result is little else than a lottery, and even indirect bribery is frequently suspected to operate in some of the cases, especially those which unscrupulous attorneys conduct. Probably the chief reason why jury trial has so long stood, and still stands, so high in public favour is, that notwithstanding all its glaring and familiar defects, no other machinery has ever been devised which is not open to similar or greater strictures.

In criminal trials in Scotland, prisoners have the advantage of being by law entitled, before the day of trial, to have a copy of the indictment, also a list of the witnesses to be brought forward against them, and likewise a list of the jurors, of whom forty-five are summoned. As regards the order of procedure at a criminal trial, a different practice prevails: the evidence is first given on both sides, and then the prosecutor's counsel addresses the jury, after whom the prisoner's counsel addresses the jury; so that in all cases the prisoner has the last word, and he always knows the whole of the prosecutor's case before he requires to open his own. The judge then sums up the case, as in England. From the forty-five jurors, fifteen are drawn by lot; these constitute the jury, and the verdict of a majority suffices. There is also a verdict of 'Not proven' allowed to be given, and which is often preferred by the jury in cases where there is little moral doubt, though the legal evidence is insufficient. In England, such a verdict is equivalent to, and treated as, a verdict of 'Not guilty;' and it is so far final in Scotland, that the prisoner cannot a second time be put on his trial. The expediency of such a verdict has been objected to, as fixing a stigma on the accused person; but the answer has been made, that it is most in conformity with the true result of the inquiry. In Scotland, new trials are not allowed in criminal cases; and in case of pardons, the Home Secretary acts in the same way as he does in England.

As regards trial by jury in civil cases in Scotland, the practice was introduced by a statute in 1815, which imported most of the forms then existing in the English practice. As in England, the jury in civil cases consists of twelve persons. Unanimity is not now essential. By a recent statute, 22 and 23 Vict. c. 7, if, after being kept three hours in deliberation, nine or more of the jury agree on a verdict, such verdict is to be taken as that of the jury; and if, after being enclosed nine hours, the jury, or nine of them, cannot agree, the judge is entitled to discharge them, and generally does so. Moreover, the judge may allow the jury refreshment after they are locked up to deliberate. These latter modifications on the rigid rule have not been yet adopted in England.

A jury *de medietate linguæ* is a jury half composed of foreigners, and it is a privilege which may be demanded by foreigners, when indicted in England for felony or misdemeanour, if so many foreigners are found in the place.

JURYMAST, a temporary spar used to replace a mast which has been lost from any cause, and so to enable the vessel to reach some port for more permanent repair.

JUS DELIBERA'NDI. See ANNUS DELIBERANDI.

JUS DEVOLU'TUM, a phrase used in Scotch ecclesiastical law, to denote the right which devolves on the presbytery to present or appoint a minister to a vacant benefice, if the patron do not within six months present a properly qualified person.

JUS GE'NTIUM, a phrase now translated to mean a branch of International Law (q. v.).

JUS MARI'TI, a phrase used in Roman law, and adopted in the Scotch law to denote the legal right accruing to a husband *qua* husband over his wife's property. See HUSBAND AND WIFE.

JUS RELI'CTÆ, in Scotch Law, is the right of a widow to a share in the movable or personal property of her deceased husband. This is a vested or absolute right, and cannot be defeated by the husband's will; and hence the movable estate of the married parties is often called in Scotch law the goods in communion, because, on the death of the husband, there is a division of such goods between the widow, the children, and next of kin of the deceased. If the husband has left children, then the goods in communion are divided into three equal parts, one of which belongs to the widow. If, on the other hand, there are no surviving children or grandchildren, then the goods are divided into two equal shares, one of which belongs to the widow. When the husband dies insolvent, the wife cannot claim her *jus relictæ* in preference to the creditors. Though the widow has this right to her *jus relictæ* at common law, yet, if she entered into an antenuptial contract of marriage, by which she accepted an equivalent provision, her right may be defeated, provided the contract expressly stated the one to be in substitution for the other. In

England, there is no such absolute right of a widow to a share of a husband's goods, unless he died intestate, in which case, but in which only, she gets a similar share of the personal estate by virtue of the statute of distributions. See Goods in Communion, Husband and Wife, Succession.

JUS REPRESENTATIO'NIS, a phrase adopted by the Scotch from the Roman law, to denote that in heritable succession, and also to a limited extent in movable succession, when one or more of the children of a deceased person have predeceased, the children of such predeceasing children represent their parent, and take his or her share. Thus, if A die, and one of his children, B, had predeceased A, leaving children C, D, E, F, then C, D, E, F collectively take the share of A's property which would have come to B if B had survived A.

JUSHPO'RE, a protected state on the south-west side of Bengal Proper, is entirely surrounded by British territory. It contains 617 square miles and 66,926 inhabitants. Its chief place is a town of the same name. The country, a table-land, is much overrun with jungle, the cleared ground producing grain, chiefly rice, and oil, and the uncleared portions abounding in wild silk.

JUSSIEU, De, the name of a family which, for more than a century and a half, has numbered among its members some of the first botanists of the age.—Antoine de J., who was born at Lyon in 1686, and died at Paris in 1758, was Professor at the Jardin du Roi, and the author of various works on botany; amongst others, an *Appendix to Tournefort* (Lyon, 1719). He made several voyages and journeys to foreign countries for the purpose of collecting plants, on which occasions he was accompanied by his younger brother Bernard, who co-operated with him in all his investigations, and acted as his assistant.—Bernard de J., who was born at Lyon in 1699, and died in Paris in 1777, contented himself through life in assisting his brother and nephew, without seeking renown by the publication of his own important observations. Having been named superintendent of the gardens at the Petit-Trianon in 1759, he arranged the plants in accordance with a natural system substantially the same as that which his nephew and pupil, Laurent de J., subsequently elaborated in a more perfect manner. As Bernard refused to make publicly known the principles on which his mode of arrangement was based, the glory of his labours devolved upon Laurent, who alone possessed the key to this botanical enigma. —Laurent de J., who was born at Lyon in 1748, and died at Paris in 1836, was worthy the rich heritage left to him by his learned and disinterested relatives. At the age of 17, he began his botanical studies under his uncle Bernard, and, four years later, was nominated demonstrator and assistant to Lemonnier, the Professor of Botany in the Jardin du Roi. He at once began to reform the arrangement of the gardens and collections of plants under his charge, and to apply to them his own and his uncle's ideas in regard to the natural method. For thirty years he continued to develop his novel views; and when his *Genera Plantarum*, which he began in 1778, was finally completed in 1789, the natural system was finally established as the true basis of botany (see Botany). In 1793, J. became Professor of Botany in the newly organised Jardin des Plantes, where he continued to teach till 1826, when blindness compelled him to resign his chair to his son Adrien. During his tenure of office, he founded the library of the Museum, which is one of the best in Europe. His papers in the *Annales du Museum* (from 1804—1820), and his articles in the *Dictionnaire des Sciences Naturelles*, rank among the most valuable contributions to the literature of botany, and embody all the results of his own investigations.—Adrien de J., his son, was born at Paris, December 23, 1797, and died in the same city, June 29, 1853. From his earliest years, he had shewn himself a worthy representative of the reputation of his family. As a youth, he carried off the first prize in the *Concours*, or annual competition among all the collegiate schools of Paris; and on taking the degree of M.D. in 1824, he presented as his thesis a memoir on the family of the *Euphorbiaceæ*, which attracted the attention of all botanists. His subsequent papers on the *Rutaceæ*, *Meliaceæ*, and *Malpighiaceæ*, fully realised the expectations that had been entertained of him. His memoir on the embryo of the *Monocotyledons* is a work of great merit, and was to have been followed by a series of papers on similar subjects, when ill health compelled him to relinquish this project. He was also prevented, by the same cause, from extending his *Cours Elémentaire de Botanique* (1848) into a complete and general treatise. In 1831, he was elected a member of the Academy, and, shortly before his death, he was nominated to the presidency of that body. J. contributed many valuable papers to the *Annales du Museum*, the *Comptes Rendus*, and the *Dictionnaire Universel d'Histoire Naturelle;* but the services which he rendered to science were not due only to his writings, for his influence as a lecturer was of even higher importance, and has been manifested by the number of able botanists of all nations who have owed their training to him.

JUSTE MILIEU, a French term, signifying the *just mean*, or, according to the common expression, the *golden mean*. After the revolution of 1830, this term acquired a political signification, and came into very frequent use, because of the declaration of the organs of Louis Philippe, that the *juste milieu* was the only principle of government which could secure the welfare of France.

JUSTICE, one of the cardinal virtues of the ancients, and the name for a principal department of social and moral duty in all ages. Practically, justice is considered to be clear and definite; but theoretically, there have been great disputes as to its ultimate analysis and the source of its binding quality. It has been maintained very generally, that both the perception of what is just and unjust, and the powerful sentiment in favour of the one, and in opposition to the other, are instincts of our nature, or make a part of that comprehensive instinct termed Conscience, or the Moral Sense. On the other hand, it has been held that utility, in other words, the general interests of mankind at large, is what determines justice, and that the sentiment enforcing it grows out of a regard to those interests.

The supposed instinctive origin of the sense of justice is encumbered with all the objections that attend the hypothesis of innate notions generally, so powerfully set forth by Locke in his *Essay on the Understanding* (see Ethics). But neither is the other view free from serious difficulties, of which the greatest is the universally felt contrast between the Just and the Expedient, or the simply useful. We are frequently called upon to sacrifice expediency to justice, which would seem to imply an obligation higher than the interests of mankind. *Fiat justitia, ruat cælum*—'Let justice be done, although the universe should collapse.' Whence arises this paramount obligation?

If we inquire into the nature of justice by examining the particulars coming under it, we find such instances as the following: It is unjust to deprive a man of his personal liberty, his property, or any other thing belonging to him by law; justice, therefore, requires us to respect each one's *equal rights*. Sometimes, however, we call the law itself unjust, in which case we sympathise even with disobedience to it. It is then supposed that there is some higher law that should have preference—as, for example, the moral law. Thus, it is conceived by most men at the present day to be unjust to hold our fellow-creatures in slavery. Again, it is considered unjust to *break faith* with any one; in other words, promises and engagements must be fulfilled in order to do justice. It is unjust to shew partiality in cases where all are equally entitled to favours. *Impartiality* in public tribunals is of the very essence of justice. Nearly the same idea is expressed by the notion of *equality*. In all these cases, there are some definite individuals—one or more—that are considered to be possessed of a *right*, and to be wronged if that right is not fulfilled. Herein lies the difference between justice and Benevolence or generosity, this last being the mere overflowing of our disinterested fellow-feeling, which no one can claim as a right, and for whose neglect we are not punished.

These particulars, which are among the most marked instances of the property in question, do not suggest any qualities present in all just actions, and absent in the opposite, excepting the existence of a so-called right on the part of somebody, and also the sentiment which demands the punishment of those that violate those rights. We are no nearer the solution of the original question, which is, Why should these rights be either determined or enforced on any other ground than expediency, or the well-being of mankind? It is admitted on all hands that the just and the expedient concur in the long-run, but yet people demur to making expediency the test of justice. Probably, there is something peculiar in the application of the term 'expediency,' which is the cause of the apparent paradox whereby the two qualities are made the same, and yet not the same.

This is really the case. Of the social regulations that affect the wellbeing of mankind, there are two widely different classes. In the first place, there are the interests of Security, or those requisites without which human society could not be maintained. Respect for liberty, life, and property, and the performance of engagements, are essential to the very existence of human beings in society: if these cannot be enforced, if offenders in these points were to escape with impunity, disorganisation and ruin would be the inevitable consequences. The strength of the sentiment that injustice calls forth is therefore not a matter of surprise; *existence* is at stake, and whatever be the force of our impulse of self-preservation, and our desire of the preservation of our fellow-beings, the same will be the measure of our repugnance to the acts that endanger both the one and the other. Compare these interests with another class of things, also for the good of society, as, for example, the promotion of trade, manufactures, or science, all which are very advantageous to mankind, but not absolutely essential to our existence. They at most express the difference between two grades of happiness, not the difference between existence and annihilation. The contrast between the just and the expedient may now be apparent; both relate to the welfare of mankind; but the one is concerned with *being*, the other with *well-being*, to use a favourite distinction of Oliver Cromwell's. The one is so immeasurably superior in point of urgency to the other, as to account for the very different degrees of our attachment to the two interests. The superior claims of justice to generosity flow from the same considerations; in fact, the argument is an identical one. We can live without generosity, or with some very small share of it; a thoroughly selfish community, if not also very short-sighted as well, might exist; but a community where justice was nowhere observed, could not exist. Still, the grounds of justice are and can be no other than general utility. 'If,' says Mr John Stuart Mill, 'that expression does not seem to convey a sufficient feeling of the strength of the obligation, nor to account for the peculiar energy of the sentiment, it is because of the extraordinarily important and impressive kind of utility which is concerned. The interest involved is that of security, to every one's feelings, the most vital of all interests. All other earthly benefits are needed by one person, not needed by another; and many of them can, if necessary, be cheerfully foregone, or replaced by something else; but security no human being can possibly do without; on it we depend for all our immunity from evil, and for the whole value of all, every good beyond the passing moment, since nothing but the gratification of the instant could be of any worth to us, if we could be deprived of everything the next instant by whoever was momentarily stronger than ourselves. Now, this most indispensable of all necessaries, after physical nutriment, cannot be had unless the machinery for providing it is kept unintermittedly in active play. Our notion, therefore, of the claim we have on our fellow-creatures to join in making safe for us the very groundwork of our existence, gathers feelings around it so much more intense than those concerned in any of the more common cases of utility, that the difference in degree becomes a real difference in kind. The claim assumes that character of absoluteness, that apparent infinity, and incommensurability with all other considerations, which constitute the distinction between right and wrong, and that of ordinary expediency and inexpediency. The feelings concerned are so powerful, and we count so positively on finding a responsive feeling in others (all being alike interested), that *ought* and *should* grow into *must*, and recognised indispensability becomes a moral necessity, analogous to physical, and often not inferior to it in binding force.'—*On Utilitarianism.*

If there were such a thing as intuitive, eternal, and immutable justice, independent of all the concerns of this world, and paramount over the highest interests of mankind, it ought to be something clear and unambiguous, the same in all ages and nations, being revealed to the human mind without any reference to men's outward circumstances. But, not to repeat the arguments that refute this notion as respects morality in general (see Ethics), it may easily be seen that as to justice in particular there is a very great disagreement among mankind in everything except the first essentials of social security—namely, the respect for legal rights, the keeping faith, and the like. These things men in all ages have recognised as a part of justice; but in the things less essential to the common safety of mankind, where notions of just and unjust are still admitted and pleaded, there is anything but unanimity of opinion; nay, what is considered just in one country and time, is considered unjust in other countries or other times. Primogeniture is one example; slavery is another.

JUSTICE, College of. See College of Justice.

JUSTICE, Lord Chief, the title given in England to the chief judge of the Courts of Queen's Bench and Common Pleas. The chief of the former court is called the Lord Chief-justice of England, while the other is merely the Lord Chief-justice of the Court of Common Pleas.

JUSTICE OF THE PEACE, in England, is a person appointed by commission of the crown, or by act of parliament or charter, to exercise certain judicial authority in a county or borough. The person who practically appoints to the office is the lord chancellor, who in his discretion may include in the commission certain persons who must have an estate of £100 a year, clear of all rents and charges; or if he has no estate in possession, but is entitled to the reversion thereof, if it be of the rent of £300 a year. All persons having the above qualification may be appointed justices of the peace; but practising attorneys or solicitors are not eligible for counties in which they practice. The office of justice of the peace is entirely gratuitous, for they receive neither salary nor fees, and hence the justices are often called the 'great unpaid.' But in modern practice it has been found necessary to deviate from this rule, and to appoint in all the cities and many large towns certain paid justices called stipendiary magistrates at a fixed salary, who discharge the duties of justices, which are necessarily onerous and important. In the city of London and certain other places, the mayor and certain corporators are constituted by charter justices of the peace by virtue of their office.

The institution of justices of the peace is very ancient. Previous to 1327, there were conservators of the peace in every county chosen by the freeholders out of the principal men of the county to perform similar duties, but by a statute of Edward III., a change took place in the practice, and ever since, the election of justices has been taken from the people, and exercised by the crown. At first, however, they were still called merely conservators or keepers of the peace, and were not dignified with their present title. Gradually, the office grew more and more important, in consequence of many statutes adding to their duties and jurisdiction, until, in the thirtieth year of the reign of Elizabeth, the form of commission was revised, and was settled nearly in the form which is now used. The commission is in the name of the sovereign, addressed to certain persons by name, and directing them 'to keep our peace in our county of ——, and to keep all ordinances and statutes for the good of the peace, and for the good rule and government of the people, and to chastise and punish all persons that offend against the said ordinances.' The commission then assigns them to inquire 'by the oath of good and lawful men of all manner of felonies, poisonings, enchantments, sorceries, arts, magic, trespasses, forestallings, regratings, engrossings, and extortions whatsoever, and of all crimes and offences, &c.' Formerly, it was usual to select the most eminent to be of the *quorum*, a name derived from the first word of the clause *quorum aliquem vestrum* A, B, C, D, &c. *unum esse volumus*, and one of these must always be present; but now nearly all are included in the quorum clause; and it is no longer an objection to a warrant that one of the convicting justices is not of the quorum. When new justices are appointed, the commission is sent by the clerk of the peace to the crown-office, where the names are inserted. On appointment, the justice must take an oath that he possesses the necessary estate as a qualification; and if he act without taking such oath, he incurs a penalty of £100. Each justice, on appointment, also takes the oath of allegiance, and the usual judicial oath. The appointment of a justice of the peace has always stood high in popular estimation, and is eagerly sought after by men of station, especially in the country. As the appointment is practically in the hands of the lord chancellor, it is a frequent charge brought by one political party against another that the appointments are given as rewards for political service; but owing to the frequent alternation of power among parties, the undue preponderance of one set of politicians is speedily neutralised by the acts of their successors.

The functions of justices of the peace are exceedingly multifarious in the present day, for there are few departments of the law in which the aid of justices is not required for purposes either of administration or of judicial decision. For the last century especially, there has been a continual addition to their duties created by successive acts of parliament, and this is caused by certain remedies which either did not exist before being created, or by their being transferred from other courts and jurisdictions to the summary powers of justices. Of late, about twenty statutes every year involve material alterations, chiefly by way of addition to this branch of jurisdiction. To enumerate all the heads of law which in part have been confided to the disposal of justices, would require too much space; but it may suffice briefly to indicate the general character of their duties. These are either administrative or judicial. Thus, in carrying out the provisions of the poor-law, if the parish officers require to remove a pauper from one parish to another, instead of intrusting this power to these officers, they are required to go before justices of the peace, so as to shew the circumstances under which the removal takes place, and to satisfy the justices that the statutes on the subject have been complied with. But the great and distinguishing functions of justices are concerned in the judicial decision of what are called offences punishable by means of summary convictions or orders. The theory on which all this jurisdiction is founded is, that while the graver crimes must be left to the ordinary remedy of an indictment, and the slighter wrongs to that of an action at law, there are many intermediate offences which are not worthy of the solemnity of an indictment, nor yet fit to be left to the slow, expensive, and often elusory result of a civil action. Hence this intermediate class of cases arises, which justices can punish by fine and imprisonment swiftly and decisively. Thus, if certain classes of servants employed in agriculture or mechanical arts suddenly break their engagement, they may be fined or imprisoned by justices, for if there were no speedy remedy like this, the mischief often caused to the master might go unredressed. In like manner, justices punish poaching offences, whether against fish or game, personal assaults, vagrancy offences, &c.

Another important class of duties consists in the preparatory proceedings of all criminal trials, as issuing the warrants to arrest, and examining witnesses so as to see if there is a *primâ facie* ground of suspicion sufficient to warrant the committal of such persons to be tried before juries. There are also various offences of the class of misdemeanours which justices are entitled to try with the aid of a jury at quarter-sessions, but none of the more serious offences are intrusted to their jurisdiction. The courts composed of justices are general or quarter sessions where indictable offences may be tried by juries; and petty sessions and special sessions, where a great variety of judicial and administrative business is performed. All these duties are not only performed gratuitously, but the justices are liable for mistakes often of a very innocent description, and have to pay damages for the injuries thereby caused to third parties. They are protected to some extent, so far as they have acted judicially, but if anything like malice can be proved against them, they seldom escape being sued and amerced in heavy damages.

As regards Scotland, the first act establishing justices was that of 1587, c. 82. The office was further regulated by acts in 1609, 1617, 1633; by instructions during the Protectorate in 1655, embodied in the act 1661, which is the principal statute regulating the duties of justices. Two justices are held to form a quorum. The jurisdiction of justices is confined in practice to the penal statutes in reference to revenue, highways, fishings, game, and public-houses, and in many of these the sheriffs have cumulative jurisdiction. Their ordinary criminal jurisdiction is confined to breaches of the peace, petty thefts, and trifling assaults. They appoint a procurator-fiscal or public prosecutor for their own court. The civil jurisdiction is chiefly confined to the small-debt court. In many counties, the sheriffs' small-debt court is the only tribunal resorted to. No particular qualification as regards rank or property is essential. The appointment is less popular, and the range of authority and jurisdiction, as just shewn, is much inferior to what it is in England. This is chiefly due to a different arrangement of judicial business, and to the antiquity of the practice of local sheriff courts in Scotland, which are presided over by trained lawyers, who are paid by a fixed salary. These officers absorb much of the multifarious jurisdiction exercised by justices of the peace in England.

JUSTICE-CLERK, LORD, a high judicial officer in Scotland, being the second highest judge in point of rank, and in the absence of the Lord Justice-general, the presiding judge of the Court of Justiciary. His usual duty is to sit as chief of one of the divisions of the Inner House called the Second Division of the Court of Session (q. v.). The office in its origin was, as its name imports, of a more humble character.

JUSTICE-GENERAL, LORD, the highest judge in Scotland, also called the Lord President of the Court of Session. Formerly, the office of Justice-general was a sinecure, and not a judicial office, but the title is now, since 1831, associated with that of the Lord President.

JUSTICES, LORDS. From the times of the Norman and Plantagenet kings, it has been the occasional practice in England for the sovereign to appoint one or more persons called Lords Justices, to act as his substitutes in the supreme government during his absence from the kingdom. Subsequent to the Revolution, these appointments have been made by letters-patent under the great seal, and the authority of parliament has sometimes been required in confirmation of their powers. On five occasions, such appointment was made by William III. when going abroad, though while his queen was alive, he delegated his authority to her during his absence. The statute 12 and 13 Will. III., settling the succession on the House of Hanover, provided 'That no person who shall hereafter come to the crown shall go out of the dominions of England, Scotland, or Ireland, without consent of parliament;' but this clause was repealed by 1 Geo. I. c. 2, and the first sovereign of the House of Hanover, during five of his absences in Germany, made an appointment of lords justices. George IV., on his visit to Hanover, delegated his authority to 19 guardians, of whom the Duke of York, heir-presumptive, was one. On none of the absences of her present Majesty from her kingdom has there been any delegation of the royal authority; and on one of these occasions, Lord Chancellor Lyndhurst stated in the House of Lords that the law officers regarded it unnecessary in point of law to appoint lords justices, in which opinion he concurred. In case of the sovereign's minority, a regency has generally been resorted to. The powers of lords justices have been usually limited in the matter of pardoning and reprieving criminals, summons or prorogation of parliament, the disposal of public moneys in the treasury, and of church preferment in the gift of the crown. The lords justices appointed under the commissions of 1719 and 1729 could continue the existing parliament by short prorogations, till otherwise directed under the royal sign-manual—the other acts here specified could not be exercised without the special signification of the royal pleasure, except when necessary for the public service. The power to create peers has only once been delegated, by Charles I. in 1644; and Lord Herbert, afterwards Earl of Glamorgan, in whose favour the right was exercised, was, after the Restoration, compelled to resign by the House of Lords.

Lords justices have sometimes been appointed to carry on the government of Ireland in place of a viceroy; in modern times, this has only been done during occasional absences of the lord-lieutenant, or in the interval between the demise of one lord-lieutenant and the appointment of his successor. These lords justices have usually been the Lord Primate, the Lord Chancellor, and the Commander of the Forces.

JUSTICES' CLERK, an officer, generally a solicitor, appointed by justices of the peace in England to assist them in their duties. Owing to the justices themselves not being trained lawyers, and yet being called upon to administer many branches of the law, and construe acts of parliament, all of which require much skill, the justices' clerk is a person of much local influence, and in practical effect guides and controls the justices under the form of advice. He is, properly speaking, not a public officer, but in the nature of a servant of the justices. By various statutes, he is entitled to receive fees in connection with the business transacted by the justices.

JUSTI'CIARY COURT, the highest criminal court in Scotland. Its judges are five of the judges of the Court of Session—viz., the Lords President, Justice-clerk, and three others appointed by patent. The quorum of the high court consists of three judges. It sits usually in Edinburgh, but also holds circuit-courts twice a year in some of the largest towns, and thrice in Glasgow, the kingdom being divided for that purpose into three divisions or circuits. The jurisdiction embraces all crimes whatever; and it is an appellate court as regards inferior criminal tribunals. Its decisions are final, there being no appeal to the House of Lords.

JU'STIFIABLE HOMICIDE is the killing of a human creature without incurring legal guilt, as where a man is duly sentenced to be hanged; where one, in self-defence, necessarily kills another to preserve his own life, &c.

JUSTIFICA'TION, one of the most common terms of technical theology. In Protestant theology, it expresses an act of divine favour whereby a sinner is absolved from the penalty of his sins, and accepted as righteous, not on account of anything in himself, but on account of the righteousness of Christ imputed to him. According to this view it is a purely forensic act—the act of a judge sitting in the forum, or place of judgment, and acquitting the condemned by an exercise of clemency, in consideration of the merits of another, who has paid the penalty which was justly his due. In this forensic sense of the word the apostle is understood by Protestants to speak (Rom. iii. 26) of God as 'the justifier of him which believeth in Jesus.'

In the doctrinal system of the Roman Catholic Church, justification is considered not purely as a forensic act, or act of acquittal, but, further, as an infusion of personal righteousness, and as hence equivalent to what Protestants specially call *sanctification*. The distinction between the two things is in Protestant doctrine a cardinal distinction—the one being viewed as an *act*, the other as a *work;* the one proceeding from the divine clemency or grace once for all, the other, from the progressive agency of the divine Spirit. A corresponding distinction is likewise found in the Catholic system between the *act of justification* and the *state* or *condition of habitual justice*.

This doctrine of justification is laid down most plainly in the Epistles of St Paul, and it has appeared to some as if there were a discrepancy in this respect between these writings and the Epistle of St James. Whereas the one says: 'For if Abraham were justified by works, he hath whereof to glory; but not before God. For what saith the Scripture? Abraham believed God, and it was counted unto him for righteousness.' The other says: 'Was not Abraham our father justified by works? Ye see then that by works a man is justified, and not by faith only.' Perhaps the most effectual way of reconciling these statements is to suppose that the Apostle Paul is describing the inward reality of justification, which has no dependence upon works, but only upon faith, while St James is speaking of its outward manifestation—of its reality as evinced in the Christian character and conduct, which necessarily expresses itself in good works, without which, in *this* sense, there can be no justification. Justification, in short, is independent of works in its origin and primary condition. Its origin is the grace of God—its only primary condition, acceptance of this grace, or *faith*. But it is dependent upon works as its essential manifestation. Faith is not passive, but *active;* and a faith which is not active, which is not a spring of earnest Christian activity, is not a true faith. Such a faith cannot justify a man.

JU'STIN, a Roman historian who flourished, in all probability, in the 3d or 4th c., although some assign him an earlier date. His History—which is of great value, from its being our only authority on many important points—is merely a selection of passages from the *Universal History* of Trogus Pompeius, a work now lost.

JUSTINIA'NUS (JUSTINIAN) I., FLAVIUS ANICIUS, nephew, by the mother's side, of the Emperor Justin, was born 483 A.D., in the village of Tauresium, which afterwards grew into the splendid city of Justiniana, and on the site of which the modern Kustendje stands. Although of obscure parentage, he shared the success of his maternal uncle, Justin, being invited at an early age to Constantinople, where he received a careful education, and if the reports of his courtly biographers can be accepted, attained to considerable eminence in philosophy, theology, and law, as well as in the more elegant pursuits of poetry, music, and architecture. When his uncle was elevated to the purple in 518, he appointed J. commander-in-chief of the army of Asia. The tastes of J., however, inclining him rather to civic pursuits, he declined this appointment, and remained attached to the court of Constantinople. In 521, he was named consul, and during the remaining years of the reign of his uncle, he continued to exercise great influence. In 527, the Emperor Justin, by the advice of the senate, proclaimed him his partner in the empire. Justin survived the step but a few months, and J. was crowned as sole emperor, along with his wife, the famous Theodora, whom, despite of her more than dubious antecedents as an actress, he had raised to the position of his wife. J., on his accession, was in his 45th year. His reign, which extends over 38 years, is the most brilliant in the history of the late empire. Although himself without the taste or the capacity for military command, he had the fortune or the skill to select the ablest generals of the last days of Roman military ascendency. Under the direction of his generals, and especially of the celebrated Narses (q. v.) and Belisarius (q. v.), his reign may be said to have restored the Roman Empire, at least in outward appearance, to its ancient limits, and to have reunited the East and West under a single rule. In his first war—that with Persia—he concluded a treaty by which the crisis that had so long threatened was at least warded off; but the rejoicings which celebrated its termination had almost proved fatal, by a domestic revolution, to the authority of J. himself. A conflict of the so-called Blue and Green factions in the circus in 532 was but an outburst of political discontent, which went so far as to elect a rival emperor, Hypatius. J. himself was struck with dismay, and had made preparations for flight; but the vigour and determination of Theodora arrested the revolt. Narses, with a relentless hand, repressed the tumults, 30,000 victims having, it is said, fallen in a single day. By the arms of Belisarius, the Vandal kingdom of Africa was re-annexed to the empire; and the same general, conjointly with Narses, restored the imperial authority as well in Rome as in Northern Italy and a large portion of Spain. One of the most extraordinary, though in the end ineffective, works of the reign of J. was the vast line of fortifications which he constructed, or renewed and strengthened, along the eastern and south-eastern frontier of his empire. These works of defence, and the construction of many public buildings both in his capital and in other cities of the empire, involved an enormous expenditure, and the fiscal administration of J., in consequence, pressed heavily on the public resources; but it is admitted to have been ably and uprightly conducted. It is, however, as a legislator that J. has gained renown. Immediately on his accession, he set himself to collect all previous legislative enactments which were still in force; and in order to do this thoroughly, he first compiled a *code*, which comprised all the constitutions of his predecessors (527—529). See CODE. The authoritative commentaries of the jurists were next harmonised, and published under the title *Digesta Pandecta* (529—533). See PANDECTS. The code was republished in 534, with the addition of J.'s own constitutions. His third great legal undertaking was the composition of a systematic treatise on the laws, for the guidance of students and lawyers. This was published a short time before the *Digest*, under the title of *Institutiones*, i. e., 'Institutes.' All these works were accomplished under the careful superintendence and direction of Tribonian, and were written originally in Latin. The later treatises which J. caused to be written were in Greek, and were entitled *Novellæ*, i. e., 'New Works.'

The character of J. as a ruler contrasts favourably with that of most of the emperors, whether of the earlier or the later empire. His personal virtues were of a class and in a degree seldom united in one of such station; and his public administration, with the single exception of that of ecclesiastical affairs, in which he was an arbitrary and imperious intermeddler, exhibits great ability, and just and upright intentions. He died at the age of 83, and in the 38th year of his reign, November 14, 565.

JUSTI'NUS, surnamed the MARTYR, and

frequently the PHILOSOPHER, a Father, and, after Tertullian, the most distinguished apologist of the Christian Church, was a native of Flavia Neapolis, a Roman city erected on the site of the ancient Sechem, in Samaria. The date of his birth is variously assigned to the years 89, 113, 114, and 118 A.D. His father Priscus was a heathen, and J. was educated in the religion of his father. He became an ardent student of the philosophy of his age, beginning with the school of the Stoics, but finally adhering to that of the Platonists. With the last, as he himself relates, he was in the commencement highly satisfied; but, as he was one day wandering along the sea-shore, he encountered a man of mild and venerable aspect, who created in J.'s mind a desire for higher knowledge than Plato had reached, referring him to the study of the Jewish prophets, and through them to the great Christian teacher whom they foretold. The result was his conversion to Christianity, at some date between 119 and 140 A.D. After his conversion, he retained the garb of a philosopher, but, as a Christian philosopher, he strove by his writings and his instructions to bring others to the truth which he had himself discovered. He is said to have been beheaded about the year 165, in the reign of Marcus Aurelius, because he refused to offer sacrifice to the heathen gods. His death is attributed by the ancients to the enmity and malignant arts of the Cynic philosopher Crescens. The works of J., although not very voluminous, are highly interesting and important. The books ascribed to him with certainty are two *Apologies for the Christians*, the first addressed 'to Antoninus Pius,' the second 'to the senate;' a *Dialogue with Tryphon the Jew*, which professes to be the record of an actual discussion held at Ephesus. The *Address to the Greeks* is not so certainly a genuine work of J., and the same may be said of his *Exhortation to the Greeks*, his *Letter to Diognetus*, and his work *On the Monarchy of God*, an argument against the polytheism of paganism. The other works ascribed to him are certainly spurious. The first edition of his works is that of Robert Stephens (Paris, 1551). The Benedictine edition of J. is that of Maran (Paris, 1742), and a recent edition has appeared in Germany by Professor Otto, 2 vols. 8vo (Jena, 1842—1844).

JUSTINUS I., or JUSTIN THE ELDER, Emperor of the East, was born in 450 A.D., of barbarian parents, and entered as a private into the emperor's body-guard, of which he rose to be commander. He held this last post till the death of Anastasius I., whom he succeeded on the throne, 518 A.D. Feeling that, from his total want of learning, he was unfitted to direct the internal civil administration, he wisely resigned this duty to the quæstor Proclus, whose administration gave general satisfaction. In 519, he entered into an arrangement with the pope, which resulted in a cessation of hostilities between the Greek and Latin churches. In 523, he resigned to Theodoric, king of Italy, the right—which till this time the eastern emperors had always exercised—of appointing 'consuls' in Rome; and the same year he became involved in a war with the king of Persia. Some time before his death in Aug. 527, he associated his nephew Justinian with himself in the government.

JUSTINUS II., or JUSTIN THE YOUNGER, Emperor of the East, succeeded his uncle Justinian I., in 565 A.D., and espoused Sophia, the niece of the Empress Theodora, a beautiful and able, but revengeful woman. His rule was weak and despicable. Through the influence of the empress, Narses (q.v.) was dismissed from the exarchy of Ravenna, though at the time J. was fully aware that the Longobards were meditating an invasion of Italy. The joy of these savages, on hearing of the disgrace of the one man whom they dreaded, was excessive; and in 568 they burst like an avalanche upon Italy, which from this time was for ever lost to the Greek Empire. In the midst of a disastrous war with Khosrû, king of Persia, J. died, 26th September 578, after appointing Tiberius, one of his generals, as his successor. J. had been insane from 574, from which time till his death the supreme authority was in the hands of the empress.

JUTE. The jute of commerce is a fibre produced from two species of *Tiliaceæ*, the *Corchorus olitorius* and *Corchorus capsularis*, two plants, alike in qualities, though slightly different in appearance, and sown indiscriminately; the first having round seed-pods and reddish stalk, the latter long seed-pods and bright green stalk. From the fibre which is the cheapest known are produced gunnies, gunny-cloth and cordage, and from the finer qualities carpets, shirting, coat-linings, &c., are made. It is extensively used for mixing with silk, cotton, and woollen fabrics, and also in paper-making, while the leaves are eaten in many places as food.

Although indigenous to the tropics, Bengal being the largest jute-growing country, the plant grows in most climates and on all kinds of soil, rich alluvial lands, and lands subject to salt-water tidal influences particularly favouring its production. It is an exhausting crop for the soil. The plant, if weeded once, requires no more attention till cutting time. It grows to a height of 12 feet, having a single stalk without branches or leaves till near the top, and will flourish though flooded with two feet of water for a month at a time. In Bengal, the plant is cut while in flower, about three months after sowing. Cut close to the ground, stripped of leaves and branches, it is tied in bundles and steeped from 10 to 20 days in water, to loosen the fibre by rotting the outer bark. After steeping, the plant is beaten till the fibre only remains, which is cleaned, dried, and made into 'drums' of 70 or 80 lbs. If for exportation, it is pressed into bales of 300 lbs. and upwards. Fine jute has a beautiful glossy golden appearance, and is soft and silky to the touch. Great importance attaches to length and strength of fibre.

The first mention of the word jute is in 1796, in the manuscript commercial index of the court of directors of the East India Company. It is the Bengali name used by the natives of Cuttack and Balasore, where the first European manufactories were established in the middle of last century. In 1829, the total export from Calcutta was twenty tons, value £60. In 1833 it had increased sixteenfold, and about 1864—1865 the increased demand caused jute cultivation to extend to other districts, the exportation in 1872—1873 reaching the enormous amount of 300,000 tons, value £3,500,000.

England, Bombay, and America originally divided the exports of jute, and up to the time of the civil war, North America took the largest share of the gunnies (see GUNNY BAGS). Jute and gunnies are now exported from Bengal largely to France, Australia, and other parts of the world. Jute grown in England is not remunerative. It has been successfully grown in small quantities in America, however.

Gunnies are classed as Nos. 1, 2, and 3. No. 1, thick and close woven, is used for sugar, fine grains such as linseed or rape-seed, and similar products; No. 2, also close woven, but thinner, for rice and the larger grains; No. 3, thick, coarse, and open, is principally suited for the outer covering of double bags. The manufacture of gunny with primitive looms is a common form of convict labour in Bengal. Near the Himalayas, in North-eastern Bengal, the natives wear a fine cloth of their own manufacture, made of jute, or jute and cotton.

Increased demand has lately induced jute production in Burmah, Italy, Queensland, and America, &c.; and a European company is being started (1874) to cultivate jute in British Burmah on a large scale. The manufacture, again, is largely carried on in Great Britain, and is the chief industry of Dundee and Belfast. In Bengal, jute valued at about a million sterling is annually manufactured, mostly for local consumption, the bulk being turned out by the English mills, of which there are six, working about 1500 looms, mostly near Calcutta, the Gauripore and Barnagore mills being the principal. Additional mills on a large scale are being erected, so that it remains to be seen whether the advantages of locality and cheap labour in India, over enterprise, cheap machinery, and established trade at Dundee and Belfast, will cause the present supremacy of the latter places to wane.

A coarse paper has been made for centuries back in Bengal out of jute, by beating the fibre into a pulp with lime, drying it in sheets, sizing with rice starch, and polishing with a stone or shell.

New Zealand flax (*Formium tenax*) is a rival fibre. Rhea or China grass (*Urtica tenacissimus*), which grows wild in rank luxuriance in the tropics, is so fine and strong as to rival silk, but there is great difficulty in separating the fibre from the wood and bark. The Indian government offer £5000 for a cheap invention for this purpose; and till this is discovered, Bengal jute is likely to maintain its supremacy among the cheap fibres of the world.

JÜ'TERBOGK, a small manufacturing town of Prussia, in the province of Brandenburg, is situated on the Nuthe, 27 miles south of Potsdam. Here considerable wool and flax markets are held, and wine is produced to some extent. Woollen-cloth manufactures, spinning, weaving, and dyeing are also carried on. Pop. (1871) 6673. In the vicinity is the field of Dennewitz, where the Prussians defeated the French under Ney and Oudinot, September 6, 1813.

JU'TLAND (Dan. *Jylland*), the only considerable peninsula of Europe that points directly north, forms a portion of the kingdom of Denmark, and used to comprise the province of North Jutland and the duchy of Slesvig (q.v.), which was called by the Danes South Jutland. The province of North Jutland has an area of 9618 square miles, and a population (1870) of 788,119. See DENMARK. J. is said to have been inhabited in the earliest times by the Cimbri (q. v.), and from this circumstance it has received the name of the Cimbrian Peninsula, or Chersonesus. In historical times, we find it inhabited by the Jutes, who took part in the expedition of the Saxons to England. As allies of the Saxons, they waged war with Charlemagne, and under the name of Normans (Northmen), frequently desolated the coast of Germany and France.

JUVENA'LIS, DECIMUS JUNIUS, the Roman satirist, was born at the Volscian town of Aquinum. The year of his birth is unknown; but it may be taken for granted that he was a youth in the reign of Nero; that he was come to man's estate, and was writing in that of Domitian (81—96 A. D.); and that he survived into the times of Hadrian (117—138 A. D.). He seems to have enjoyed a competence. He practised at Rome as an advocate; and there are some reasons for supposing that he visited Egypt. Among his friends were Martial and Statius, and perhaps Quintilian. But nothing is known of his personal history except a few leading facts—among them, that he recited some of his satires in public with much applause; and even these facts are not known to us in any detail. His interest for posterity depends altogether on his writings—on his sixteen satires, still surviving, which occupy the very first rank in satirical literature, and are of priceless value as pictures of the Roman life of the Empire. J. and Horace respectively represent the two schools into which satire has always been divided; and from one or other of them every classical satirist of modern Europe derives his descent. As Horace is the satirist of Ridicule, so J. is the satirist of Indignation. J. is not a man of the world so much as a reformer, and he plays in Roman literature a part corresponding to that of the prophets under the Jewish dispensation. He uses satire not as a branch of comedy, which it was to Horace, but as an engine for attacking the brutalities of tyranny, the corruptions of life and taste, the crimes, the follies, and the frenzies of a degenerate state of society. He has great humour of a scornful, austere, but singularly pungent kind, and many noble flashes of a high moral poetry. We would especially point out that the old *Roman* genius—as distinct from the more cosmopolitan kind of talent formed by Greek culture—is distinctly discernible in Juvenal. He is as national as the English Hogarth, who perhaps gives a better image of his kind and character of faculty than any single English humorist or moralist that we could name. J. has been better translated in our literature than almost any other of the ancients. Dryden's versions of five of his satires are amongst the best things Dryden ever did. Dr Johnson imitated two of the most famous in his *London* and *Vanity of Human Wishes;* and the version of the whole of them by Gifford is full of power and character. The best known modern edition of J. is that of Ruperti, and there are good recent English ones by Macleane and Mayor.

JUVENILE OFFENDERS. The practice of singling out offenders of a tender age from adult offenders, and subjecting them to different punishment and reformatory treatment, has gained ground of late years. In the eye of the law, persons are considered capable of committing crime when of the age of seven, and are punishable like other persons. But in England and Ireland, in cases of larceny, whenever a person under the age of 16 is brought before justices, and is convicted, he or she may be committed to the house of correction for three calendar months or less, or, in the discretion of the justices, shall be fined £3 or less; or if a male under 14 years, shall be once privately whipped (with a birch rod, not more than 12 strokes), either instead of or in addition to such imprisonment. The juvenile offender, however, may object to be tried by justices of the peace, and may insist upon being tried by jury, if he prefer it. And in all cases of juveniles under 16 being convicted of offences, the justice or magistrate may, in addition to the sentence then passed, provided such sentence is not less than 14 days' imprisonment, direct the offender, at its expiration, to be sent to a reformatory school for a period of not less than two years, and not more than five. But the parent or guardian may have the child sent to another reformatory school than the one named by the magistrate, on paying the additional expense, if any. The expense of the conveyance of the offender to the school is paid by the county or borough, but his continued maintenance there must be paid for by the parent or step-parent, if of sufficient ability, such sum, however, not to exceed 5s. per week. Children who have not yet committed crime, but are in a vagrant and neglected state, may also be sent to an Industrial School (q. v.). In Scotland, there are also statutes with regard to reformatory schools and juvenile offenders similar to what exist in England.

K

K THE eleventh letter of the English alphabet. The Shemitic languages had two characters with the same or very similar consonantal power—the one called in Hebrew *Kaph* (hollow of the hand), the other *Koph* (the hind head). Both were at first transplanted into the Greek [κ (*Kappa*) = K, ϙ (old Greek *Koppa*) = Q], and thence into Latin; but in Greek, *Koppa*, or *q*, was early dropped, and in Latin *Kappa*, or *k*, was supplanted by *c* (see ALPHABET, and letter C), except in the case of a few words, as *Kalendæ* and *Kæso*. In the languages derived from Latin, accordingly, *k* is used only in writing foreign words. Although unknown to the Anglo-Saxon alphabet, it has in modern English to a considerable extent taken the place of *c* in words of Saxon origin. See C. The character *Koppa*, or *q*, has been retained in modern alphabets, as it was in Latin, only in the combination *qu*. This is clearly a relic of the primitive nature of written characters, when they constituted syllabaries rather than alphabets, each character expressing a consonantal articulation followed by a particular vowel sound; so that there was one character for *ba*, and another for *bo*; one for *ka*, and another for *ko* or *ku*, as in hieroglyphs. *K* (*q*, or *c* hard) is the sharp mute of the guttural series, *k*, *g*, *ch*, *gh*. See LETTERS. The interchanges of *k* are indicated under C.

KAÂBA (Arab. 'square house'), the name of an oblong stone building within the great mosque of Mecca (q. v.). According to the legend, Adam first worshipped on this spot, after his expulsion from Paradise, in a tent sent down from heaven for this purpose. Seth substituted for the tent a structure of clay and stone, which was, however, destroyed by the Deluge, but afterwards rebuilt by Abraham and Ishmael. Certain it is that the building existed from time immemorial, and served the Arabs before Mohammed as a place of idolatrous worship, probably to Zohal (Saturn). It is, as it now stands—rebuilt in 1627—35 to 40 feet high, 18 paces long, 14 broad. Its door, coated with silver, is opened only three times in the year—once for men, once for women, and once for the purpose of cleaning the interior. Next to this door, in the north-east corner of the edifice, is set the famous lava-like Black Stone which, since the second year of the Hedjrah (q. v.), has served as Kibleh, i. e., as an indicator of the direction towards which all Moslems must turn in their prayers. This stone, which is said to have dropped from paradise together with Adam, is held in extreme veneration, and one of its principal names is 'The Right Hand of God on Earth.' It was originally of white colour, but the sins of mankind have caused it to shed so many silent tears, that it has become (externally) quite black. Others explain this change of colour by the unnumbered kisses and touches bestowed upon it by the pilgrims, part of whose ceremonies (see HAJJ) consists in compassing the K. seven times, each time either kissing this stone, or touching it with the hand, and kissing the latter. A smaller stone, to which, however, less veneration is shewn, is set in the south-east corner of the Kaaba. The outside of the K. is annually covered anew with the richest black silks, on which are embroidered sentences from the Koran in gold; a pious contribution first on the part of the califs, later of the sultans of Egypt, now of the Turkish emperors. The K. has a double roof, supported by pillars of aloe-wood, and it is said that no bird ever rests upon it. The whole edifice is surrounded by an enclosure of columns, outside which there are found three oratories, or places of devotion, for different sects; also the edifice containing the well Zem-Zem, the cupola of Abbas, and the Treasury. All these are further enclosed by a splendid colonnade, surmounted by cupolas, steeples, spires, crescents, all gilded and adorned with lamps, which shed a brilliant lustre at night. These surroundings, between which and the K. run seven paved causeways, were first devised by Omar, for the better preservation of the K. itself.

KAAMA, or **CAAMA** (*Antilope Caama*), a species of antelope, a native of the south of Africa, nearly allied to the *Bubalus* (q. v.) of the north of Africa. It is the *Harte-beest* of the Dutch colonists of the Cape of Good Hope, where it is the most common of all the large antelopes. Its horns are rather short and thick, curved like the sides of a lyre. It inhabits plains, and congregates in large herds. Its flesh is very good, more resembling beef than that of almost any other antelope. It is very capable of domestication.

KA'BA-NAGY, a small town of Hungary, situated in a plain 20 miles south-west of Debreczin. Pop. (1869) 5745.

KABYLES, another name for the Berbers (q. v.).

KA'FFA, or **FEODOSSIA**, a fortified town and seaport of South Russia, in the gov. of Taurida, is picturesquely situated on the E. coast of the Crimea, 70 miles east of Simferopol. The harbour, a portion of the bay of K., an inlet of the Black Sea, is deep and safe. It contains a citadel, a barracks, and a museum of antiquities chiefly collected in the vicinity; and although it has greatly declined, it is still the seat of considerable trade. The principal exports are wheat, hides, sackcloth, and goats' hair. About 250 vessels, of an average of 45,194 tons, enter and clear the port annually. Pop. (1867) 9882. K., the ancient *Theodosia* or *Feodosia*, was in the 13th c., when it was under the Genoese dominion, the centre of trade. In 1465, it fell into the hands of the Turks, under whom it had 100,000 inhabitants. In 1783, it was taken by the Russians, to whom it was ceded by the treaty of Jassy in 1792.

KA'FFIR, or **KAFIR**, the name of a great family of the human race inhabiting the south part of the continent of Africa, classed by Dr Latham in division B of the variety Atlantidæ, their physical conformation being modified negro, and which also includes the Betjuans (q.v.), Ovampos, Damaras, and other similar tribes living in the region south of 18° south latitude, and extending to the boundaries of the Cape Colony. By the term K., however, the tribes inhabiting the coast-country on the east side of South-east Africa are generally understood, and recent events have further narrowed the designation in a popular sense as more particularly applying to the tribes living in the country between the Cape Colony and Natal, those east of the latter colony, as far north as Delagoa, being now better known as Zulus or Zulu Kaffirs. General distribution of the K. races: 1. Tribes (Amatabele, Amazulu, &c., north of Natal; Amampondo, Amaxosa,* &c., in Kaffraria Proper) speaking the Zulu language and its dialects, inhabiting the east-coast region; 2. Tribes (Makololo, north, and Bakuku, north-west of Lake Ngami; Bakalihari, &c.) speaking the Sichuana language and its dialects, inhabiting the central region, and known under the general name of Betjuans; 3. Tribes (Ovampos and Damaras) speaking the Ovampo or Otjiherero and its dialects, inhabiting west-coast region.

History, &c.—The word K. is derived from the Arabic *Kiafir*, 'an unbeliever,' which was applied by the Mohammedan inhabitants of the east coast to the native tribes living south of them, and adopted by the Portuguese, after their settlements at Melinda and Mozambique, to designate the inhabitants of the vast region lying to the south, and extending to the country of the Hottentots, now the Cape Colony.

The oldest genealogical records of the K. chiefs go back to 1617. In 1688, the old Dutch colonial records first mention the Kaffirs as having at that early period driven the Hottentot aborigines as far south as the Great Fish River; and in 1784, the latter was declared the boundary of the Cape Colony to the east. In 1798, commenced our series of K. wars, and between that and 1811 they were repeatedly attacked and driven across the Fish River. In 1819, under the leadership of a false prophet called Makanna, they ventured to attack Graham's Town, but were repulsed with great slaughter. A period of broken peace and ill-kept treaties then succeeded, during which time a considerable European and Hottentot population had been settled along the frontier (1820). In 1828, they were driven out of the Kat River Valley, which was filled with Hottentot settlers; then came the great war of 1834—1835, which cost upwards of a million sterling, and ended in the Kaffirs being driven to the east of the Great Kei, and the territory between it and the Great Fish River was taken possession of by Sir B. Durban, but immediately restored by the then Colonial Secretary, Lord Glenelg. In 1846, war, which had been long inevitable, again broke out, and the Gaika and Islambie Kaffirs, members of the great Amaxosa tribe, invaded the colony, and overran the whole of the frontier districts as far west as Uitenhage, and north to the Stormbergen, inflicting great loss even on the imperial troops on many occasions. Again, under Sir H. Smith, they were in 1848 driven back, and the country they inhabited once more annexed to the British crown, under the title of British Kaffraria. Unfortunately, however, the influence of the chiefs remained unbroken, and they used it for evil by again invading the colony in 1851, and this time not only the Gaika tribes, but the whole of the Amaxosa and Amamtembu, besides a numerous body of rebel Hottentots, all well armed, and provided with ammunition. Again, after a struggle of many months, the enemy was finally repulsed; and Sir H. Smith being relieved by Sir H. Pottinger, and he by Sir George Grey, the latter, by his wise and astute policy, succeeded in breaking up the power of the chiefs, dispersing the tribes amongst the European settlers, and utterly destroying their strength, in which he was not a little assisted by a terrible famine which about that period fell on the unfortunate people, they having neglected to plant their fields, and having killed nearly all their cattle, at the command of a false prophet called Umlangeni, whose influence the deluded chiefs used to urge their people to this last war. Since 1852, the principal actors in these great frontier contests, the well-known chiefs Macomo, Pato, Seyolo, &c., are miserable exiles and prisoners on a sandy islet in Table Bay, and another K. war appears to be a very remote contingency. A well-armed European population now occupies British Kaffraria, and the natives look for justice to local magistrates instead of to their former chiefs. Beyond the Kei River, the chiefs still rule, but their power is very much broken, as our frontier police control matters with a pretty high hand on both sides of the border.

The K. races are a tall, well-made, and generally handsome people, of a dark brown or bronze colour, and hair in short woolly tufts. As we proceed to the north, they gradually become more assimilated to the negro type, until at last the two races seem to blend together. They are brave, and in times of peace, kind and hospitable to strangers, affectionate husbands and fathers; and their minds have a peculiarly acute and logical turn, which in many of our 'palavers' with them often gave them the best of the argument. They are an honest people, except, perhaps, in the article cattle. Although their idea of God appears very indistinct, and their feelings of veneration but small, yet they are very superstitious, and dread the influence of wizards and sorcerers. Their huts, which are built by the women, are of a bee-hive shape, composed of wattles stretched with grass, and a collection of them is called a 'kraal,' a word of Portuguese origin signifying an enclosure. The general rule of the chiefs is patriarchal, they being assisted, however, by a number of 'pakati,' or councillors, whose advice is generally followed by the chief. Polygamy is allowed, and wives are generally purchased for cattle. The chief has absolute power over the property of his whole tribe, although he seldom exercises it. If any individual accumulates great wealth, an accusation of witchcraft is sure to make him disgorge it. They practise, in common with all other African nations, circumcision and many peculiar rites of purification, many of them analogous to those prescribed in the Mosaic law; but these rites appear, both in Africa and Asia, to have been generally practised at an earlier period even than the Jews adopted them. The K. criminal code is very simple: a fine, great or small, of cattle pays for almost any offence, and the *lex talionis* is strictly forbidden even in case of murder. Many of their ceremonies and dances are of a very gross and obscene nature, although the K. women, especially after marriage, are very chaste and modest in their deportment, and present in this respect a striking contrast to the Hottentot race. The Kaffirs are strictly a pastoral people, and the men tend their herds exclusively, even to milking them, leaving to the women the labour of cultivating their gardens, building their huts, gathering fuel, &c. They generally wear a blanket; the former robe of softened ox-hide is now very seldom seen. In time of war, the K. appears in the field naked and painted with a fiery red clay. The native arms are assagais and clubs, but the use of firearms is now prevalent amongst all the South-African tribes; and in the late war, the K. warriors, in skirmishing, excited the admiration of the light companies of some of our most distinguished regiments. The K. language is considered as a dialect of the Sichuana, which is the original stock of the different tribes of the K. race. It is fine, sonorous, and expressive, with a most ingenious and complicated system of grammar. On the Cape frontier, many Hottentot and Dutch words have been introduced; and in the Zulu dialect, the Wesleyan missionaries and Bishop Colenso of Natal have published many excellent works tending to elucidate the philology of South-African languages.

---

* The prefix *Ama* signifies tribe or family.

The Amafengu, or Fingoes, are the remains of various Zulu tribes, refugees from the wars of Chaka, reduced to slavery by the Amaxosa Kaffirs, and rescued by Sir B. Durban in 1835, and settled by him along the frontier of the Cape Colony. They are a saving, careful people, and many of them are converted to Christianity. They have always been our firm allies against their hereditary enemies the Kaffirs, although of the same race and language. The Fingoes are often, from their money-making propensities, called the Jews of the K. race. The Amampondo, Amabaxa, and other tribes living near the Natal frontier, have never been at war with us, although often quarrelling amongst themselves: they are gradually declining in numbers, and are not near so fine a race as the frontier Kaffirs.

The number of the K. races has been estimated at three millions, scattered over an area of about a million square miles. Of these, there may be about 300,000 in Kaffraria Proper, 150,000 in British Kaffraria and Cape Colony, and 150,000 in Natal.

KAFFIR CORN. See Durra.

KAFFRA'RIA, Proper or Independent. The general designation of Kaffraria was formerly applied to the whole of the coast region of South Africa east of the Great Fish River, and extending as far north as Sofala, but it is now limited to a comparatively small region enclosed by the high and almost impassable mountain-chain called Kalambi, or Quathlamba, running parallel to the coast (see Cape of Good Hope and Africa) at a distance of about 120 miles from it between the east frontier of the Cape Colony and Natal, and comprising an area of about 25,000 square miles, lying between the Great Kei and Umzimculu rivers.

K. is drained by the Great Kei, the Umzimvoobo or St John's River, and its fan-like branches, the Tsetse and Tena, which rise in the Quathlamba, the Umzimculu, Umtata, Umbashee, and several other streams, with short courses, which rise in a high escarpment or ridge, forming a sort of buttress to an undulating grassy but woodless plateau, which extends along the foot of the mountains at a height of about 2500 feet above the sea. The rivers, especially near the coast, run through deep-wooded kloofs, sunk below the level of the surrounding country, and none of them are navigable. The coast generally is rocky and dangerous, and should not be approached closer than three miles; anchorage may be found in one or two shallow bays east of the St John's River.

K. is inhabited by the remains of the Amaxosa and Amamtembu tribes of Kaffirs (who, since the annexation of British Kaffraria, have retired across the Kei River), the once powerful tribes of the Amagaleka, Amampondos, and Amabaxa, besides the remains of many broken Zulu tribes, refugees from the wars of Chaka and Dingaan, who have found shelter in that portion of the country that borders on Natal. The total number of natives may be roughly estimated at 300,000; but it is probable in a very few years the whole region will be absorbed into the neighbouring colonies of British Kaffraria and Natal, as the population is rapidly decreasing, and the chiefs fast losing their prestige and influence. The paramount chief is Rili, or Creili, of the Amagaleka tribe, who has his principal kraal about 20 miles east of the Great Kei River.

The soil of K. is fertile. The natives raise sufficient crops of Indian and Kaffir corn, pumpkins, &c., for their own use. Cotton has been successfully grown in many localities along the coast. Cattle, horses, and goats thrive well, and a considerable trade with the adjacent colonies is carried on in hides, horns, goat-skins, tallow, and wagon-wood. The Wesleyan Society have established many well organised stations, forming convenient halting-places along the lines of road which traverse Kaffraria between the Cape Colony and Natal, and where travellers will be sure to meet a kind reception.

KAFFRARIA, British, a country of South Africa, between the Great Kei, the White Kei, the Keiskamma, and Indian Ocean (wrested from the Kaffirs by the Cape colonists in the war of 1846—1847), was for a time an independent colony, but is now a part of Cape Colony. It has an area of 4500 square miles, and is bounded on the north by a high and picturesque range of mountains called the Amatola (4000 to 5000 feet), a continuation of the Great Winterberg and Katberg ranges in the Cape Colony. It is well watered by the Keiskamma, Chumie, Buffalo, Gonubi, and other minor streams or torrents, generally running in deep and rugged beds, and by the Great Kei, a considerable stream, dividing it from Independent Kaffraria. None of these rivers are navigable.

The physical aspect of British K. is similar to that of Lower Albany, or the east-coast region of the Cape Colony. Many fertile, well-watered valleys are found amongst the spurs of the Amatola Mountains. Behind these mountains are high grassy plateaux, extending to the Kei River, and well adapted both for grazing and agriculture.

In 1859, British K. was divided into farms of from 1000 to 3000 acres, which were granted free on certain terms of settlement and defence. The pop. in 1864 was 8183 of British and German descent (exclusive of the military), and 78,018 of the native races, Amaxosa and Amafengu Kaffirs.

The principal town is King William's Town, the head-quarters of the military and seat of government, and containing a population of about 2500 souls. The port of British K. is East London, at the mouth of the Buffalo River, where there is good anchorage. There are numerous military posts and German villages extending along the line of the Buffalo from the sea to the mountains, and also several mission-stations, Episcopal, Wesleyan, Presbyterian, and German; and the natives are in numerous cases reclaimed from heathenism, and becoming an orderly and civilised population. In 1861, by her Majesty's letters-patent, British K. was declared an independent colony, under a lieutenant-governor, the governor of the Cape being styled High Commissioner. Its revenues were derived from quit-rents of the farms granted, and the revenue duties collected at the port of East London, and were about sufficient to pay the expenses of the limited executive.

The larger *feræ naturæ* have nearly disappeared, although a few years back the high plains north of the Amatola, called the Bontebok Flat, were the favourite hunting-grounds of South African sportsmen. A considerable number of the German Legion, sent here after the Crimean war, have received grants of land, and make excellent settlers. Two

English, and one or two German newspapers are published in King William's Town.

In 1865, British Kaffraria ceased to be an independent colony, and was annexed to Cape Colony.

KAFIRISTA'N (i. e., country of the Kafirs or infidels), a country of Central Asia, on the south declivity of the Hindu Kush, forming part of the northern basin of the Cabul, in 35°—36° N. lat., and 69° 20′—71° 20′ E. long.; area, 7000 square miles. The country is divided into narrow valleys by spurs of the Hindu Kush. The inhabitants, whose number is unknown, differ, as the name of the country implies, in creed and origin from the great body of the neighbouring tribes; in features and complexion, they claim kindred with Europeans. Their language, too, is said to be wholly independent of the other dialects of Central Asia. This state of isolation is mainly owing to the natural strength of the region, which, though repeatedly invaded, has never yet been subdued. The soil is fertile enough to render external intercourse comparatively unnecessary, yielding, as it does, fruits, wheat, and millet, and feeding large herds of cattle, sheep, and goats. Metals and timber likewise abound, the people working in the same with considerable skill.

KA'FTAN, an article of Turkish dress, resembling a dressing-gown, which is in use also amongst other oriental nations.

KAIN, an old term in Scotch Law, used to denote rent paid in kind, as in the shape of poultry or animals, to a landlord. The word is said to be derived from *canum*, a Latinised form of the Gaelic *ceann*, 'the head.'

KAIRWA'N, a decayed town of Northern Africa, in the state of Tunis, is situated 80 miles south of the town of that name, in a treeless, marshy plain. It is surrounded by a brick wall, surmounted by four towers. It contains about 50 ecclesiastical structures, of which the Okbah Mosque, one of the most sacred of Islam, is compassed by a quadrangular wall, and contains numerous ancient pillars of marble, granite, and porphyry. The trade is chiefly in furs; saddlery and sandals are manufactured. Pop. 12,000.

KAISARIYEH. See CÆSAREA.

KAI'SERSLAUTERN, or LAUTERN, a thriving town of Rhenish Bavaria, is pleasantly situated on the Lauter, 25 miles north-west of Landau. Pop. (1871) 17,867.

KAKODYLE. See CACODYLE.

KALAMAZOO', a city of Michigan, United States, is situated in the south-west portion of the state, on the west bank of the river of the same name, 65 miles from its mouth, and 143 miles west of Detroit, on the Michigan Central Railway. It has a state lunatic asylum, a college for both sexes, ten churches, two newspapers, and several manufactories. Pop. in 1870, 9181.

KA'LBÉ, or CALBE, a town of Prussian Saxony, in the government of Magdeburg, is situated 18 miles south of the town of that name, on the left bank of the Saale. Spinning and weaving, with manufactures of paper, tobacco, and sugar, are here carried on. Pop. (1871) 7932.

KALE, or BORECOLE (Ger. *Kohl*), a cultivated variety of *Brassica oleracea*, differing from CABBAGE in the open heads of leaves, which are used for culinary purposes as *greens*, and also as food for cattle. There are many sub-varieties, of which some are of a green, and others of a reddish-brown or purplish colour; some have the leaves comparatively plain, and others have them very much waved or curled, some also fringed or laciniated. Most of the kinds are biennial, like the cabbage, but some may be reckoned perennial, as the *Milan Kale* (*Chou de Milan*), and are frequently propagated by cuttings. The kind called *German Greens* is one of the most delicate, and is very much cultivated in Britain, chiefly as a winter vegetable. The more the leaves are curled the more is it esteemed. The mode of its cultivation nearly agrees with that of cabbage.

KALE, SEA. See SEA KALE.

KALEI'DOSCOPE (from Gr. *kalos*, beautiful, *eidos*, image, and *skopeo*, I see), an optical instrument invented by Sir David Brewster in 1817. It consists of a tube, through whose whole length pass two mirrors or reflecting planes, which are hinged together along one edge, and make with each other an angle which is an aliquot part of 180°, whilst the one end is fitted up with an eyeglass, and the other is closed by two glasses, at a small distance from each other, between which are placed little fragments of glass or other variously coloured objects. The eye looking into the tube now perceives these objects multiplied as many times as the angle which the reflecting planes make with each other is contained in the whole circumference of a circle, and always symmetrically disposed; and the slightest shaking of the instrument produces new figures. There are various modifications of the kaleidoscope, by some of which its power is much increased; and it is not only a pleasing toy, but of great use to pattern-drawers and others, to whom it supplies endless varieties of figures.

KALENDAR. See CALENDAR.

KALENDS. See CALENDS.

KALEWALA. See FINNISH LITERATURE.

KALGUE'F, or KOLGUEV, an island of Russia, in the Arctic Ocean, 240 miles in circumference, belongs to the government of Archangel, and is situated 115 miles east of the northern extremity of the peninsula of Kanin. It is the resort of innumerable flocks of wild-fowl, especially eider-ducks, geese, and swans, which are caught in great numbers by the fowlers who visit the island every summer.

KÂLIDÂSA, the greatest dramatist, and one of the most celebrated poets of India. He is known to the literary public of Europe especially through his drama *S'âkuntala*, which, first introduced to the notice of the western world by Sir William Jones (1789), created so great a sensation throughout Europe, that the early success obtained by Sanscrit studies in England and Germany may be considered due to this master-piece of Sanscrit literature. Another drama of the same poet, and next in renown to *S'âkuntala*, is the *Vikramorvas'î*, or the Hero and the Nymph. Besides these works, Hindu tradition ascribes to his authorship a third drama and several poems, which no European critic will believe could ever have sprung from a mind like that of Kâlidâsa. Professor Lassen, in the *Indische Alterthumskunde*, passes the following judgment on this poet: 'Kâlidâsa may be considered as the brightest star in the firmament of Hindu artificial poetry. He deserves this praise on account of the mastery with which he wields the language, and on account of the consummate tact with which he imparts to it a more simple or more artificial form, according to the requirements of the subject treated by him, without falling into the artificial diction of later poets, or overstepping the limits of good taste; on account of the variety of his creations, his ingenious conceptions, and his happy choice of subjects; and not less on account of the complete manner in which he attains his poetical ends, the beauty of his narrative, the delicacy of his sentiment, and the fertility of his imagination.' But although we are enabled by his works to appreciate the merits of this poet, we know little of his personal history. That he lived at Ujjayinî or Oujein, and that he was 'one of the nine gems of the court of Vikramâditya,' is all that is related in regard to him. But as there have been several Vikramâdityas at Ujjayinî, his date is as uncertain as that of any personage of the ancient history of India. Dr Bhâo Dâjî, in a learned and ingenious essay 'On the Sanscrit Poet, Kâlidâsa' (*Journal of the Bombay Branch of the Royal As. Soc.*, October 1860), has endeavoured to indentify Vikramâditya, the contemporary of K., with Harsha Vikramâditya, and that the great poet would therefore have lived in the middle of the 6th c. of the Christian era.

KALIHA'RI DESERT. The Kalihari is a vast central and nearly uninhabited tract of country lying between Great Namaqualand and the Betjouana country, in South Africa, extending from the northern banks of the Gariep or Orange River to the latitude of 21° south, or the verge of the Ngami region, a distance of nearly 600 miles, with an average breadth of about 350 miles, and presenting some curious physical features quite distinct from other desert regions of the globe. It is a nearly waterless, sandy, but in many places well wooded region, on which rain seldom falls, intersected by dry watercourses, with a substratum of a tufaceous limestone, and to all appearance formerly the bed of an immense lake. Livingstone considers it remarkable for little water and considerable vegetation, and therefore very different from the karroos of the Cape Colony, which have neither water nor vegetation except after heavy rains, and from the bare and sandy deserts of North Africa and Arabia. No mountains or elevations of any considerable height are found in the Kalihari, the general level of which may be considered as 3000 feet above the sea. The few springs or 'sucking-places' which here and there are found are generally carefully concealed by the Bakillhari, a miserable wandering race of Betjouana Bushmen, who roam through the desert in quest of game, of the skins of which they make the fur-robes called 'carosses.' The Kalihari has been crossed by C. J. Andersson and others, near its outskirts; but of its central parts very little is known. After heavy rains, immense herds of elephants, rhinoceroses, and giraffes are found in its dense thickets, and feed on the succulent wild melons called 'Kengwe,' which then abound there. In the north part, are immense forests of thorn-trees.

KA'LISZ, a town of Poland, on the Prosna, in the government of the same name, 136 miles west-south-west of the city of Warsaw. It is one of the oldest Polish towns, and was formerly the capital of a palatinate. Population (1867) 13,602, who carry on an extensive trade. The adjoining county is the best cultivated in the kingdom. Two famous battles were fought here—the first between the Poles and Russians and the Swedes in 1706; the other between the Russians and Saxons in 1813.

KALIYUGA, in Hindû chronology, the fourth or last of the periods contained in a Mahâyuga or great Yuga (q. v.). It may be compared to the Iron Age of classical mythology. It consists, according to native imagination, of 432,000 solar-sidereal years, and begins 3101 years before the Christian era. The relation of the four Yugas being marked by a successive physical and moral decrement of created beings, the Kaliyuga is the worst of all. 'In the Kr'ita (or first) age,' Manu says, 'the (genius of) Truth and Right (in the form of a bull) stands firm on his four feet, nor does any advantage accrue to men from iniquity. But in the following ages, by reason of unjust gains, he is deprived successively of one foot; and even just emoluments, through the prevalence of theft, falsehood, and fraud, are gradually diminished by one foot (i. e., by a fourth part).' The estimate in which this Kaliyuga, our present age, is held by the modern Hindus may be gathered from one of their most celebrated Purânas, the Padma-Purân'a. In the last chapter of the Kr'iyâyogasâra of this Purâna, the following account is given of it: 'In the Kaliyuga, (the genius of) Right will have but one foot; every one will delight in evil. The four castes will be devoted to wickedness, and deprived of the nourishment which is fit for them. The Brahmans will neglect the Vedas, hanker after presents, be lustful and cruel. They will despise the scriptures, gamble, steal, and desire intercourse with widows. . . . . For the sake of a livelihood, some Brahmans will become arrant rogues. . . . . The Sûdras will endeavour to lead the life of the Brahmans; and out of friendship, people will bear false witness . . . . they will injure the wives of others, and their speech will be that of falsehood. Greedy of the wealth of others, they will entertain a guest according to the behest of the scriptures, but afterwards kill him out of covetousness; they are indeed worthy of hell. The twice-born (i. e., the first three castes) will live upon debts, sell the produce of cows, and even their daughters. In this Yuga, men will be under the sway of women, and women will be excessively fickle. . . . . In the Kaliyuga, the earth will bear but little corn; the clouds will shed but little rain, and that, too, out of season. The cows will feed on ordure, and give little milk, and the milk will yield no butter; there is no doubt of that. . . . . Trees, even, will wither in twelve years, and the age of mankind will not exceed sixteen years; people, moreover, will become gray-haired in their youth; women will bear children in their fifth or sixth year, and men will become troubled with a great number of children. In the Kaliyuga, the foreigners will become kings, bent upon evil; and those living in foreign countries will be all of one caste, and out of lust take to themselves many wives. In the first twilight of the Kaliyuga, people will disregard Vishn'u; and in the middle of it, no one will even mention his name.'

KA'LMAR, a town and seaport on the south-east coast of Sweden, capital of a læn of the same name, is situated on the Kalmar Sound, opposite the island of Oland, and about 200 miles south-south-west of Stockholm. It has a good harbour, a handsome cathedral, and a large and beautiful castle, in which, on the 12th July 1397, the treaty called the 'Union of Kalmar,' which settled the succession to the three northern kingdoms upon Queen Margaret of Denmark and her heirs for ever, was agreed to by the deputies of the three kingdoms. The union, nevertheless, lasted only till the death of Margaret (see DENMARK, HISTORY OF). The commerce of the town is considerable, and manufactures of sugar and tobacco are carried on. Pop. 9200.

KA'LMIA, a genus of plants of the natural order *Ericeæ*, consisting of evergreen shrubs, mostly about two or three feet high, natives of North America, with red, pink, or white flowers, generally in corymbs. The flowers are very delicate and beautiful, and the corolla is in the shape of a wide and shallow bell. Some of the species are frequent ornaments of gardens in Britain. They delight in a peat-soil. *K. latifolia*, the MOUNTAIN LAUREL, or CALICO BUSH of North America, occupies large tracts on the Allegheny Mountains. It grows to the height of ten feet, and the wood is very hard. It is narcotic and dangerous; the leaves are poisonous to many animals, and the honey of the flowers possesses noxious properties. A decoction of the leaves has been used with advantage in cutaneous diseases.

KA'LMUCKS, or, as they call themselves, the Derben-Ueirat (the Four Relatives), and also designated by the name of Eleutes and Khalimik (Apostates), are the most numerous and celebrated of the Mongol nations. They are divided into four tribes, the first of which, the *Khoskôts* (Warriors), number nearly 60,000 families, and inhabit the country around the Koko-nur, which they consider the native country of the race. One portion of this tribe migrated to the banks of the Irtisch, and became subsequently incorporated with the second tribe, the Dzûngars; another portion migrated to the banks of the Volga, in the 17th c., and is found at the present day in the government of Astrakhan. The second tribe are the *Dzûngars*, who give the name to a large territory (Dzungaria) in the west of Chinese Tartary; at the present day they number about 20,000 families. The third tribe are the *Derbets* or *Tchoros*, who deserted Dzûngaria, and finally, to the number of 15,000 families, removed a few years ago to the plains of the Ili and the Don, where they are being rapidly incorporated with the Don Cossacks. The fourth great tribe of the K. are the *Torgots*, who, about 1660, separated from the Dzûngars, and settled in the plains of the Volga, whence they were called the *K. of the Volga;* but finding the Russian rule too severe, the majority returned to Dzûngaria.

No Mongol or Turkish race presents such characteristic traits as the K.; indeed, they answer exactly to the description given of them by Jornandes 13 centuries ago, when, under the name of Huns, they devastated Southern Europe. The Kalmuck is short in stature, with broad shoulders, and a large head; has small black eyes, always appearing to be half-shut, and slanting downwards towards the nose, which is flat, with wide nostrils; the hair is black, coarse, and straight, and the complexion deeply swarthy. The Kalmuck is considered to be the original type of the Mongol and Manchû races, and his ugliness is the index of the purity of his descent. They are a nomad, predatory, and warlike race, and pass the greater part of their lives in the saddle. Their usual food is barley-flour soaked with water, and their drink is the 'koumiss' (made from fermented mare's milk). In 1829, Russia established a Kalmuck institute for the training of interpreters and government officials for the K. of Russia, and she has since been making great efforts to introduce civilisation among them. Many still retain their native Buddhism.

KALO'CSA, a town of Hungary, near the left bank of the Danube, about 70 miles south of Pesth. It contains a fortified bishop's palace, with a library of 30,000 volumes. K. is a steam-packet station on the Danube, and contains a pop. of (1869) 16,302.

KALONG, a name originally Javanese, and belonging to one or more species of frugivorous Bat (q. v.) inhabiting Java, but now frequently applied to all the frugivorous bats, the family *Pteropidæ*, or at least to all the species of the genus *Pteropus*. The *Pteropidæ* are all large bats, and some of them are the largest of all the *Cheiroptera*. They are called *Roussette* by French naturalists, and often, popularly, FLYING FOX by Europeans in the East. They are found in the East Indies, Japan, Australia, Africa, and South America. There are many species. Their food consists chiefly of soft fruits, as bananas, figs, &c. The Javanese K. (*Pteropus Javanicus*) measures about 5¼ feet in expanse of wing. The head and body are more than a foot long. It is gregarious, and during the day, great numbers may be seen hanging by their hinder claws, motionless and silent, on the branches of trees which they have selected for their abode. The body is covered with fur of a reddish-brown colour. This and the other true *Pteropi* have no tail, and a smaller number of vertebræ—24 in all—than any other mammalia. Some of the *Pteropidæ* have a very short tail. The flesh of some of them is eaten, and one, inhabiting the Moluccas and Isles of Sunda, has been called the Eatable Kalong (*P. edulis*). It is said to be white and delicate. Some of the species are migratory.

KALPA, in Hindu Chronology, a day and night of Brahmâ, which, according to some, is a period of 4,320,000,000 solar-sidereal years, or years of mortals, measuring the duration of the world, and as many, the interval of its annihilation. The Bhavishya-Purân'a admits of an infinity of kalpas; other Purânas enumerate thirty. A great kalpa comprises not a day, but a life of Brahmâ.—In Vedic literature, kalpa is a Vedânga. See KALPA-SÛTRA.

KALPA-SÛTRA is, in Vedic Literature, the name of those Sanscrit works which treat of the ceremonial referring to the performance of a *Vedic* sacrifice. See VEDA.—In Jaina Literature, it is the name of the most sacred religious work of the Jainas. See JAINAS. It is chiefly occupied with the legendary history of Mahavîra, the last of their 24 deified saints, or Tîrthankaras, but contains also an account of other four saints of the same class. The name of the author was Bhadra Bâhu, and the work was composed, as Stevenson assumes, in the year 411 of the Christian era; but the conjecture of another writer places it 632 after Christ. It is held in so high respect with the Jainas, that, 'of the eight days in the middle of the rains which are devoted to the reading of those works esteemed peculiarly sacred, no less than five are allotted to the Kalpa-Sûtra.' Stevenson, *The Kalpa-Sûtra and Nava Tatva* (Lond. 1848).

KALU'GA, a government of Russia, lies immediately south-east of that of Smolensk. Area, 11,780 sq. m.; pop. (1867) 984,255. The surface is flat; the soil, stony, sandy, and only moderately fertile. More than half of the province is under forest. It is watered by numerous rivers, the chief of which is the Oka. The principal occupation of the inhabitants is the cultivation of hemp. Sailcloth, which is not only sent to the ports of Russia and Europe, but also largely exported to America, is the chief article of manufacture. Coloured cloths for the China trade are also made. The government of K. is divided into eleven districts.

KALUGA, chief town of the government of the same name, is situated on the right bank of the Oka, in lat. 54° 31′ N., long. 36° 20′ E. From the 14th to the 18th c., its stronghold was a great protection against the invasions of the Lithuanians, the Tartars of the Great Horde, and especially against the Crimean Tartars. Situated in the centre of the empire and on a navigable river, it carries on an extensive corn-trade, the corn being sent down the Oka to Nijni-Novgorod, and thence up the Volga, the Volga canals, and the Neva, to St Petersburg and the Baltic ports. The value of this branch of trade is 22,000,000 rubles (£3,500,000). There are several leather and other factories in the town. Pop. (1867) 36,080. K. has for many years been a place of banishment for political offenders; and used to be the residence of Schamyl, the Circassian chief.

KA'MA, a navigable river of European Russia, the principal affluent of the Volga, rises in the government of Viatka, and after a south-west course of 1100 miles, joins the Volga in the government of Kasan, 50 miles above the town of that name. Its chief tributaries are the Viatka, the Tchoussovaia, and the Bielaia. This river is navigable 40 miles below its source, and the navigation commences in the beginning of May. The annual value of the goods conveyed on the K. is estimated at £8,000,000. The river abounds in fish, especially salmon.

KÂMA, or KÂMADEVA, the Hindu god of Love, and one of the most pleasing creations of Hindu fiction. In Sanscrit poetry, especially that of a later period, he is the favourite theme of descriptions and allusions; and mythology exalts his power so much that it allows even the god Brahmâ to succumb to it. According to some Purânas, he was originally a son of Brahmâ; according to others, a son of *Dharma* (the genius of Virtue), by *S'raddhâ* (the genius of Faith), herself a daughter of *Daksha*, who was one of the mind-born sons of Brahmâ. The god S'iva being on one occasion greatly incensed at K., reduced him to ashes; but ultimately, moved by the affliction of Rati (Voluptuousness), the wife of K., he promised her that her husband should be reborn as a son of *Kr'ishna*. The god Kr'ishna, accordingly, having married Rukminî, she bore him *Pradyumna*, who was the god of Love. But when the infant was six days old, it was stolen from the lying-in chamber by the terrible demon S'ambara; for the latter foreknew that Pradyumna, if he lived, would be his destroyer. The boy was thrown into the ocean, and swallowed by a large fish. Yet he did not die; for that fish was caught by fishermen, and delivered to *Mâyâvatî*, the mistress of S'ambara's household; and when it was cut open, the child was taken from it. Whilst Mâyâvatî wondered who this could be, the divine sage, Nârada, satisfied her curiosity, and counselled her to rear tenderly this offspring of Kr'ishna. She acted as he advised her; and when Pradyumna grew up, and learned his own history, he slew the demon S'ambara. Mâyâvatî, however, was later apprised by Kr'ishna that she was not the wife of S'ambara, as she had fancied herself to be, but that of Pradyumna—in fact, another form of Rati, who was the wife of K. in his prior existence.—K. is described or represented as holding in his hands a bow made of sugar-cane, and strung with bees, besides five arrows, each tipped with the blossom of a flower which is supposed to conquer one of the senses. His standard is, agreeably to the legend above mentioned, a fabulous fish, called Makara; and he rides on a parrot or sparrow—the symbol of voluptuousness. His epithets are numerous, but easily accounted for from the circumstances named, and from the effects of love on the mind and senses. Thus, he is called *Makaradhwaja*, 'the one who has Makara in his banner;' *Mada*, 'the maddener,' &c. His wife, as before stated, is *Rati*; she is also called *Kâmakalâ*, 'a portion of Kâma,' or *Prîti*, 'affection.' His daughter is *Trishâ*, 'thirst or desire;' and his son is *Aniruddha*, 'the unrestrained.'

KAMI'NETZ-PODO'LSK, or PODOLSK, a town of West Russia, capital of the government of Podolia, is picturesquely situated near the Austrian frontier, on a steep rock above the river Smotritza, an affluent of the Dniester. Its foundation dates from the earliest times. Pop. (1867) 22,490. The most noteworthy buildings are the Gothic Cathedral and the Dominican Church. The fortifications, which were razed in 1812, have been renewed. K. was, before the partition of Poland, the strongest bulwark of that country against the Turks.

KA'MPEN, one of the prettiest towns of the Netherlands, in the province of Overyssel, is situated near the mouth of the Yssel, in the Zuyder Zee. Here a bridge 790 feet long, and upwards of 20 feet broad, extends across the river. Though formerly of greater importance, it still carries on a considerable general trade. Pop. 15,400.

KAMPTU'LICON, the name given to a kind of floor-cloth, which is said to be made of india-rubber and cork; much of it, however, consists of oxidised linseed oil and cork. The cork is reduced to a state resembling very fine saw-dust, and kneaded up with the real caoutchouc, or with the artificial kind made of oxidised linseed oil, the whole being kept very soft by heat. The mass is then made into sheets by passing through cylinder rollers heated with steam. The sheets, when cold, are ready for use, when no ornamental surface is required; but very excellent designs may be painted upon it, the same as upon ordinary floor-cloth. Kamptulicon, notwithstanding the ease with which it is made, is more expensive than the floor-cloth made by painting hempen or linen fabrics; it has, however, qualities which render it very valuable for special purposes; its elasticity to the tread not only makes it agreeable to walk on, but it is noiseless, and is consequently well adapted for hospital passages and other positions in which quiet is desirable; it is also impervious to damp, and thereby well suited to damp stone floors. See LINOLEUM, in SUPP., Vol. X.

KAMTCHA'TKA, PENINSULA OF, forms the south-east extremity of Siberia, from which it stretches southward, extending in lat. between 51° and 60° N., and in long. between 155° 40′ and 164° 20′ E. It is 725 miles long, and averages 190 miles in breadth. A chain of volcanic mountains traverses the centre of the peninsula, and gives rise to the rivers, of which the Kamtchatka is 150 miles in length. There are about 14 volcanoes in the peninsula, the most remarkable of which—the volcano of Plutchevsky—is 16,000 feet high. This mountain now only emits smoke and embers; but in former times, eruptions used to take place every seven or eight years. The soil, in general, is stony; but there are many tracts of mountain-slope which are arable. Agriculture, however, is much hindered by untimely frosts, periodical rains, and sometimes by multitudes of mice and rats. The bread required by the inhabitants of the fortresses of Petropaulovsk and Tagil is supplied from Okhotsk. The principal occupations of the inhabitants are fishing and hunting. The most valuable domestic animal is a peculiar kind of dog which never barks. K. was annexed to Russia at the end of the 17th c., after the expedition of the Cossack chief Atlasof. Pop. 10,000, made up of Kamtchadales, Kourdetri, Omototzi, and Russians. The Kamtchadales—the preponderating race of the inhabitants—live mostly in the south. They are small in stature, with a large head, broad face, black hair, small eyes, broad shoulders, and hanging lips and stomach. Formerly, they lived in tents made of branches; they now dwell in huts. They have nominally embraced Christianity, but retain much of their savage nature and superstitions. Nijni-Kamtchatsk, the chief town of the government, is situated on the river Kamtchatka. The fort of Petropaulovsk, with a fine harbour covered with ice only during a brief period of the year, is most picturesquely situated, and enjoys a healthful climate.

KAMYSHIN, a town of Russia, in the government of Saratov, 120 miles below the town of that name, on the right bank of the Volga, lat. 50° 5′ N., long. 45° 25′ E. It possesses (1867) 13,644 inhabitants, who carry on a considerable trade in corn.

KANAGA'WA, a town of Japan, and the shipping port of Yedo. It was opened (together with Hakodadi and Nagasaki) to British subjects on the 1st July 1859 by the treaty of August 1858.

It is situated on the northern edge of a bight on the western side of the great bay of Yedo, and about 16 miles from that city. Here is located the official section of the small foreign community which, through the manœuvres of the Japanese, has been established—not at K., but at Yokohama—on the opposite point of the bay, and in a more isolated situation. K. has a larger foreign trade than any other port of Japan. In 1873, the imports amounted to $19,535,758; the exports, to $15,095,218. The chief imports are cotton and woollen goods; the chief exports, silk and tea. Trade is carried on chiefly by American, British, and Dutch vessels.

KANARIS, Konstantin, a native of the isle of Ipsara, distinguished for his exploits in the Grecian war of independence, and particularly for the destruction of Turkish vessels by fireships. He was master of a small merchant-vessel before the commencement of the war. In 1822, he blew up the Turkish admiral's ship in the Strait of Chios, and thus avenged the cruelties which the Turks had perpetrated on the Greeks in that island. In November of the same year, he burned the Turkish admiral's ship in the harbour of Tenedos. His native isle of Ipsara having been ravaged, he took revenge, on 17th August 1824, by burning a large Turkish frigate and some transport-ships which were carrying troops to Samos, and thereby saved Samos from the calamity which Chios and Ipsara had endured. In 1825, he formed the bold design of burning the Egyptian fleet in the harbour of Alexandria, where it lay ready to carry troops to the Peloponnesus, and it appears that only an unfavourable wind springing up prevented his success. He was appointed to important commands by the Greek president, Capo D'Istrias, and in 1848 and 1849 was war minister of Greece, and president of the cabinet. In 1862, he took part in the revolution which overthrew King Otho, and has since been more than once in office under the present king.

KANAWHA, Great. See Great Kanawha.

KANDAVU, one of the Fiji Islands (q. v.).

KANE, Sir Robert, M.D., a celebrated chemist, was born in Dublin in 1810. He was educated for the medical profession, and in 1832 was received as a member of the Royal Irish Academy, and in the same year projected the *Dublin Journal of Medical Science*, which at first treated only of chemical and pharmical subjects. In 1840, he received the gold medal of the Royal Society of London for his researches into the colouring matter of lichens. From 1844 till 1847, K. was Professor of Natural Philosophy to the Royal Dublin Society, and in the last-mentioned year received the Cunningham Gold Medal of the Royal Irish Academy for his discoveries in chemistry. In 1846, he originated the Museum of Industry in Ireland, was appointed its first director, and the same year received from the Lord-lieutenant the honour of knighthood. He held for a number of years the office of president of the Queen's College, Cork, which he resigned in 1864. His important works are—*Elements of Chemistry* (1841—1842, 1849), a work of widely acknowledged merit; *Industrial Resources of Ireland* (1844), being the substance of a lecture delivered in the previous year, and published at the expense of the Royal Society of Dublin.

KANE, Elisha Kent, M.D., a celebrated Arctic explorer, was born in Philadelphia, United States, February 3, 1820, entered Virginia University in 1836, afterwards studied medicine, and entered the navy as a surgeon, in which capacity he visited China, India, the East Indies, and, under leave of absence, Arabia, Egypt, Greece, and Western Europe. Soon after returning home, he was ordered to the west coast of Africa in May 1846, but being attacked by fever, was compelled to return in the following April. He was then transferred to the military staff, and served in Mexico. In May 1850, he commenced his career of Arctic discovery as surgeon, naturalist, and historian to the first Grinnell expedition. In the spring of 1853, he was again sent out, this time as commander of a second Grinnell expedition, in which he achieved important results. These results are fully detailed in his *Second Grinnell Expedition in Search of Sir John Franklin* (2 vols. Philadelphia, 1856). On his return, in the autumn of 1855, honours were showered on the fortunate adventurer; he received gold medals from the Queen of Great Britain, the Royal Geographical Society of London, the American Congress, and the New York Legislature; but his health, which had been precarious since 1844, was rapidly failing, and after a visit to London, where he grew rapidly worse, he sailed to Havannah, where he died on February 16, 1857. His life has been written by W. Elder, M.D. (8vo, Philadelphia, 1857).

KANGAROO' (*Macropus*), a genus of marsupial quadrupeds, of which there are many species, almost all Australian, although a few are found in New Guinea and neighbouring islands. The genus, which some naturalists subdivide, is the type of a family *Macropidæ*, including also the Kangaroo-rats or Potoroos (q. v.), which have canine teeth in the upper jaw, whilst the kangaroos have no canine teeth, and in their dentition generally, and in their digestive system, make a nearer approach than any other marsupial quadrupeds to the ruminants; the potoroos, on the other hand, approaching the rodent type. Kangaroos are said sometimes to ruminate. The stomach of kangaroos is large, and is formed of two elongated sacs. They are entirely herbivorous. The *Macropidæ* are all characterised by great length of the hind-legs, whilst the fore-legs are small; but the radius allows a complete rotation of the fore-arm; and they make use of the fore-feet as organs of prehension, and for many purposes, with great adroitness. The fore-feet have five toes, each armed with a strong curved nail; the hind-feet have four toes—one very large central toe, with a very large solid nail. The hind-feet are very long, through an extraordinary elongation of the metatarsal bones. The tail is very long, thick, strong, and tapering, and is of great use in balancing the animal in its leaps, and also for sustaining the body in its ordinary erect sitting posture, in which it uses the hind-legs and the root of the tail as a tripod. In this posture, also, it usually walks by the hind-legs alone. The head is in form somewhat like that of a deer; the ears moderately large, and oval; the eyes large, and the aspect mild.

The Great K. (*M. giganteus*) is generally about 7½ feet in length from the nose to the tip of the tail, the tail being rather more than three feet in length, and fully a foot in circumference at the base. The height of the animal is rather more than fifty inches, in the erect sitting posture already mentioned, but it sometimes raises itself on its toes to look around it, and its height is then greater than that of a man. The Woolly K. or Red K. (*M. laniger*) rather exceeds it in size. The Great K. was first discovered in Cook's first voyage, 22d June 1770, and until that time it may almost be said that kangaroos were unknown to Europeans, although a New Guinea species (*M. Brunii*) had been described by Le Brun in 1711. It is of a grayish-brown colour, the fur moderately long, and moderately soft. It is found in many parts of Australia and in Van Diemen's Land. It sometimes attains the weight of 160 lbs., or upwards. Its flesh is highly esteemed, and it is much sought after by the colonists, so that it is now rare in regions where it was once abundant. It is not properly gregarious. The kangaroos are all timid animals, making their escape from their pursuers by extraordinary leaps. The Great K. often proves too swift for greyhounds. When driven to bay, it sometimes kills a dog by a single stroke of its hind-leg, the great nail ripping him open at once. Some of the kangaroos inhabit open plains, some are more generally found in forests, some are frequent on the snowy summits of the highest Australian mountains. They are of very various size; some are not much larger than a rabbit. They are easily tamed; some species have been brought to Britain, and have bred in zoological collections, but have not yet been properly naturalised.

Great Kangaroo (*Macropus giganteus*).

The exceedingly immature state in which young kangaroos are born, and the manner in which they are nourished, fall to be noticed in the article Marsupiata. Ere they finally desert the pouch of the mother, the young may be seen poking their heads out of it, and nibbling the herbage among which she moves.

KANGAROO GRASS (*Anthistiria australis*), the most esteemed fodder-grass of Australia. It grows to a height much above that of the fodder-grasses of Britain, affords abundant herbage, and is much relished by cattle. The genus is allied to *Andropogon*, and has clusters of flowers with an involucre. The awns are very long and twisted, both in the K. G. and in a nearly allied species, *A. ciliata*, which is one of the most esteemed fodder-grasses of India.

KANO', a great manufacturing and mercantile town and capital of a province of the same name, in the empire of Sokoto, Central Africa, stands in lat. 12° 2' N., and long. 8° 22' E. The province is estimated to contain 500,000 inhabitants, and from its beauty and wealth, has been called the 'Garden of Central Africa.' The wall which surrounds the town of K. is 15 miles in circuit, and between it and the town, which is circular in shape, and is about three miles in diameter, a space intervenes large enough to supply the inhabitants with corn in case of siege. The houses are built of clay, covered for the most part with conical thatched roofs. The industry consists chiefly in the weaving and dyeing of cotton cloths, which are exported from K. to the value of £30,000 annually, to Timbúktu on the west, over the empire of Bornu on the east, and to Tripoli on the north. Dr Barth estimates the number of slaves exported from K. at 5000 annually. The population is about 30,000, but during the busiest season of the year, from January to April, it rises to about 60,000.

KANSA, in Hindu Mythology, a king of the race of Bhoja—considered also as a demon, Kâlanemi, in human shape—notorious for his enmity towards the god Krishna (see Vishnu), by whom he was ultimately slain.

KA'NSAS, a river which, with its tributaries, drains the northern portion of the state of Kansas, United States of America, flowing eastward into the Missouri, into which it falls, on the eastern boundary of the state. Its northern branch, Republican Fork, rises in the Rocky Mountains.

KA'NSAS, one of the United States of America, lying between lat. 37° and 40° N., and long. 94° 40' and 102° W. Bounded on the N. by Nebraska, E. by Missouri, S. by Indian Territory, W. by Colorado, it is 208 miles broad, and 408 miles long, and contains 81,318 square miles. The capital is Topeka, and the principal towns are Atchison, Lawrence, and Leavenworth. The chief rivers are the Missouri, Kansas, Osage, Neosho, the Arkansas, and their branches. Nearly 2,000,000 acres are mineral lands, but three-fourths of the entire area is well suited for agriculture. There are no mountains or swamps, but the land rises in bluffs and rolling prairies. Efforts are being made to reclaim the arid plains, once called the 'Great American Desert,' and there seems promise of success. The soil is very fertile, producing all the cereals, with cotton, hemp, tobacco, and fruits. The prairies contain abundance of game, consisting of the buffalo, deer, antelope, wild turkey, wild goose, prairie hen. The rivers are full of fish, and their banks are sparsely timbered. Iron, coal, lignite, marble, kaolin, and salt are among the minerals. In 1872 there were 1771 lines of railway completed, and about 2000 more projected. In 1870 there were 1689 educational establishments, including a university and 21 colleges, 6 academies, 1 normal school, 1 grammar school, &c., with a total attendance of 59,882. K. was organised as a territory in 1854, and became the scene of violent contests between northern and southern settlers, on the question of slavery. After much violence, a constitution was adopted, excluding slavery, and K. was admitted into the Union, January 29, 1861. Pop. in 1870, 364,399.

KAN-SU', the most north-western province of China, is bounded on the E. by Shen-se, on the S. by Tibet and Se-Chuen. Area estimated at from 80,000 to 100,000 square miles; the pop. is 15,193,135. Its surface is mountainous; chief river the Hoang-ho. Lan-chow is the capital, and there are six other cities of the first rank.

KANT, Immanuel, one of the greatest and most influential metaphysicians of all time, was the son of a saddler, of Scotch descent, and was born at Königsberg, 22d April 1724. He was educated at the university of his native town, and after spending some years as a private tutor, took his degree at Königsberg, in 1755, and began to deliver prelections on logic, metaphysics, natural philosophy, and mathematics. In 1762, he was offered, but declined the chair of poetry, and in 1770, he was appointed professor of logic and metaphysics. He died 12th February 1804. K.'s private life was uneventful, yet curious and almost ludicrous in its mechanical regularity. As Socrates could hardly be induced to go beyond the walls of Athens, so K. clung with oyster-like tenacity to the city of his birth, never leaving it during the thirty years of his professorship.

He remained a bachelor all his life. K. was a man of unimpeachable veracity and honour, austere even in his principles of morality, though kindly and courteous in manner, a bold and fearless advocate of political liberty, and a firm believer in human progress. The investigations by which he achieved the reputation of a reformer in philosophy, refer not so much to particular sections or problems of that science, as to its principles and limits. The central point of his system is found in the proposition, that before anything can be determined concerning the *objects* of cognition, the *faculty* of cognition itself, and the *sources of knowledge* lying therein, must be subjected to a critical examination. Locke's psychology, indeed, at an earlier period in European speculation, had shewn a similar tendency; but before K., no thinker had definitely grasped the conception of a critical philosophy, and K. himself was led to it not so much by Locke, as by Hume's acute scepticism in regard to the objective validity of our ideas, especially of the very important idea of causality. The Kantian criticism had a twofold aim: 1st, to separate the necessary and universal in cognition from the merely empirical (i. e., from the knowledge we derive through the senses); 2d, to determine the limits of cognition.

In regard to the former of these, it is of importance to observe, that K. did not subject the old psychological doctrine of 'faculties' to any analysis, but attributed to each of these—viz., to the faculties of Sense, Understanding, Judgment, and Reason—certain innate *à priori* forms, conceptions, and functions, which, as constituting the necessary conditions of any experience whatever, possessed, on account of their subjective necessity, a universal subjective validity. Thus, in the Sense, as the faculty receptive of external impressions, there must lie, according to K., the forms of Space and Time; in the Understanding, as the faculty by which the manifold in appearance is combined in the unity of conception, the Categories; in the Reason, as the faculty of principles, the Ideas of the Unconditioned and the Absolute; in the Judgment, in as far as it is not merely subsumtive, but also reflective, the conception of Design or Conformity to the purpose in view; finally, in the Will or the Practical Reason, the Categorical Imperative of the Moral Law.

In regard to the latter aim of the Kantian criticism—viz., to determine the limits of theoretical knowledge—the efforts of K. go to shew that universal forms existent *à priori* in the human mind, can afford knowledge only under the condition that the objects which they cognize are presented by experience; while for the determining of what lies beyond the limits of Experience, they are merely empty forms, by which something indeed is *thought*, but nothing *known*. Even within the limits of Experience itself, we are cognizant, according to K., through the forms of the Sense and of the Understanding, not of things as they are in themselves, but only as they appear; hence the opposition between *noumena* and *phænomena*. But when we try to transcend those limits, and to ascertain the intelligible basis of the phenomenal world by the forms of the Sense and the Categories, the *Reason* becomes entangled in an unavoidable Dialectic, for which there is no objective, but only a critical solution. The objects of this Dialectic, the carrying out of which constitutes an essential and leading part of the *Critique of the Pure Reason*, are the Soul, the World, and God; and in relation to the cosmological conceptions in particular (viz., of the Beginning and End of the World, of the Unity or Non-unity of the ultimate particles of Things, of Causality through Freedom or through the necessity of Nature), the Reason is involved in a series of self-contradictions (in the Kantian technology, *antinomies*). The result, according to K., of the critical examination of all claims to a knowledge transcending Experience in the regions of rational or speculative Psychology, Cosmology, and Theology, is the necessity for abandoning the hope of attaining such. The idea (native to the Reason) of the Unconditioned is allowed to possess a regulative, not a constitutive value; that is to say, it is a principle necessary for the extension of our inquiries beyond the fixed limits of experience, without, however, yielding us an extended knowledge. So far the philosophy of K. is purely negative and destructive. Hamilton, Mansel, and others have—in regard to the limits of the knowable—merely reiterated the arguments of the great German, while in regard to the points in which they do differ from him, as, for example, the *nature* of our knowledge, it is a matter of very great doubt if they are as logical and consistent as their predecessor.

But the austere and stoical morality of K. was something too *positive* to allow him to rest satisfied with merely negative results; hence he sought in the reality of his Ethics a compensation for the nihilism of his Metaphysics. He maintained the unconditional validity of the Moral Law, and of the consequences which legitimately flow from it. This validity, however, it should be observed, is simply *moral*, and in no way demonstrates the metaphysical reality of the ideas, which, nevertheless, by a power of its own, it compels us to accept. The Reason, as operating in the sphere of Ethics, is called by K. the Practical Reason, or the Practico-legislative Reason. The ideas which the Practico-legislative Reason postulates are, 1st, the idea of *Freedom;* 2d, of Immortality, as the necessary condition for an ever-increasing approximation to the fulness of the Moral Law; and 3d, of the Being of God, as the necessary condition of such a regulation of the universe as shall shew the order of nature to be the expression of a moral design. Rejecting all the ontological, cosmological, and physico-theological proofs of the existence of God as mere futilities, K. based his belief in God on the inward necessities of a practical morality. Religion—i. e., the recognition of our duties as divine commands—has, in the system of K., the closest dependence on Morality; in fact, becomes identical with it. This purely ethical conception of religion led him to a criticism of the positive dogmas of theology from an ethical standpoint, in which are contained most of the elements of theological rationalism. The application of the Practical Reason, as understood by K., to Æsthetics and Jurisprudence is equally fruitful of important results.—K.'s first work, *Gedanken von der wahren Schätzung der lebendigen Kräfte* (Thoughts on the True Estimation of the Active Powers), was published in 1747. The principal of its successors were, *Die falsche Spitzfindigkeit der vier syllogistischen Figuren* (The False Hair-splitting of the Four Syllogistic Figures, 1762), *Beobachtungen über das Gefühl des Schönen und Erhabenen* (Observations on the Beautiful and Sublime, 1764); *De Mundi Sensibilis et Intelligibilis Forma et Principiis* (On the Form and Principles of the Sensible and Intelligible World, 1770); this is the prelude to his *Kritik der reinen Vernunft* (Critique of the Pure Reason, 1781); *Grundlegung der Metaphysik der Sitten* (Basis of the Metaphysics of Ethics, 1785), *Kritik der pratischen Vernunft* (Critique of the Practical Reason, 1788), *Kritik der Urtheilskraft* (Critique of the Judgment, 1790), and *Religion innerhalb der Grenzen der blossen Vernunft* (Religion within the Limits of Mere Reason, 1793). For an account of the influence of K. in the development of speculation in Germany, see German Philosophy.

KA'OLIN is the name given by the Chinese to the fine white clay which they use in making their porcelain. It is furnished by the decomposition of a granitic rock, the constituents of which are quartz, mica, and felspar, the latter having gradually mouldered, by the joint action of air and water, into this substance. A very similar clay, to which the Chinese name has been given, occurs near St Austel in Cornwall, and near Limoges in France. In these cases, it is produced by the decomposition of *Pegmatite*, a granite in which there is scarcely any mica, and very little quartz. All clays are silicates or hydrated silicates of alumina; and these clays, which are much valued by the porcelain-makers, may be represented by the formula $Al_2O_3,3SiO_3 + 2HO$.

KAPILA, the renowned founder of the Sânkhya (q. v.), one of the philosophical systems of the Hindus. Professor J. E. Hall, in his learned and excellent preface to his edition of the text-book of the Sânkhya, the *Sânkhya-Pravachana*, says: 'By the prevalent suffrage of mythology, Kapila is reputed to have been a son of Brahmâ; but he is otherwise described as an incarnation of Vishnu. He is also recounted to have been born as the son of Devahûti; and again is identified with one of the Agnis or fires. Lastly, it is affirmed that there have been two Kapilas—the first, an embodiment of Vishnu; the other, the igneous principle in human disguise. It must be acknowledged, in short, that we know nothing satisfactory concerning Kapila; the meagre notices of him that are producible being hopelessly involved in uncertainty, and inextricably embarrassed by fable. Yet it may be credited, with but little hesitation, that he was something more substantial than a myth; and there seems to be tolerably good ground for receiving, as an historical fact, his alleged connection with the Sânkhya.'—*Bibliotheca Indica*, *Sânkhyapr.*, p. 14, *seq.*

KARAITES. See Jewish Sects.

KARAMA'N, KARAMA'NIA, or **CARAMANIA**, an inland eyalet of Asia Minor, is bounded on the W. by Anatolia, on the E. by Rumili, on the S. by the Taurus Mountains. Cattle-breeding is the chief employment of the inhabitants, who are for the most part nomadic Turks. The town of Karaman or Larauda, said to be the chief trading town of this district, contains a population variously estimated at from 10,000 to 20,000.

KARAMSIN, Nicholas Michailowitsh, the greatest of Russian historians, was born on 1st December 1766, at Bogoroeldza, in the government of Simbirsk. His father was an officer of Tartar descent, and placed him in the army, but he soon retired from it, and devoted himself to literary pursuits, and after a tour in Germany, Switzerland, and France, took part in establishing the *Moscow Journal*, and published volumes of tales, poetry, &c. But the work which first gained him a high reputation was his *Letters of a Russian Traveller* (6 vols. Moscow, 1797—1801), a work which exercised an extraordinary influence in the improvement of literary taste in Russia. After some other literary attempts of no great importance, he directed his attention to the history of his country. In 1803, he was appointed imperial historiographer, with a pension of 2000 rubles; and from this time he laboured uninterruptedly at his *History of Russia* (12 vols. Petersb. 1816—1829), for the preparation of which he had access to all the national archives. For this work, the Emperor Alexander, who had read part of it in manuscript, made him a present of 60,000 rubles. It has been translated into other languages. It comes down only to 1611. It is in high repute in Russia, displays much research and judgment, and is, in fact, by far the most valuable work in Russian historical literature. K. died on May 13, 1826.

KARA'SU-BAZAR, a manufacturing town in the Crimea, 25 miles east-north-east of Simferopol. It is surrounded by gardens, and contains 5 churches and 22 mosques with minarets. Pop. (1867) 14,397, who carry on considerable trade, and manufacture morocco leather and other articles.

KARATCHE'F, a town in the north-west of the government of Orel, European Russia, on the Sniejas, an affluent of the Dezna, dates from the 12th c., and contains (1867) 10,023 inhabitants, who carry on a large trade in cordage.

KARDZSA'G-UJ-SZALLA'S, a market-town of Hungary, capital of the district of Great Cumania, is situated about 90 miles east-south-east of Pesth. It is the centre of a district of exuberant fertility, and is the mart for the grain, fruit, wine, and cattle raised in that district. Pop. (1869) 14,486.

KARE'LIA, an ancient province of Sweden, near the Gulf of Finland, annexed to the Russian empire by Peter the Great, and now forming portions of the governments of Finland, St Petersburg, Olonetz, and Archangel. The original inhabitants were of Finnish origin.

KARE'NGIA (*Pennisetum distichum*), a grass closely allied to the Millets, and producing a grain of the same kind. It is a native of Central Africa, and is extremely plentiful on the southern borders of the Sahara, supplying in some places the principal part of the food of the inhabitants.

KARIKA'L, a remnant of the once extensive possessions of France in India, lies on the Coromandel Coast, on the estuary of one of the branches of the Kaveri, within the limits of the British district of Tanjore. It contains only 63 square miles, with (1869) 92,516 inhabitants, of whom the great majority are natives. K. was ceded to the French by the Rajah of Tanjore in 1759. Having subsequently fallen into the hands of the English, it was restored at the general pacification of 1814, on condition that it should neither contain any fortification, nor possess any garrison, unless for purposes of police. This tract is of little commercial importance, for it is only during the season of high water that the estuary is navigable even for coasting craft. K. is 150 miles to the south of Madras.

KARNA'C. See Thebes.

KARR, Jean Alphonse. See Supp., Vol. X.

KARROO' is the original Hottentot term, now generally adopted into the language of physical geography, for the immense barren tracts of tablelands, about 2000 feet above the sea-level, which occupy such a large portion of the surface of the Cape Colony and the region north of it. The karroos of South Africa are generally composed of shallow beds of the richest clay-soil, resting on a substratum of slaty rock, and only want the fertilising power of water to render them as productive as any other part of the surface. After heavy rains, luxuriant vegetation quickly springs up, which as quickly perishes; and the different rivers shewn on maps as crossing the karroos, are generally little more than dry water-courses, with strings of standing pools in their beds. In the most barren portions the soil is much impregnated with alkaline matter.

The principal karroos of the Cape Colony are found extending in a north-easterly direction, between the Roggeveld and Nieuveld Mountains and the coast ranges, forming a belt of table-land about 350 miles in length, with an average width of

60 miles, and only inhabited by the Boers in the winter season, when water and grass are abundant.

Within the last few years, by the introduction of merino sheep, and the construction of dams, land in the karroo is becoming more valuable; and farms that, a few years ago, were considered nearly valueless, now realise considerable sums.

KARS, the capital of a pashalik in the Turkish eyalet of Erzerum or Armenia, 110 miles north-east from Erzerum, near the Russian border. It is situated on a table-land of upwards of 6000 feet in elevation; the climate is therefore rather severe. Pop. 12,000, mostly Armenians, who carry on an active transit trade. In 1828, it was taken from the Turks by the Russians under Paskievitsch. The siege of K. by the Russians under Mouravieff, and its defence by the Turks, with the aid, and under the conduct, of General Williams, form one of the most brilliant passages in the history of the Crimean war. The siege began on the 16th of June 1855, and the place held out till the beginning of December.

KÂRTTIKEYA, the Hindu Mars, or god of war, a being represented by the Purânic legends as sprung from S'iva, after a most miraculous fashion. The germ of K. having fallen into the Ganges, it was on the banks of this river, in a meadow of S'ara grass, that the offspring of S'iva arose; and as it happened that he was seen by six nymphs, the *Kr'ittikâs* (or Pleiades), the child assumed six faces, to receive nurture from each. Grown up, he fulfilled his mission in killing Târaka, the demon-king, whose power, acquired by penances and austerities, threatened the very existence of the gods. He accomplished, besides, other heroic deeds in his battles with the giants, and became the commander-in-chief of the divine armies. Having been brought up by the Kr'ittikâs, he is called *Kârttikeya*, or *Shân'mâtura*, the son of six mothers; and from the circumstances adverted to, he bears also the names of *Gângeya*, the son of Gangâ; *S'arabhû*, reared in S'ara grass; *Shan'mukha*, the god with the six faces; &c. One of his common appellations is *Kumâra*, youthful, since he is generally represented as a fine youth; and as he is riding on a peacock, he receives sometimes an epithet like *S'ikhivâhana*, or 'the god whose vehicle is the peacock.'

KA'SCHAU, a town of Hungary, is situated in the beautiful valley of the Hernad, surrounded by vine-clad mountains, 130 miles north-east of Pesth. It contains 15 churches, of which that of St Elizabeth (built 1342—1382) is said to be by far the finest Gothic edifice in Hungary. Stoneware, leather, cloth, sugar, tobacco, and paper, are manufactured. Pop., inclusive of suburbs (1869), 21,742. Two battles were fought near K. during the Hungarian revolution, both of which the Austrians gained.

KASHA'N, one of the most flourishing towns of Persia, is situated in a well-peopled, well-cultivated district, 3690 feet above sea-level, and 92 miles north of Ispahan. The vicinity is celebrated for its fruit, and the town for its extensive manufactures of silk-stuffs, gold brocade, carpets, and copper-wares. It is a large town, and abounds, like all Persian towns, in mosques, bazaars, baths, &c. Pop. 30,000.

KASHGA'R. See CASHGAR.

KASKA'SKIA, a river of Illinois, United States of America, which rises in the eastern part of the state, and running south-west, falls into the Mississippi at Kaskaskia. It is navigable to Vandalia, 150 miles.

KASSIMO'F, a town in the north-east of the government of Riazan, European Russia, on the left bank of the Oka, dates from the 12th century. Pop. (1867) 12,927. The chief branches of industry are tanning, rope-making, and chemicals. In the vicinity are several tombstones and other interesting relics of the time of the Mongolian rule.

KASTAMU'NI, a town of Turkey in Asia, in the north of Anatolia, is capital of an eyalet of the same name. The glory of this city has to a great extent departed. It contains thirty mosques, and about as many public baths; but its industrial products comprise only cotton goods to a small extent, and some copper-wares. Pop. 12,350.

KAT RIVER, a branch of the Great Fish River, in the Cape Colony, rising in the Didimaberg, in the valleys of which, in 1828, were settled, under the care of the London Mission Society, a large body of Hottentots and Bastaards, who occupied the country formerly inhabited by the Kafir chief Macomo and his people. But in the commencement of the war of 1850, the credulous Hottentot population believing that the Colonists were about to drive them from their farms, threw themselves into the arms of the Kafir chiefs, and expelling the missionaries, invaded the Colony. This led to the breaking up of the settlement as a mission station and exclusive native reserve; and it now forms the division of Stockenstroom, and is inhabited by a rather dense, mixed population of Hottentots, Fingoes, and Europeans. It is one of the best watered, wooded, and fertile districts in the Cape Colony, and includes an area of about 400 square miles.

KATER, HENRY, a mechanist of considerable eminence, was born at Bristol in 1777, and died in London in 1830. At his father's desire, he began the study of the law, but in 1794 relinquished his legal studies, and obtained a commission in the 12th Regiment of Foot, then stationed in India. During the following year, he was actively engaged, under Colonel Lambton, in the trigonometric survey of India; and on his return in 1808, became a student in the senior department at Sandhurst, and was shortly afterwards promoted to a company in the 62d Regiment.

His contributions to science are chiefly to be found in the *Philosophical Transactions*, to which, between the years 1813 and 1828, he contributed fifteen papers. The most important of these memoirs are those relating to his determination of the length of the seconds' pendulum at the latitude of London; and those which describe his 'floating collimator,' an instrument for aiding the determination of the horizontal or zenith points. For the invention of this instrument, he received the gold medal of the Royal Astronomical Society. In addition to these memoirs, he was, conjointly with Dr Lardner, the author of 'A Treatise on Mechanics' in the *Cabinet Cyclopædia*. Most of the learned societies in Great Britain and on the continent enrolled him among their members. His memoirs on the verification and comparison of the standards of weights and measures of Great Britain and Ireland, induced the emperor of Russia to employ him to construct standards for the weights and measures of that country; and for these labours he received the order of St Anne, and a diamond snuff-box. He died from an affection of the lungs in the fifty-third year of his age.

KA'TRINE, LOCH, one of the most celebrated of Scottish lakes, is situated near the south-west border of Perthshire. It is eight miles in length, and three-quarters of a mile in mean breadth; greatest depth, 78 fathoms; height above the sea, about 370 feet. Its shape is serpentine, and displays great variety of shore and background. Ben Venue and Ben An are on its banks. It contains several islets, one of which, Ellen's Isle, is the centre of the action of the *Lady of the Lake*. Several also of Wordsworth's lyrics were written on subjects suggested in this locality.

The waters of Loch K. are remarkably pure, having only one degree of hardness, and in all, two grains of solid matter to the gallon. The water-supply of the city of Glasgow (q. v.) is drawn from this lake and those connected with it (Vennachar and Achray). The water is conducted first by a tunnel 6975 feet long through a mountain, and then by aqueducts, pipes, and tunnels, to the reservoir near the city—a distance of upwards of 25 miles.

KÁTSENA, a large, but now desolate town of Central Africa, capital of a province of the same name, subject to the Sultan of Sókoto, is situated in a beautiful and salubrious district in lat. 12° 54′ N., and long. 7° 25′ E., ninety miles north-west of Kanó. It is surrounded by a wall about fourteen miles in circuit, and contained at one time at least 100,000 inhabitants. In 1807, the conquering Fúlbe assailed it, and a war was commenced, which lasted for upwards of seven years. The capture of K. was achieved only through its destruction. It has now a population of from 7000 to 8000, and Kano (q. v.) has taken its place as the centre of commerce for the country.

KATTIMUNDOO′, or **CUTTIMUNDOO**, a substance somewhat resembling gutta-percha. It is the milky juice of the East Indian plant, *Euphorbia nereifolia*, and is either obtained as a natural gum, which has oozed through the bark, or by making incisions, and collecting the juice which flows. It is much used in India as a cement for knife-handles, and for similar purposes, but is not exported to other countries.

KATTYWA′R, a term originally applied to one of the ten districts of the peninsula of Guzerat, has gradually been made to extend, as a collective name, to the whole of them. In this larger sense, it stretches in N. lat. from 20° 42′ to 23° 10′, and in E. long. from 69° 5′ to 72° 14′, containing 21,000 square miles, and 1,475,685 inhabitants. This province of India, touching on part of its eastern frontier the district of Ahmedabad, is everywhere else bounded by water—the Runn and Gulf of Cutch, the Arabian Sea, and the Gulf of Cambay. Politically, the country is divided among more than 200 chiefs, some of them paying tribute to the Guicowar of Guzerat, and the rest to the British government, but all of them being under the protection of the latter since the year 1820. Between them, these petty princes have a revenue of £865,270 sterling, and a force of about 4000 cavalry and 8000 infantry. The climate is unhealthy, and the surface is generally undulating. The principal crops are millet, maize, wheat, sugar, and cotton.

KÂTYÂYANA, a name of great celebrity in the literary history of India. It belongs, in all probability, to several personages renowned for their contributions to the grammatical and ritual literature of the Brahmanical Hindus; but it is met with also amongst the names of the chief disciples of the Buddha, S′âkyamuni.—The most celebrated personage of this name, however, is K., the critic of the great grammarian Pân′ini; and he is most likely the same with the K. who wrote the grammatical treatise called the *Prâtis′âkhya* of the white Yajurveda. See VEDA. Professor Goldstücker, in his *Pân′ini, &c., his Place in Sanscrit Literature* (London, 1861), has shewn that he cannot have been a contemporary of Pân′ini, as was generally assumed; and in a paper recently read by him before the Royal Asiatic Society (February 1863), he has proved that this K. lived at the same time as the great grammarian Patanjali, whose date he had previously fixed between 140 and 120 before the Christian era. See PATANJALI.

KA′TYDID (*Platyphyllum concavum*), a species of Grasshopper (q. v.) of a pale-green colour, a native of North America, very plentiful in some parts of the United States, where its peculiar note is always to be heard during the summer, from the evening twilight till the middle of the night. This note is almost like a shrill articulation of the three syllables kat-y-did, following each other in quick succession, after which there is a pause of two or three minutes. The organ of sound is a transparent elastic membrane in a strong oval frame, in each of the wing-covers; these membranes, by the overlapping of the wing-covers, can be made to rub against one another, and the sound is produced by the friction.

KA′TZBACH, a small river in the Prussian province of Silesia, falling into the Oder at Parchwitz. It has become famous in history from the battle fought on its banks on 26th August 1813, between the French troops under Marshal Macdonald, and the Prussians under Blucher, in which the latter were completely victorious. The French lost in the battle of the K. 5000 killed, and 18,000 wounded and prisoners, with 103 cannons, two eagles, and 250 ammunition-wagons.

KAULBACH, WILHELM VON, a celebrated German painter, was born at Arolsen, in the principality of Waldeck, 15th October 1805, and in his seventeenth year entered the Academy of Arts at Düsseldorf, where he soon became one of Cornelius's best pupils. He seemed thoroughly penetrated by the severely ideal and allegorical spirit of that great master, yet even from the first he displayed no lack of individual genius. Among his first important productions (1828—1829), were six symbolical figures, the best known of which is 'Apollo among the Muses.' To the same period belongs a work of a wholly different and even opposite character, 'The Madhouse,' conceived and executed in the most vigorously realistic spirit. It added immensely to K.'s reputation, and King Ludwig of Bavaria now employed him to decorate Duke Maximilian's palace in Munich. For this he executed, in the strictly antique style, sixteen frescoes illustrating the fable of Psyche and Cupid. His designs from Klopstock, Goethe, and Wieland, for the same monarch, are also worthy of mention. In 1837, K. completed his 'Battle of the Huns,' a picture representing the grand legend of the continued struggle in mid-air of the souls of the Huns and Romans who had fallen before the walls of Rome, which was regarded as the culmination of the new German school. Nevertheless, the realism of which we have spoken still found expression in various works. His patient study of Hogarth is quite visible in his illustration of Schiller, of Goethe's *Faust*, and *Reineke Fuchs*. In 1846, K. completed what is probably his chef-d'œuvre, the 'Destruction of Jerusalem by Titus.' It is a marvellous mixture of history and symbolism. In 1849, K. succeeded Cornelius as director of the Bavarian Academy of Art. In 1859, he finished his 'Battle of Salamis.' The *grisaille* cartoon (in oil) of Peter Artries is one of his latest and most characteristic works; among his other paintings are 'The Tower of Babel,' and a series of frescoes at Munich. Latterly he painted many portraits. He died April 7, 1874.

KAUNITZ, WENZELIUS ANTHONY, PRINCE VON,

Count of Rietberg, a great Austrian statesman, born at Vienna in 1711; studied at Vienna, Leipsic, and Leyden; travelled in England, France, and Italy; and being the head of an ancient and honourable family, soon received important political appointments from the Emperor Charles VI. He continued to fill important situations under Maria Theresa. He gained great fame as a diplòmatist, in 1748, at the congress of Aix-la-Chapelle. He was afterwards Austrian ambassador at the French court; and in 1753, was appointed court and state chancellor, and in 1756 chancellor also for the Netherlands and Italy, and continued for almost forty years to have the principal direction of Austrian politics. The project of the partition of Poland originated with him. He had so much to do in the management of the political affairs of Europe, that he was jocularly called the European coach-driver. He was very vain and confident of his own abilities, so that his highest praise for anything which he thought well done was to say with an oath: 'I could not have done it better myself.' He was narrow in his political views, regarding exclusively the supposed interests of Austria, but sincere and upright according to his notion of his duty. He took a very active part in the ecclesiastical reforms of Joseph II., so that at Rome he was styled *the heretical minister*. He was a liberal patron of the arts and sciences. He retired from public life on account of old age, when Francis II. ascended the throne, and died 27th June 1794.

KAU'RI, or **KOWRIE**, or **K. PINE** (*Dammara australis*), a species of Dammar (q. v.), a native of New Zealand. It is a tree of great size and beauty, and is said sometimes to attain a height of 140 feet or more, with whorls of branches, the lower of which die off as it becomes old. The timber is white, close-grained, durable, flexible, and very valuable for masts, yards, and planks. It is much used for masts for the British navy, no other being considered equal to them. The Fiji Islands, New Hebrides, and Australia produce other species, the timber of all of which is sold under the name of *K. Pine*, although there are differences of quality. All of them are trees of dark dense foliage. All of them also produce a resin called K. RESIN, or K. GUM, and sometimes Australian Copal and Australian Dammar, of which large quantities are imported into Britain and North America, chiefly from New Zealand. It is sometimes found in pieces as large as a child's head, of a dull amber colour, where forests of these trees have formerly grown, and is obtained by digging. It is also collected from the trees from which it has newly exuded, and is then of a whitish colour. It is used for making varnishes, &c.

KAVA. See AVA.

KAZA'N, a town of Russia, capital of the government, and ancient capital of the kingdom of the same name, is situated on the river Kazanka, four miles from the north bank of the Volga, and 200 miles east-south-east of Nijni-Novgorod. It was founded in 1257 by a Tartar tribe, and after various vicissitudes, was made the capital of an independent kingdom, by the Khan of the Golden Horde, which flourished in the 15th century. In 1552, the Russians, under Iwan the Terrible, carried the town after a bloody siege, and put an end to the existence of the kingdom. Pop. (1867) 78,602. K. contains 70 churches and 9 mosques; a university, theological academy, and other educational establishments. The manufactures are leather, soap, cloth, and silk.

KAZAN (in Tartar, *a golden-bottomed kettle*), a government of Russia, between Astrakhan on the east, and the government of Nijni-Novgorod on the west. Area, 23,650 square miles, $\frac{3}{8}$ths of which is cultivated, $\frac{1}{8}$th in pastures, and $\frac{1}{8}$th covered with forests. Pop. (1867) 1,670,337—mostly Christians, with a number of Moslems, and some idolaters. The soil is for the most part fertile; corn is exported; the climate is rather severe, but healthy. Cattle-breeding, keeping of bees, and fishing are the chief employments of the people. There is an extensive trade in timber, pitch, and wooden dishes.

KAZIMI'RZ, a town of Poland, in the government of Lublin, on the right bank of the Vistula, 30 miles east-south-east of Radom. It was founded in 1350, and formerly carried on a flourishing trade in grain, in which a number of English commercial houses established here were engaged. K. contained in 1867 only 2606 inhabitants, of whom a great many were Jews.

KEAN, EDMUND, was born in London about 1787. His father was a stage-carpenter; his mother, an actress. From his infancy, the glare of the footlights was familiar to him as the light of common day. While but a child, he made his appearance on the boards, and on one occasion gave a recitation before George III. at Windsor Castle. In 1803, he joined a strolling company in Scotland, and for eleven years he performed in country theatres. He came to London in 1814, in which year he appeared as Shylock in Drury Lane, his immense popularity filling the coffers of the managing committee, and enriching himself. All London flocked to hear him; and Hazlitt, Hunt, and Lamb, who were constantly in the pit, declared that his acting was like 'teaching Shakspeare by a flash of lightning.' He twice visited America, made meteoric visits to the provinces, and ever in the heyday of his powers 'the pit rose at him,' to use his own expression. Unhappily, his habits were dissolute, and almost constant intoxication impaired his memory and his physical vigour. In 1833, while his son Charles was playing Iago to his Othello, the great actor broke down, and was led off the stage. He never again appeared in public. His death took place at Richmond on the 15th May 1833. His great characters were Othello, Shylock, Richard III., and Sir Giles Overreach. He was amongst actors what Byron is amongst poets, and Napoleon amongst generals.

KEAN, CHARLES JOHN, second son of Edmund, was born in 1811, and educated at Eton. When his father fell into ill-health, he adopted the stage as a profession. He was popular in the provinces and in America before he achieved reputation in London. He married, in 1842, Miss Ellen Tree, and till his death in 1868 they acted together. He became the lessee of the Princess's Theatre in 1850, and was the director of the royal theatricals. His management at the Princess's Theatre was distinguished chiefly by the splendid manner in which certain plays were produced. The utmost pains was expended on scenery and dress, and as much care was taken to avoid anachronisms as to secure good acting. *Sardanapalus*, produced in 1853, was perhaps the most striking of these 'restorations,' as they are called. K. attempted the parts in which his father shone, but did not succeed in being more than a comparative to the superlative which the elder generation of playgoers remembered. In a lower line of character, and in such pieces as the *Corsican Brothers*, *The Wife's Secret*, and *Louis XI.*, he was more at home than in the world of Shakspeare.

KEANG-SI, an inland province of China, lies immediately north-west of the maritime province of Fo-kien. See CHINESE EMPIRE.

KEANG-SU′, an important maritime province of China, the wealthiest and most densely peopled district of the empire. See Chinese Empire.

KEATS, John, an English poet, was born in London in 1796. He was educated at Enfield, and was afterwards apprenticed to a surgeon. Certain of his sonnets were published in the *Examiner*, then edited by Mr Leigh Hunt, and received his cordial admiration. He published in 1817 his first volume of poems; and in the following year *Endymion* appeared, dedicated to the memory of Thomas Chatterton. This poem was severely handled in the *Quarterly Review* and in *Blackwood*. He published a third volume of poems, containing *Lamia*, *Isabella*, *Eve of St Agnes*, the fragment of *Hyperion*, and the odes to the *Nightingale* and the *Grecian Urn*. His health was at this time delicate; and shortly after the publication of his book he went to Italy, and died at Rome, on the 24th February 1821, his last moments soothed by the tender care of Mr Severn the artist. The English pilgrim can see his grave and Shelley's in affectionate neighbourhood. An admirable memoir of K., with copious selections from his letters, was published by Monckton Milnes (Lord Houghton).

K.'s early poems are disfigured by conceits and affectations, but his latest place him amongst the masters of his art. The *Eve of St Agnes* is as melodious as any portion of the *Faery Queen*; *Hyperion* has something of the organ-tone of Milton. His influence is strikingly apparent in the subsequent efforts of the English muse—Browning has his colour without his melody, Tennyson has his colour and his melody both.

KEBLE, John. See Supp., Vol. X.

KECSKEME′T, a town of Hungary, 54 miles south-east of Pesth, is a station on the railway between that city and Temesvar. It is said to be the greatest market-town in the country, and with its extensive suburbs, its streets, straggling and low buildings, may be considered as a type of the Magyar town. Agriculture and vine-growing are carried on; but the inhabitants are chiefly employed in rearing cattle, sheep, horses, and swine. Five markets are held here annually; the cattle-market is the most important in Hungary. Pop. (1869) 41,195.

KEDGE, or KEDGE-ANCHOR, a small anchor used in large ships to keep the bow of the vessel clear of the bower, or principal anchor. Another use of the kedge is to move the ship from mooring to mooring in a harbour; for this purpose, it is conveyed to a distance in a boat, then dropped, and the vessel hauled up towards it by a cable attached.

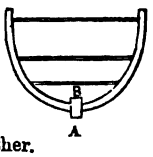
KE′DJERI, a seaport of Bengal, stands on the west side of the most westerly channel of the Hoogly, once the principal approach to Calcutta from the sea. Between it and the metropolis there is a telegraphic line of about 40 miles in length, being the first work of the kind in India.

KEEL is the backbone, as it were, of a ship, running longitudinally along the middle of the bottom. It consists of massive timbers clinched together lengthwise. From it spring, on either side, the ribs on which the ship's sides are laid, and from it, at the bow and stern respectively, the stem and the stern-post. As the decks bear by transverse beams upon the ribs, it follows that the whole weight of the ship and its contents exercise an oblique lateral pressure on each side of the keel. It is usually protected by strong iron binding, so that the keel may be as little injured as possible, in the event of the ship taking the ground. In iron vessels of modern construction, the keel is frequently dispensed with, corresponding strength being obtained by internal tie-beams, &c.; but the absence of the keel takes away one preventive to rolling from side to side. To be 'on an even keel,' is to have the keel parallel to the surface of the water, i. e., the bow and stern equally deep.

KEELAGE, a toll or custom payable by ships for resting in a port or harbour.

KEELHAULING, a punishment in use, or formerly in use, for sailors in the Dutch navy. The culprit was suspended from one yard-arm, and attached to him was a rope passing beneath the keel to the yard-arm on the opposite side of the ship. The punishment consisted in dropping the prisoner suddenly into the water, and hauling him beneath the keel up to the yard-arm on the other side.

KEE′LSON, in a ship, passes inside the vessel (B in fig.), from stem to stern, as the keel (A) does outside. The floor-timbers are passed below it, each being bolted through the keel, and alternate ones through the keelson. Like the keel, the keelson is composed of several massive timbers scarfed longitudinally together.



KEEP, in medieval fortification, was the central and principal tower or building of a castle, and that to which the garrison retired, as a last resort, when the outer ramparts had fallen. See Castle. A fine specimen of the ancient keep is still extant amid the ruins of Rochester Castle.

KEEPER OF THE GREAT SEAL, a judicial officer, whose duties are now generally merged in those of the lord chancellor.

KEEPING THE PEACE. When a person has been assaulted, or is apprehensive of an assault, he may apply to justices to order the assaulting or threatening party with sureties to keep the peace. This is done by the justice ordering the party to enter into recognisances under articles of the Peace (q. v.), called in Scotland a bond in pursuance of letters of Lawburrows (q. v.).

KEI RIVER, Great. This important stream divides British Kaffraria on the south-west from Kaffraria Proper, and with its branches, the Black or White Kei, the Indwe and Tsomo, all rising in the Stormbergen, drains a basin of about 7000 square miles. It is very rugged in its lower course, and its mouth, like all other Kaffrarian rivers, is hopelessly barred.

KEI′GHLEY, a market and manufacturing town in the West Riding of Yorkshire, is situated on the river Aire, nine miles north-west of Bradford. It has a free grammar-school, with an endowment of £240 per annum. A mechanics' institution, opened in 1870, contains a club of 1000 members, and schools and classes with 600 students. Many new churches, factories, and other buildings have been erected. The manufactures of worsted, machines, and paper are important. Pop. (1871) 19,775.

KEISKA′MMA. This river forms the boundary between the Cape Colony and that of British Kaffraria. It is a purely Hottentot name, signifying 'clear water.' It rises in the Amatola, and with its branches, the Chumie and Gaga, waters a very fertile tract of country, formerly the head-quarters of the Amaxosa Kafirs, now densely settled with industrious German and English settlers.

KEITH, The Family of. The origin of this, as of most other Scottish historical houses, is unascertained. It first appears in record during the latter half of the 12th c., and undoubtedly took its name from the lands of Keith in East Lothian, to which the office of the king's marischal was attached.

The family enters the page of history in the beginning of the 14th century. In 1305, Sir Robert of Keith, hereditary marischal of Scotland, is found high in the confidence of King Edward I. of England, holding under him the office of joint justiciar of Scotland from the Forth to the Mounth, and sitting in the English council at Westminster as one of the representatives of Scotland. He kept his allegiance to England for some years after Bruce was crowned king of the Scots, but joined that prince before Bannockburn, where he commanded the cavalry, and by a well-timed charge upon the English archers, contributed not a little to the fortune of the day. His services were rewarded by a large grant of land in Aberdeenshire; and the possessions of the family were still further increased, before the close of the century, by a marriage with one of the co-heiresses of Sir Alexander Fraser, chamberlain of Scotland, Bruce's brother-in-law. Through this alliance, the Keiths acquired great estates in Kincardineshire, and having added to them the remarkable sea-girt rock of Dunnottar, they built or restored a castle upon it, which was henceforth their chief seat.

Earls Marischal.—About 1458, the family was ennobled in the person of Sir William Keith, who was created Earl Marischal and Lord Keith. His House reached its highest pitch of power in the person of his great-great-grandson, the fourth earl, nicknamed, from the seclusion in which he lived at Dunnottar, 'William who kept the Tower.' By marriage with his kinswoman, the co-heiress of Inverugie, he nearly doubled the family domains, which now included lands in seven shires, Haddington, Linlithgow, Kincardine, Aberdeen, Banff, Elgin, and Caithness. He was reputed the wealthiest peer in Scotland, having a rental of 270,000 marks a year, and being able, it was boasted, to travel from the Tweed to the Pentland Firth, eating every meal and sleeping every night on his own lands. These vast possessions passed to his grandson, George, the fifth earl, who, in 1593, founded the Marischal College and University of Aberdeen. Its walls were inscribed with the words: 'THAY HAIF SAID : QUHAT SAY THAY : LAT THAME SAY;' in allusion, it would seem, to the popular reproach which the earl had brought upon himself by adding the lands of the ancient abbey of Deer (q. v.) to his already overgrown estates. The story ran, that his wife earnestly entreated him to forego the spoil. 'But fourteen score chalders of meal and bear was a sore temptation,' says Patrick Gordon of Cluny, and the earl was deaf to her entreaties. Hereupon, it is said, she dreamed a dream, which was thought to portend the downfall of the House of Keith. She saw the monks of Deer set themselves to work to hew down the crag of Dunnottar with their penknives, and while she was laughing them to scorn, 'behold! the whole crag, with all its strong and stately buildings, was undermined and fallen in the sea.' This was written before 1660. Within little more than half a century, Dunnottar was in ruins, and its lord a landless exile. At the age of 22, George, the tenth and last Earl Marischal, took part with his younger brother James in the rising of 1715. He was attainted, and his estates (yielding £1676 a year) were forfeited; but he himself escaped abroad, where he rose to distinction in the Prussian service. His communication to the British government of a political secret which he learned when Prussian ambassador at Madrid, procured his pardon in 1759. A year or two afterwards, he revisited Scotland, and bought back part of the family estates, but refused the proffered restoration of the family titles. He speedily returned to Prussia, and died there in 1778 at the age of 86. His brother, who had risen in the Prussian service to the rank of field-marshal, fell at Hochkirch in 1758.

Lords Keith.—Neither having any issue, the direct male line of the House came to an end. His sister, Lady Mary, by her marriage, in 1711, with John, sixth Earl of Wigton, had a daughter, Lady Clementina, who married Charles, tenth Lord Elphinstone, by whom, besides other children, she had Sir George Keith Elphinstone, who, in 1797, was created Lord Keith of Stonehaven Marischal in the Irish peerage, and in 1803, Lord Keith of Banheath in the peerage of the United Kingdom. His daughter, the Baroness Keith, is the wife of the Count de Flahault.

Earls of Kintore.—Sir John Keith, third son of the sixth Earl Marischal, was, for his services in saving the Scottish Regalia during the Commonwealth, raised to the peerage by the titles of Earl of Kintore, and Lord Keith of Inverury and Keithhall. On the death of his grandson, the fourth earl, in 1761, the estates devolved on the last Earl Marischal; and on his death in 1778, the estates and titles passed to Alexander, sixth Lord Falconer of Halkertoun, the grandson of the eldest daughter of the second earl. Her descendant is now the ninth Earl of Kintore and eleventh Lord Falconer of Halkertoun.

KELAT, the capital of Beloochistan, stands at an elevation of more than 7000 feet, in lat. 28° 52′ N., and long. 66° 33′ E. The district round about is fruitful, and thickly peopled. K. contains about 12,000 inhabitants. Seated on the summit of a hill, K. is a place of military importance. In the Afghan wars, it was twice taken by the British.

KELLERMANN, François Christophe, Duke of Valmy, born 28th May 1735, at Wolfsbuchweiler, in Alsace, entered the French army, and had risen to the rank of a maréchal-de-camp before the Revolution broke out. He warmly espoused its cause, and contributed much to its progress in Alsace. In 1792, he received the command of the Army of the Centre on the Moselle, repelled the Duke of Brunswick, and delivered France by the famous cannonade of Valmy. Yet, on allegation of treason against the republic, he was imprisoned for ten months, and only liberated on the fall of Robespierre. He afterwards rendered important services in Italy, and on the erection of the Empire he was made a marshal and a duke. In the campaigns of 1809 and 1812, he commanded the reserves on the Rhine. At the Restoration, he attached himself to the Bourbons. He was moderate and constitutional in his views. He died 12th September 1820.

KELLS (originally, *Kenlis*), an ancient corporate town of the county of Meath, Leinster, Ireland, is situated on the Blackwater, 13 miles north-north-west of Trim, and has been associated, from a very early period, with the most important events of Irish history, sacred and profane. The town originated in a monastery, which was founded in the middle of the 6th c. by St Columba; in which monastery the Columban community of Iona found a refuge when that island was devastated by the Norsemen, between 802 and 815. K. is renowned for an ancient manuscript copy of the gospels, called the Book of Kells. It is beautifully executed with coloured ornamentation, and is believed to be the work of the 6th or 7th century. It is now preserved in Trinity College, Dublin. K. was a bishop's see, and before the act of union, it returned two members to the Irish parliament. Its oldest charter is of 11 and 12 Richard II. This was modified by several succeeding charters, under which the municipal body was maintained until the Irish Municipal Reform Act, which created a body of town commissioners. New roads have been formed, and new schools, workhouse, &c., built. Pop. (1871) 2953.

KELP (Fr. *varec*) is the crude alkaline matter produced by the combustion of sea-weeds, of which the most valued for this purpose are, *Fucus vesiculosus*, *F. nodosus*, *F. serratus*, *Laminaria digitata*, *L. bulbosa*, *Himanthalia lorea*, and *Chorda filum*. These are dried in the sun, and then burned in shallow excavations at a low heat. About 20 or 24 tons of sea-weed yield one ton of kelp, which, as met with in commerce, consists of hard, dark-gray or bluish masses, which have an acrid, caustic taste, and are composed of chloride of sodium, of carbonate of soda (formed by the decomposition of the organic salts of soda), sulphates of soda and potash, chloride of potassium, iodide of potassium or sodium, insoluble salts, and colouring matter. It used to be the great source of soda (the crude carbonate); but as this salt can now be obtained at a lower price and a better quality from the decomposition of sea-salt, it is prepared in far less quantity than formerly. A ton of good kelp will yield about eight pounds of iodine (which is solely obtained from this source), large quantities of chloride of potassium, and additionally, 'by destructive distillation, a large quantity (from four to ten gallons) of volatile oil, from four to fifteen gallons of paraffine oil, three or four gallons of naphtha, and from one and a half to four hundred-weight of sulphate of ammonia.'—Ansted's *Channel Islands*, p. 515. Except the iodine and chloride of potassium, none of these substances are obtained under the present treatment.

In Brittany, the total annual production of kelp is as much as 24,000 tons, while in all the British Islands the total manufacture is only 10,000 tons. Professor Ansted, in the work already quoted, shews that the manufacture of kelp might be made a source of great wealth to the Channel Isles. The Guernsey sea-weed is stated by Professor Graham to be the richest known source of iodine, and the increasing demand for that substance for photographic purposes renders the subject highly important. From the numerical data given in pp. 514, 515, of the *Channel Islands*, it appears that they might yield annually about 10,000 tons of kelp, worth about £4 per ton. The British supply would thus be exactly doubled.

Before the remission of the duty on salt and on Spanish barilla, the kelp manufacture was carried on to a very large extent, and the value of many estates in the Scottish Highlands and Hebrides greatly increased in consequence of it. The rent of some farms in the Orkneys rose from £40 to £300 a year. Many thousand tons were made annually on the shores of Great Britain, which sold for £7 to £10 per ton, and employment was given to a great number of people. The regular cultivation of the sea-weed was even proposed, and to some extent carried into effect, by placing large stones within tide-mark upon sandy shores, which were soon covered with it.

KELP, in point of law, if found beyond high-water mark, belongs to the owner of the adjacent land. The right to kelp is often let by the owner separately from the lands in the Highlands of Scotland.

KE'LSO, a town in Scotland, finely placed on the north bank of the Tweed, opposite to the point where that stream receives the waters of the Teviot. The name was anciently written *Kalchu* or *Calchou*, and is supposed to have had its origin in a precipitous bank abounding in gypsum, still called the *Chalkheugh*. The town derived its importance, if not its existence, from a richly endowed abbey of Tironensian monks, planted at Selkirk in the year 1113, by King David I., when Prince of Cumbria, and transplanted, after his accession to the Scottish throne in 1124, 'to the church of the blessed Virgin Mary, on the bank of the Tweed beside Roxburgh, in the place called Calkou.' The abbey was ruined by the English under the Earl of Hertford in 1545, and all that now remains of it is part of the Abbey Church. It is in the later Norman or Romanesque style, and had a nave of two bays, north and south transepts each of two bays, a central tower still 91 feet high, and a choir of unascertained length. The more modern parts of the town are well built. A handsome bridge, designed by Rennie, connects Kelso with its suburb of Maxwellheugh, and commands a noble view. On the north-west of the town, in the midst of a beautiful park, is Floors Castle, the seat of the Duke of Roxburgh: it was built in 1718, from the design of Sir John Vanbrugh, and was enlarged and improved by the present duke from the designs of the late Mr Playfair of Edinburgh. On the opposite bank of the Tweed are the ruins of Roxburgh Castle, once the strongest fortress on the eastern border. The town of Roxburgh, which rose under the shelter of its walls to be one of the four chief towns in Scotland, has so completely disappeared, that scarcely a vestige of it remains. K. was made a burgh of barony in 1634. It has no manufactures, and little trade, although three newspapers are published in it. Its population in 1871 was 4564.

KEMBLE, JOHN PHILIP, son of Roger Kemble, an actor, was born at Prescot, in Lancashire, on the 1st February 1757. He received his education at a school in Worcester, afterwards at a Roman Catholic seminary in Staffordshire, and finally at the English College of Douai, in France. On his return to England, he adopted the stage as his profession, making his first appearance at Wolverhampton on January 8, 1776. On the 30th September 1783, he made his first appearance at Drury Lane in Hamlet—always a favourite character of his—and in 1790, he succeeded to the management of that theatre. In 1803, he purchased a share in Covent Garden Theatre, of which he also became manager. On the destruction of the building by fire, K. raised a new theatre, which was opened in 1809, the management of which he retained till the close of his theatrical career. In June 1817, he took leave of his patrons in London; and a few days thereafter a public dinner was given to him, under the presidency of Lord Holland. Thomas Campbell made his retirement from the stage the subject of a spirited set of verses. He finally took up his residence in Switzerland, where he died, on the 26th February 1823, aged sixty-six years.

K. was a great actor, and he loved to personate the loftier characters of the drama—kings, prelates, heroes. His figure was commanding, his voice sonorous and well modulated. He was especially successful in Brutus and Coriolanus; and the ancient playgoers, who remembered his intonation and his Roman look, used to find the more modern stage comparatively unworthy of regard.

KEMBLE, CHARLES, brother of the foregoing, was born at Brecknock, in South Wales, on the 25th November 1775. He received his education, like his brother, at Douai, and like him also, he, on his return to England, devoted himself to the stage. In April 1794, he made his first appearance at Drury Lane in the character of Malcolm. In July 1806, he married Miss De Camp, a lady who had distinguished herself in the walk of high-comedy. K., on being appointed Examiner of Plays, relinquished the stage on the 10th April 1840. He died on the 12th November 1854, having almost completed his 79th year.

KEMBLE, John Mitchel, chiefly distinguished for his researches in Anglo-Saxon literature and the early history of England, was the son of Charles Kemble, and was born in London, 1807. He studied at Trinity College, Cambridge, where he took the degree of B.A. in 1830, and afterwards that of M.A. While an undergraduate, he spent some time at Göttingen, under Jacob Grimm, which perhaps determined the bent of his mind towards Anglo-Saxon studies. The first fruits of these studies was an edition (1833) of the poem of Beowulf (q. v.), to a second edition of which he added a translation, with a glossary and notes. Not to mention several minor publications, he edited for the English Historical Society a valuable collection of charters of the Anglo-Saxon period, entitled *Codex Diplomaticus Ævi Saxonici*, 2 vols. (1839—1840). But his most important work, which contains the chief results of all his researches, is *The Saxons in England*, 2 vols. (1849). This work is unfinished. The author had been making preparations for two more volumes, when he died suddenly, March 26, 1857. K. was for a good many years editor of the *British and Foreign Review;* he also held the office of Censor of Plays, under the Lord Chamberlain.

KEMPIS, Thomas à, so called from his native place, Kempen, a village in the diocese of Cologne, was born probably in 1379. His family name was Hämerken (Latinised, *Malleolus*, 'Little-hammer'). He was educated at Deventer, and in 1400 entered the Augustinian convent of Agnetenberg, near Zwoll, in the diocese of Utrecht, of which his brother John was prior, and in which he took the vows in 1406. He entered into priest's orders in 1413, and was chosen sub-prior in 1429, to which office he was re-elected in 1448. His whole life appears to have been spent in the seclusion of this convent, where he lived to an extreme old age. His death took place in 1471, at which time he certainly had attained his 90th year, and most probably his 92d. The character of K., for sanctity and ascetic learning, stood very high among his contemporaries, but his historical reputation rests almost entirely on his writings, which consist of sermons, ascetical treatises, pious biographies, letters, and hymns. Of these, however, the only one which deserves special notice is the celebrated ascetical treatise *On the Following (or Imitation) of Christ*, the authorship of which is popularly ascribed to him. This celebrated book has had, next to the sacred Scripture itself, the largest number of readers of which sacred literature, ancient or modern, can furnish an example. In its pages, according to Dean Milman (*Latin Christianity*, vi. 482), 'is gathered and concentred all that is elevating, passionate, profoundly pious in all the older mystics. No book, after the Holy Scripture, has been so often reprinted; none translated into so many languages, ancient and modern,' extending even to Greek and Hebrew, or so often retranslated. Sixty distinct versions are enumerated in French alone, and a single collection, formed at Cologne within the present century, comprised, although confessedly incomplete, no fewer than 500 distinct editions. It is strange that the authorship of a book so popular, and of a date comparatively so recent, should still be the subject of one of the most curious controversies in literary history. The book, up to the beginning of the 17th c., had been ascribed either to Thomas à K. or to the celebrated John Gerson (q. v.), chancellor of the university of Paris, except in one MS., which, by a palpable anachronism, attributes it to St Bernard; but in the year 1604, the Spanish Jesuit, Mauriquez, found a MS. in which it is attributed to the abbot, John Gersen, or Gesen, whom he regarded as clearly a distinct person from the Chancellor Gerson. From the time of this discovery, three competitors have divided the voices of the learned—not alone individuals, but public bodies, universities, religious orders, the Congregation of the Index, the parliament of Paris, and even the French Academy; and the assertors of these respective claims have carried into the controversy no trifling amount of polemical acrimony. The most recent and best account of the details of the discussion, as well as its history, will be found in Malou's *Recherches historiques et critiques sur le véritable Auteur du Livre de l'Imitation de Jésus Christ* (Louvain, 1849). We shall only state that M. Malou gives his verdict in favour of the claim of Thomas à K., an opinion in which the learned have now generally acquiesced. The first edition of the *Imitation* was printed at Augsburg, in 1486, and before the end of that century, it was reprinted upwards of 20 times in Germany. The most remarkable modern edition is a Heptaglot, printed at Sulzbach (1837), containing, besides the original, later versions in Italian, Spanish, French, German, English, and Greek. The theology of the *Imitation* is almost purely ascetical, and (excepting the 4th book, which regards the Eucharist, and is based on the doctrine of the real presence) the work has been used indiscriminately by Christians of all denominations.

KE'MPTEN (anciently, *Campodunum*, *Campidona*), a city of Bavaria, situated on the river Iller, 64 miles south-south-west of Augsburg, with which it is connected by railway. Like most of the Swabian cities, K. grew up around a monastery, which was founded by the disciples of the great Irish missionary monk, St Gall, about the end of the 7th century. Partly by the favour of the emperors, partly through the natural sequence of the events of the period, the abbots of the monastery were the suzerains of the town and its environs, and eventually the abbot of K. became a prince-abbot of the empire (1348). In the secularisation of the ecclesiastical principalities in 1803—1804, it shared the common fate; the abbey, as well as the city and territory—comprising at that time 7 market-towns, 85 villages, and above 40,000 inhabitants—being assigned to Bavaria. The present city contained (1871) 10,982 inhabitants, and is divided into the abbatial town (Stifts-Stadt) and the city proper, which lies in the plain at the foot of the hill on which the abbey stands. It is a place of considerable trade, and carries on manufactures of cotton, linen, and paper.

KE'NDAL, or KI'RKBY KENDAL, a municipal and parliamentary borough of England, in the county of Westmoreland, is situated on the right bank of the Kent, 22 miles south-south-west of Appleby. Here, in the reign of Edward III., a settlement of Flemings, under a certain John Kemp, was formed, and afterwards the town became well known for its manufactures of woollen cloths, called, from the name of the town, *Kendals*. The letter of protection, dated 1331, and granted by King Edward III., 'on behalf of John Kempe of Flanders, cloth weaver, concerning the exercise of his craft,' may be found in Rymer's *Fœdera*, vol. ii. p. 283. The name, 'Kendals,' is still applied to the cloths produced here, which, with carpets, worsted stockings, cottons, linsey-woolseys, doeskins, tweeds, and coat-linings, are the staple manufactures of the town. In the immediate vicinity are also several mills, dye, marble, and paper works. The weekly market is the chief one for corn and provisions in the county. K. returns one member to the imperial parliament. Pop. (1861) 12,029; (1871) 13,446.

KE'NILWORTH, a market-town of England, in the county of Warwick, situated 4½ miles north of the town of that name, and the fashionable town of Leamington. Tanning operations are here carried on upon a large scale, and comb-making to some extent. Pop. (1871) 3335. The town, however, is chiefly interesting from historical association. The castle of Kenilworth, united to the crown domains in the reign of Henry IV., was conferred by Elizabeth upon Robert Dudley, Earl of Leicester, who here, in 1575, entertained his sovereign for 17 days, at a daily cost of £1000. The present noble owner is the Right Honourable the Earl of Clarendon. Extensive remains of the castle still exist, which are well preserved, and much visited by the aristocracy and by tourists from all parts of the country. There are also ruins of the ancient monastery.

KENNEBE'C, a river in Maine, United States, which rises in Moosehead Lake, in the west of the state, and runs in a southerly direction into the Atlantic Ocean, after receiving the Androscoggin, 18 miles from its mouth. On its banks are the important towns of Bath, Gardiner, Hallowell, and the state capital, Augusta. It is navigable by ships to Bath, 12 miles; by steam-boats to Hallowell, 40 miles. In its course of 150 miles, this river falls 1000 feet, affording abundant water-power. At Augusta are falls, increased by a dam, 584 feet long, supplying water to large factories, saw-mills, &c.

KENNICOTT, Benjamin, an eminent biblical scholar of the last century, was born at Totness, in Devonshire, April 4, 1718, and educated at Oxford, where he highly distinguished himself. He took his degree of M.A. in 1750, having been previously elected a Fellow of Exeter College; in 1767, he was appointed Radcliffe librarian; and in 1770, Canon of Christ Church, Oxford, where he died, September 18, 1783. The whole interest and importance of K.'s life are comprised in his great undertaking for the improvement of the Hebrew text. In 1753, he published a work entitled *The State of the Printed Hebrew Text of the Old Testament Considered.* This contained, among other things, observations on 70 Hebrew MSS., with an extract of mistakes and various readings, and strongly enforced the necessity for a much more extensive collation, in order to ascertain or approximate towards a correct Hebrew text. He undertook to execute the work in the course of 10 years, and laboured, until his health broke down, from 10 to 14 hours a day. In spite of considerable opposition from Bishops Warburton, Horne, and other divines, K. succeeded in enlisting the sympathies and obtaining the support of the clergy generally. Upwards of 600 Hebrew MSS., and 16 MSS. of the Samaritan Pentateuch, were collated, with the assistance of other English and continental scholars. The first volume of his edition of the Hebrew Bible appeared in 1776, and the second in 1780, accompanied by a very useful and instructive dissertation. The text chosen was that of Van der Hooght, and the various readings were printed at the bottom of the page. The *Variæ Lectiones Veteris Testamenti* (Parma, 1784—1788), published by De Rossi, is a valuable addition to K.'s Hebrew Bible. Jahn published at Vienna (1806) a very correct abridgment, embracing the most important of K.'s readings.

KENNING TO THE TERCE, a phrase in Scotch Law to denote the process by which a widow, whose husband has died infeft in lands, acquires a separate interest in a definite part thereof. She is by law entitled to the rents of one-third of the husband's lands, called her Terce (q. v.); and the above process is carried on before the sheriff of the county, the object being to define and set out a particular portion of the lands to which her life-rent may attach.

KE'NSINGTON GARDENS, one of the public ornamental parks of London, extends on the west side of Hyde Park, from which it is partly separated by the Serpentine. It is traversed by walks, and ornamented with rows and clumps of noble trees. Near the western border of the park stands Kensington Palace, an edifice of brick, originally the seat of Heneage Finch, Earl of Nottingham and Lord Chancellor of England, and afterwards bought by King William III. William III., Queen Mary, Queen Anne, and George II. all died in this palace, and here her Majesty Queen Victoria was born. The gardens at first consisted of the grounds attached to the palace, and were only 26 acres in extent, but have been frequently enlarged, and now are two and a half miles in circuit.

KENT, an important maritime county of England, occupies a portion of the south-east angle of the country, and is bounded on the N. by the estuary of the Thames, and on the E. and S.E. by the Strait of Dover. Area, 1,004,984 statute acres; pop. (1871) 848,294. Besides the river which forms the northern boundary of the county, the chief streams are the Medway, which flows north-east into the estuary of the Thames; the Stour, and the Darent. The surface is undulating, being traversed from west to east by the North Downs (see article Downs). With a climate which is in general mild and genial, and a fertile soil of mixed chalk, gravel, and clay, K. is, in an agricultural sense, a highly productive county. Besides the usual crops, great quantities of seeds are raised for the London markets, as canary and radish seeds, spinach, cresses, and white mustard. There are also numerous market-gardens and orchards. Hops (q. v.) are one of the chief products of the county. Above forty thousand acres, forming in all a hop-field more than four times as extensive as that of any other hop-growing county of England, are here devoted to the cultivation of this plant. Great numbers of sheep are fattened on the excellent pasturage found on the tracts of alluvial soil that skirt the banks of the Thames and Medway, and especially on the Romney Marsh, which comprises 44,000 acres. The county returns six members to parliament.

K. is unusually rich in historical association. For its early history, see article Heptarchy. It has been the scene of frequent sieges, battles, and revolutions; and the county is also bound up with the social history of the country through the three well-known insurrections which broke out here under Wat Tyler, Jack Cade, and Sir Thomas Wyatt. Of its numerous and interesting ecclesiastical edifices, it will suffice to specify here the cathedrals of Canterbury and Rochester. It contains the important dock-yards and arsenals of Woolwich, Chatham, and Sheerness; and the famous watering-places of Margate, Ramsgate, and Tunbridge Wells.

KE'NTIGERN, St. See Mungo, St.

KENTISH FIRE, a term employed to denote the vehement and protracted cheers with which the rabble greeted the No-popery orators at the public meetings held in Kent to prevent the passing of the Roman Catholic Relief Bill (1828—1829).

KENTISH RAG, a dark-coloured, hard, calcareous sandstone, which occurs at Hythe, and other places on the coast of Kent, in the Lower Greensand Measures. It sometimes attains a thickness of 60 or 80 feet.

KENT'S HOLE, a large cave in the limestone rock near Torquay, Devon. It is said to be 600 feet long, with a breadth varying from 2 to 70 feet, and a height from 3 to 18 feet. The bones of the cave-bear, hyæna, &c., have been found in the mud of the cave below the stalagmitic covering. See KENT'S CAVERN in SUPP., Vol. X.

KENTU'CKY, one of the United States of America, in lat. 36° 30′—39° 6′ N., and long. 82° 2′—89° 40′ W., is bounded on the N. by Ohio, Indiana, and Illinois, E. by West Virginia and Virginia, S. by Tennessee, and W. by Missouri. Area, 37,680 square miles, or 24,115,200 acres. It has 110 counties. The capital is Frankfort, and the chief towns, Louisville, Covington, Newport, Lexington, Danville, Maysville, and Paducah. The country is rolling, hilly in some portions, and in the south-east mountainous, some of the elevations rising to 3000 feet. Its chief rivers are the Ohio and Mississippi on its borders, and the Tennessee, Cumberland, Kentucky, Licking, and Green. The soil is mostly fertile, and contains some of the finest agricultural regions in America, producing wheat, maize, cotton, hemp, tobacco, and all the fruits of the warmer temperate regions. Herds of cattle find rich pasture, and millions of swine fatten in the woods. There are coal-beds, some rich in oil, extending nearly across the state. Of the many caverns, the Mammoth Cave (q. v.) is the most celebrated. There are also ,deposits of lead, iron, beautiful marbles, and salt. In 1872, there were 1159 miles of railways opened for traffic. In 1870 the value of assessed property was 409,544,294 dollars, and that of the farm productions was 87,477,374. In the same year K. possessed 2 universities and 42 colleges, besides numerous public and other schools, with 245,139 pupils. An agricultural college, with 200 students, was established in 1868 at Ashland. K. was formerly a portion of the western territory of Virginia, and once the home of warlike Indians, from the sanguinary contests with whom it derived its name—'the dark and bloody ground.' It was settled by Daniel Boone (q. v.) in 1769, organised as a territory in 1790, admitted as a state in 1792. Upon the breaking out of the Rebellion in 1861, efforts were made by Governor Magoffin to make the state secede, or at least to place her in an attitude of neutrality. Better counsels, however, prevailed, and the loyalty of the state was maintained, though many of her citizens joined the rebels. Pop. in 1870, 1,321,011.

KENTUCKY, a river of Kentucky, which rises in the Cumberland Mountains, on the south-east frontier of the state, and after a winding north-west course of 260 miles, enters the Ohio, about 50 miles below Cincinnati. The river runs through most of its course between perpendicular limestone rocks, through which it appears to have worn its bed, and is celebrated for the romantic beauty of its scenery. It is navigable by steam-boats to Frankfort, 60 miles, and by means of 17 dams and locks, to the Forks. Its banks abound with anthracite, iron, and marble.

KE'OKUK, a city of Iowa, is the south-east corner of the state, on the Mississippi River, 205 miles above St Louis. It is the site of the State Medical College, and has several academies and public schools, 10 churches, 4 banks, and an hospital. K. has a large commerce, being at the head of the low-water navigation of the Mississippi, and the terminus of two railways. Pop. (1870) 12,766.

KEPLER, or KEPPLER, JOHANN, one of the greatest astronomers of all ages, was born at Magstatt, a small village in Würtemberg, ten miles from Stuttgart, 27th December 1571. While a mere child he was left to his own resources, and his early education in consequence would have been entirely neglected had he not been admitted into the convent of Maulbrun. K. afterwards studied at the university of Tübingen, and devoted nearly the whole of his time to mathematics and astronomy. In 1593, he was appointed Professor of Mathematics at Grätz. At this time K.'s views of astronomy, as seen in his *Prodromus*, were somewhat mystical; he supposed the sun, stars, and planets were typical of the Trinity, and that God distributed the planets in space in accordance with the regular polyhedrons, &c. Yet this searching after harmony led him to the discovery of the three remarkable truths called *Kepler's laws*. K., about 1596, commenced a correspondence with Tycho Brahé, and in 1599 went to Prague to aid him in his researches. Tycho obtained for him a government appointment; but the salary was not paid, and K. lived for eleven years there in great poverty. He then obtained a mathematical appointment at Linz, and, fifteen years afterwards, was removed to the university of Rostock; but poverty from the same cause still pursued him, and he died shortly after at Ratisbon, 15th November 1630. K.'s connection with Tycho Brahé had a salutary effect upon his fiery enthusiasm, but, happily for science, the timid counsels of the old astronomer were only partially followed. K. established the law of the diminution of light in proportion to the inverse square of the distance, and was acquainted with the fact 'that the attractive force of the sun decreases as his light;' it is strange that this latter fact did not lead him to anticipate the discovery of Newton. In 1609, he published his *Astronomia nova*, a commentary on the motions of Mars, in which, taking for his base of operations the observations of Tycho, he determined the excentricity and aphelion of this planet, on the supposition of a circular orbit, and found the results quite irreconcilable with observation. This led him to his first law, *that the planets move in ellipses with the sun in one of the foci*. The second law, that *the Radius-vector* (q. v.) *sweeps over equal areas in equal times*, he at first asserted dogmatically, and was for a long time puzzled to find some proof of it (the infinitesimal calculus not having at that time been invented); but at last he hit upon the expedient of dividing the ellipse into an immense number of small triangles, whose areas could be easily found. His third law (the first discovered) was an attempt to harmonise in some way the period and mean distance of the planets, and after twenty-two years of vigorous application, he discovered that *the square of the periodic time is proportional to the cube of the mean distance*. These discoveries, great as they undoubtedly are, are rendered still more so when we take into account the little real knowledge of the heavenly bodies existing at that time, and the scanty means in the hands of astronomers for making discoveries. K. also affirmed the essential inertia of matter, the first of Galileo's laws of motion; the dependence of the curvature of the path of planets on the attraction of the sun (K. unfortunately thought it was *magnetic* attraction) and the proportionality of the mutual attraction of bodies to their respective masses; he demonstrated the four new planets of Galileo to be satellites of Jupiter; gave a complete theory of solar eclipses; and calculated the exact epoch of the transits of Mercury and of Venus across the sun's disc. He also made numerous discoveries in optics, general physics, and geometry.

KE'RGUELEN'S LAND, or ISLAND OF DESOLATION, is situated in the Southern or Antarctic Ocean, the latitude and longitude of its southern extremity, Cape George, being 49° 54′ S., and 70° 12′ E. It is about 100 miles long, and about 50 miles broad. It consists chiefly of moss-covered rocks of primary formation. It is said, however, to produce coal fit for steam-ships. The island was discovered in 1772 by the French navigator, Ives Joseph de Kerguelen Tremarec.

KERGUELEN'S LAND CABBAGE (*Pringlea antiscorbutica*), the only known species of a very curious genus of plants of the natural order *Cruciferæ*, and further interesting as being found only in that most lonely of islands, Kerguelen's Land, and as being extremely useful to the crews of whalers and other vessels which have occasion to touch there. It has a long, stout, perennial, root-stock; a *bolled* head of leaves very similar to those of the common garden cabbage. Captain Cook first discovered this plant, and directed attention to it. It is exceedingly abundant in all parts of Kerguelen's Land, which produces only seventeen other flowering plants. The root-stocks have the flavour of horse-radish. The dense white heart of the cluster of leaves tastes like mustard and cress, but is coarser. The whole foliage abounds in a very pungent pale-yellow essential oil, which is confined in vessels that run parallel to the veins of the leaf. The K. L. C. is used by voyagers, boiled either by itself, or with beef, pork, &c., and its antiscorbutic qualities make it very important to them.

KERMA'N (ancient *Carmania*), one of the eastern provinces of Persia, lying south from Khorassan, and having an area of about 59,000 square miles. The north and north-east are occupied by a frightful salt waste called the *Desert of Kerman*, which forms a part of the great central desert of Iran. On this extensive tract, not a blade of grass is to be seen. The southern portion, although mountainous, is equally arid and barren with the north, except the small tract of Nûrmanshir, towards the east, which is fertile and well watered. Roses are cultivated for the manufacture of 'attar of roses.' Silk and various gums are exported. Cattle, sheep, goats, and camels are reared, and the hair of the last two has long been celebrated for its length and fineness. The inhabitants, who number about 600,000, are chiefly Persians proper; the rest are Guebres or Parsees, Belûchis, and other wandering tribes.

Kerman, the chief town, is situated near the middle of the province, in the central mountain range, and contains a population estimated at 30,000. The manufactures are chiefly shawls, carpets, and matchlocks. The trade, though still considerable, is very small compared with what it was during the last century, when K. was the great emporium for the trade by the Persian Gulf and the Indian Ocean. In 1794, it was taken and pillaged by Aga Mohammed, and 30,000 of the inhabitants made slaves. But the chief cause of the decline of its trade was the fall of Gombroon (q. v.), its port, before the rising prosperity of Bushire.

KERMANSHA'H, a flourishing modern town of Persia, in the province of Ardelan, near the right bank of the river Kerkhah. It is the centre of converging routes from Bagdad, Tehran, and Ispahan. Its commerce is considerable, and there are manufactures of carpets and weapons. Pop. 30,000.

KE'RMES, sometimes also known in commerce as *Scarlet Grain*, a dyestuff which consists of the bodies of the females of a species of *Coccus* (q. v.) (*C. ilicis*). It has been supplanted over the greater part of Europe by Cochineal (q. v.), but is still used in some parts of the south of Europe, and more extensively in India and Persia. The K. insect is abundant in these regions, attaching itself to the leaves of a small species of oak, the K. Oak (*Quercus coccifera*), a low bushy shrub with evergreen spinous leaves, much resembling a holly. In some parts of Spain, the K. Oak grows in great profusion, as on the slopes of the Sierra Morena. Many of the inhabitants of Murcia live by collecting Kermes. This is chiefly the employment of women, who scrape the insects from the trees with their nails, which they suffer to grow long on purpose. The K. insect attacks the young shoots of the shrub, the female affixing itself and remaining immovable, till, after attaining its full size, about that of a pea, it deposits its eggs, and dies. K. is gathered before the eggs are hatched. It is thrown into vinegar, and afterwards dried in the sun or in an oven. It has been employed from time immemorial to dye cloth of a blood-red colour. It was called *Thola* by the Phœnicians, *Coccos* by the Greeks, K. by the Arabians. From K. comes the French *cramoisi*. It is supposed to have been the substance employed in dyeing the curtains of the Jewish tabernacle (Exod. xxvi.).

KERMES MINERAL, so called from its resemblance in colour to the insect Kermes, is an antimonial preparation which was discovered by Glauber (q. v.). The method of preparing it subsequently became known to M. de la Ligerie, from whom the king of France purchased the prescription in the early part of the 18th century. It was at that period often described as *Carthusian Powder*, or *Poudre des Chartres*, in consequence of a Carthusian friar having effected some remarkable cures by it. Chemists differ slightly as to its composition, but it is generally regarded as a tersulphuret of antimony. K. M. is scarcely ever employed in this country, but it is much used in France and Italy. Its effects are much the same as those of the golden sulphuret (sulphide) of antimony, and of the oxy-sulphuret of antimony of the London pharmacopœia, it being a sudorific in small doses (half a grain, for instance), and an emetic and purgative in large doses.

KERN, a name applied formerly to Irish and Gaelic infantry soldiers.

KERNER, Andr. Justinus, a German poet, one of the leading members of the so-called 'Swabian School,' was born at Ludwigsburg, in Würtemberg, 18th September 1786. He studied medicine at Tübingen, and finally settled as a physician at Weinsberg. Here he died, 21st February 1862. The most conspicuous qualities of K.'s poetry are a dreamy fancy and a highly original humour. His chief works are—*Reiseschatten von dem Schatten spieler Lux* (Heidelb. 1811); *Romantische Dichtungen* (Karlsr. 1817); and *Der letzte Blütenstrauss* (Stuttg. und Tüb. 1853). As a physician, he displayed quite a morbid interest in the phenomena of animal magnetism, and wrote several books on the subject, one of which, *Die Seherin von Prevorst* (2 vols. Stuttg. 1829; 4th edit. 1846), excited a great interest in America, and is believed to have originated the recent spiritualism.

KE'RRY, a maritime county in the south-west of Ireland, in the province of Munster, is bounded on the N. by the mouth of the Shannon, and on the W. by the Atlantic Ocean. Area, 1,185,917 statute acres, of which 414,614 are arable, 726,775 are uncultivated, and 32,761 are under water. In 1873, the total acreage under crops was 152,046, the half of which was in meadows and pasture, the rest chiefly in oats and potatoes. The county is 60 miles in length from north to south, and 58 miles broad. Its coast-line is about 220 miles in length, fringed with islands, of which the chief are Valentia, the Blasquets, and the Skelligs, and is deeply indented by Kenmare, Dingle, and Tralee Bays. Between these bays are two peninsulas, occupied by branches of the mountain system, which, stretching westward from the county of

Waterford, traverses the whole of the south of Ireland. The principal group is that of Macgillicuddy's Reeks, the chief summit of which, Carran Tual, 3414 feet, is the highest in Ireland. The largest rivers are the Laune, the Maine, and the Cashen. The county contains numerous lakes, some of them, especially those known as the Lakes of Killarney (q. v.), of exquisite beauty. The climate is mild, but moist, especially on the coast. The soil rests on slate and sandstone, with limestone; consists of a rich loam in the central districts, and is productive in grain-crops and in pasture. The manufactures are inconsiderable; oats and butter are the chief exports. The fisheries on the coast are extensive and profitable; they employ nearly 3000 men and boys. K. returns two members to the House of Commons. Pop. in 1871, 196,014.

KE'RSEY, or **KERSEYMERE**, a variety of woollen cloth, differing from ordinary *broad cloth* by being woven as a *twill*. See TWILL. It is easily distinguished from the common cloth by the diagonal ribbed appearance of its under side, where the nap not being raised, admits of its structure being seen.

KERTCH, previous to 1855, the most important port of the Crimea, with the largest trade in the export of corn, is situated on the eastern shore of the peninsula, on the strait of Kaffa or Yenikale. The town has a distinctively eastern air; and the appearance of the houses is greatly enhanced by the pillars and balconies with which they are furnished. The streets, like those of Constantinople, are haunted by troops of homeless dogs. K., the ancient *Panticapæum* or *Bosporus*, was the capital of ancient Taurica. Previous to 1475, it belonged to the Genoese; subsequently, it came into the hands of the Turks; and finally, in 1774, it was acquired by the Russians. On the 25th May 1855, it was taken by the allies during the Crimean War, on which occasion the Catacombs, a very valuable collection of antiquities connected with early Greek times, was ruthlessly plundered by the soldiery. Pop. (1867) 19,616.

KE'STREL, or **WINDHOVER** (*Falco tinnunculus*), a small species of falcon, and one of the most common of the British *Falconidæ*. It is rather larger than the merlin, its whole length being from thirteen to fifteen inches. It may be at once recognised by its peculiar habit of hovering or sustaining itself in the same place in the air by a rapid motion of its wings, always with its head to the wind, evidently looking for prey on the surface of the ground. Its prey consists in great part of mice; and although of course included by gamekeepers in the large category of 'vermin,' and destroyed on every opportunity, it deserves the most careful protection by farmers, as a check to the excessive multiplication of mice. It more rarely captures small birds, and does not disdain cockchafers and other insects. It is a very widely distributed bird. The male and female differ considerably in colour; ash-gray prevailing more in the former, and rusty brown in the latter.

Kestrels (*Falco tinnunculus*):
1, the male; 2, the female.

KE'SWICK, a market-town of England, in the county of Cumberland, is situated in a charming district on the Greta, at the northern extremity of Derwentwater, 22 miles south-south-west of Carlisle. Manufactures of coarse woollen cloth and blankets are carried on here. In the vicinity, at Borrowdale, black-lead mines are worked; and K. is well known for the black-lead pencils here manufactured. Pop. (1871) 2777.

KESZTHE'LY, a market-town of Hungary, in the county of Szalad, is situated on the western shore of Lake Balaton, 96 miles south of Presburg. The breeding of horses is carried on, and there is a good trade in corn. Pop. (1869) 4888.

KETCH, a broad, strongly built vessel of two masts—viz., the main and mizzen. It is now almost obsolete, but formerly was the favourite form for state yachts, and still more recently, was the prevailing mortar-boat. In this latter capacity it was called a bomb-ketch.

KE'TCHO, or **KESHO**. See CACHAO.

KE'TCHUP, or **CATSUP**, a name common to several esteemed kinds of sauce, much used with meat, fish, toasted cheese, &c.—MUSHROOM KETCHUP is made from the common mushroom (*Agaricus campestris*), by breaking it into small pieces, and mixing it with salt—which so acts upon it as to reduce the whole mass to an almost liquid state—straining, and boiling down to about half the quantity. Spices of different kinds are added, for which there are many receipts, and sometimes wine. Mushroom ketchup must be kept in tightly-corked bottles.—WALNUT KETCHUP is made from unripe walnuts, before the shell has hardened. They are beaten to a pulp, and the juice separated by straining. Salt and vinegar are added, also spices variously, and after considerable boiling down, the ketchup is bottled, and may be kept for years.—TOMATO KETCHUP is made in a similar manner from tomatoes, but is not strained. These are the three most esteemed kinds.

KE'TTERING, a market-town of England, in the county of Northampton, is situated 13 miles N.N.E. of the town of that name. The parish church is large and handsome, with a tower, dating from about 1450. It has a town hall and corn exchange. The Free School has an endowment of £155 a year. Boot and shoe making is the staple; silk-weaving, plush, and wool-combing also carried on. Pop. (1871) 7184.

KE'TTLEDRUM, a drum formed by stretching vellum over the circular edge of a hemispherical vessel of brass or copper. This instrument, which gives forth a sharp, ringing sound, is used by regiments of cavalry and horse-artillery in lieu of the ordinary cylindrical drum, which would, from its shape, be inconvenient on horseback.

KEU'PER, the upper division of the Triassic Period, consisting in the typical German series of a thickness of more than 1000 feet of (1) various coloured sandstones; (2) marls, with gypsum and dolomite; and (3) a series of carbonaceous slate-clay, with gray sandstones and small irregular beds of impure earthy coal. In Britain, it consists of (1) an extensive series of red marls, with large deposits of rock-salt and gypsum; and (2) white and brown sandstones with beds of red marl. The whole reaches a maximum thickness of 1300 feet. The keuper occupies a large portion of the valleys of the Ouse and the Trent, and is extensively developed in Worcester, Stafford, and Cheshire, where beds of salt, often as much as 80 or 100 feet in thickness, occur. The keuper does not abound in fossils. The contained organisms differ from those of the Permian and older periods; they have the general appearance of the fossils of the Lias and Oolite. The plants consist of ferns, equisetum-looking plants, cycads, and conifers. The character of the rocks, and the quantity of oxide of iron, which seems to have been injurious to life, account for the paucity of fossils. The strata are chiefly of interest to the palæontologist, because of the numerous footprints they contain (see ICHNOLOGY), and the remains of the reptiles which produced them, as well as because in them are also found the only observed fragments—the teeth—of the oldest mammal yet known. See MICROLESTES.

KEW, a small village in Surrey, on the right bank of the Thames, and six miles west of Hyde Park Corner. On the opposite side of the river is Brentford, with which K. is connected by a bridge. The most interesting object at K. is the Royal Botanic Gardens, containing a large and choice collection of plants, native and exotic, which have been arranged with great skill and care by Sir W. J. Hooker. The hothouses and conservatories are very numerous. There are also a *palm-house*, 362 feet by 100, and 60 feet high; a *temperate-house*, of the same height, occupying three-fourths of an acre; and a *museum*. The gardens extend over about 75 acres, and the pleasure-grounds connected with them to 240 acres. The Botanic Gardens were commenced by the mother of George III., but owe much of their celebrity to the able management of the present keeper. Since 1840 they have been open to the public in the afternoons, Sundays not excepted. There is also an observatory, which, however, is used chiefly as a meteorological station.

KEY, a common heraldic bearing in the insignia of sees and religious houses, particularly such as are under the patronage of St Peter. Two keys in saltire are frequent; and keys are sometimes *interlaced* or linked together at the *bows*—i. e., rings. Keys *indorsed* are placed side by side, the wards away from each other. In secular heraldry, keys sometimes denote office in the state.

KEY, a musical term synonymous with *scale*, from *scala*, a stair. The diatonic scale, as produced by nature, is a certain succession of tones and semitones, ascending from any sound taken as a basis to the octave of that sound, the semitones of which will be found to lie between the 3d and 4th, and between the 7th and 8th degrees, ascending from the basis. In rendering this succession of sounds available for musical purposes, by our artificial method of notation, the sounds have, so to speak, been fixed at a certain recognised pitch. Any of the sounds of the natural scale may be taken as a note to form the basis of a new scale, observing always the due succession of the tones and semitones. The note forming the basis is denominated the Key-note of the scale, and such scale is said to be in the key of that note. As in our notation, each whole tone can be artificially divided into two semitones (see CHROMATIC SCALE), it follows that, with the already existing diatonic semitones, there are twelve equal semitones between a key-note and its octave; and as each of these semitones may be taken as a new key-note, there are therefore twelve keys major, and the same number minor, all differing in pitch. In written notation, the scale of the note named C has been assumed as the natural key; the notes forming that scale being held to fall naturally into the requisite succession of tones and semitones. It follows that if any other note be taken as a key-note, one, or more, or all, of the notes of the so-called natural scale must be altered, by being either sharpened or flattened, to bring the scale of the new key into the due succession of tones and semitones. Such alteration is indicated by the marks of sharps, or flats, placed at the beginning of the staff, and is termed the *Signature* of the key. In the minor mode, the key of A minor stands exactly in the same relation to the other minor keys as the key of C does to the other major keys, A being the key-note on which the natural minor scale is found. All other keys have sharps or flats, in greater or less number, as they are distant from the natural key of C major or A minor, reckoning by perfect fifths, ascending or descending; thus, the key of G major, which is a perfect fifth above C, has one sharp for its signature—viz., F sharp; the key of D, which is two fifths above C, has two sharps—viz., F sharp and C sharp; and so on to the key of F sharp, adding a sharp for every ascending fifth. The keys with flats are found exactly in the reverse order—viz., by descending fifths—thus, the key of F, a perfect fifth below C, has one flat—viz., B flat; the key of B flat has two flats—viz., B flat and E flat; and so on to the key of G flat with six flats, which in practice is regarded as the same as the key of F sharp with six sharps. The number of flats or sharps is in some cases, for a harmonical purpose, extended still further; such as the key of C sharp with seven sharps, which is the same as D flat with five flats; or the key of G sharp with eight sharps, which is the same as A flat with four flats. The unnecessary increasing of either sharps or flats only increases the difficulty of reading the music. The term key is often loosely used in the sense of *mode*, and we frequently hear of the major or minor *key*. Much confusion has arisen from this.

KEY WEST, a city of Florida, United States of America, situated on the island of Key West (Sp. *Cayo Hueso*, Bone Key), the most westerly of the Pine Islands, of the group of Florida Keys, 60 miles south-west of Cape Sable. It is a coral island, 6 miles long, 2 wide, and nowhere more than 15 feet above the level of the sea. It has gardens of tropical fruits, and an artificial salt lake of 350 acres. There are extensive fortifications, a good harbour, two light-houses and a light-ship, several churches, a marine hospital and barracks. The city is beautiful, with ornamental cottages and gardens, and is inhabited by army and naval officers, traders, wreckers, divers, and invalids. The exports are salt, turtle, and sponges; but the frequent wrecks among these islands afford the most profitable business, which employs fifty vessels, manned chiefly by Conchs, or natives of the Bahama Islands, and their descendants. The climate is delightful, the temperature being from 50° to 90° F., with perpetual breezes, but there are also violent hurricanes. Pop. about 3000.

KEYS, POWER OF THE (*Potestas Clavium*), in Roman Catholic Theology, properly signifies the supreme authority in the church, which Catholics believe to be vested in the pope, as successor of St Peter. The phrase is derived from the metaphor addressed by our Lord to Peter in Matt. xvi. 19, and which Catholic interpreters, relying on the analogous use of the phrase in Isaiah xxii. 22, Apoc. iii. 7, and again i. 18, and also in classical writers, understand as implying the supreme power in the church. The power of the keys is divided by Catholics into two branches—that of order, which, though possessed by all bishops and priests, is believed to belong specially and primarily to the pope; and of jurisdiction, which chiefly regards the supreme government of the church, and embraces the power of enacting laws and dispensing in them, and of directing and governing not only the Christian flock, but also its pastors in their several spheres. The jurisdiction of the keys is exercised in a more limited field, and in a subordinate way by patriarchs, primates, archbishops, bishops, and other dignitaries; but that, according to the Roman theory, it has its source, as well as its chief seat, in the pope, is implied in the distinctive use of the emblem of the keys as a symbol of papal jurisdiction. The metaphor of the keys was frequently appealed to in the debates of the late Vatican Council on the papal privileges. The phrase is also applied to the sacrament of penance, to designate the power of remitting or retaining sin, and with the same distinction of order and jurisdiction, of which the former is imparted to every priest by his ordination, while the latter is only communicated by an express act of the bishop or other superior.

Protestants in general regard the power of the keys as equally intrusted to the whole ministry of the church of Christ, and as including *doctrine* and *discipline*. They admit the argument from the use of the key in Scripture as a symbol of authority; but refuse to acknowledge any limitation of that authority inconsistent with their views of Christian doctrine and of the relation of the ministry to the whole church of Christ, and of Peter to the rest of the apostles.

KEYS, Queen's. In Scotch Law, when a messenger or bailiff executes a caption or warrant under an extract decree, a writ in the former case, or in the latter, that part of the warrant which authorises him to break open the outer door of the house of the debtor, is called the queen's keys, or letters of open doors. English courts have no power to give a bailiff the right to break open an outer door in executing writs of execution for debt. See House, Imprisonment.

KHALKA'S. See Mongolia.

KHAN, a title of Mongolian or Tartar sovereigns and lords. A *khanate* is a principality. *Khagan* means 'khan of khans,' but has seldom been applied. The word khan is probably of the same origin as King (q. v.).

KHA'NIA. See Canea.

KHARA'SM. See Khiva.

KHARGEH. See El-Khargeh.

KHARKO'V, a government of Little Russia, immediately east of the government of Poltava. Area, 20,737 square miles; pop. (1867) 1,681,486. The surface is flat, with chalk hills following the courses of the streams. The soil is a rich and fertile loam, watered chiefly by affluents of the Don. In the north-west, the principal occupations are agriculture and distilling corn-brandy; in the south-east, the breeding of cattle and sheep. The breeding of horses is also carried on. Corn, tobacco, wax, honey, and tallow, are largely produced, beet-root sugar is manufactured, and there is an extensive trade in sheep and cattle; but as there is almost no communication with the surrounding governments, the resources of K. may be said to be still in great part undeveloped.

KHARKOV, capital of the government of the same name in European Russia, on the banks of three streams, affluents of the Donetz, in lat. 50° N., long. 36° 14′ E., 916 miles south-south-east of Petersburg. It had in 1867 a pop. of 59,968, and ranks as one of the chief towns of the Ukraine. Its position between Moscow, Odessa, Kief, Taganrog, and the Caucasus has made it an important market for the exchange of the products of the north and south. The chief mercantile transactions are effected during the time of the fairs, of which there are four, the principal being the Troitsk fair. The transactions during the fairs amount to about £10,000,000. The staple article of commerce is wool. The town contains seventy factories of various kinds, and manufactured goods are supplied to the surrounding governments. An enormous quantity of wool (value, £1,150,000) is washed here annually. The university of K., founded in 1805, and the other educational institutions, constitute this town the intellectual as well as the commercial centre of the Ukraine.

KHARTOU'M, an important town of Africa, the chief centre of trade in Upper Nubia, stands in a sterile district, in lat. 15° 35′ N., long. 32° 30′ E., at the junction of the Blue and White Nile. Previous to 1847, it was the residence of the governor-general of Egyptian Sûdan; it is now the seat of the local governor of the province of its own name. The principal stores of the government are kept here, and there is a government arsenal for the building and repair of boats. The houses are built principally of sun-dried bricks. K. is the centre of many converging caravan routes, and carries on considerable commerce. The imports consist chiefly of Manchester manufactured goods; the exports are ivory, gum-arabic, ostrich-feathers, bees-wax, and hides. Pop. 40,000.—See *Egypt, the Sudan, and Central Africa*, by J. Petherick.

KHATMANDU', the seat of government in Nepaul, in lat. 27° 42′ N., and long. 85° 18′ E. With narrow and dirty streets, and generally mean houses, it contains about 50,000 inhabitants. The architectural pretensions of the town—for even the residence of the rajah is a very ordinary edifice—are confined to its temples, some of them of brick, and the others of wood.

KHAY'A, a genus of trees of the natural order *Cedrelaceæ*. The Kassou-Khaye of Senegal (*K. Senegalensis*), one of the most abundant forest-trees in that part of Africa, attains a height of eighty or one hundred feet, and is much valued for its timber, which is sometimes called *Cailcedra*, and is reddish coloured, very hard, durable, and of beautiful grain. The bark is astringent and febrifuge, and contains a peculiar alkaloid.

KHERSO'N, a government of Southern Russia, on the borders of the Black Sea, first appearing in history during the 4th c. B. C., when it formed a portion of the kingdom of the Bosporus. From the 11th c., the right of possession was claimed by the Poles, the Cossacks, and various Tartar tribes, the last being ultimately successful. In the 17th c., Russians commenced to settle in the province; and during the next century, their example was followed by a number of Servians. The province, with an area of 28,666 square miles, is uniformly fertile in the north and north-west; in the south it is sometimes dry and arid, with here and there sandy wastes, which towards Odessa become incrusted with salt. Notwithstanding that three large rivers—the Dnieper, Bug, and Dniester—run through the south of the province, the want of water is often severely felt, especially in July, when the vegetation is almost completely burned up by the heat. The climate is very changeable, being very hot in summer, and piercingly cold in winter. Destructive ravages by locusts are not uncommon. The population in 1867 was 1,497,995, consisting of Little Russians (natives of the Ukraine), Moldavians, Bulgarians, Greeks, Germans, and Jews, who are chiefly employed in agriculture. The Germans cultivate tobacco, and rear silk-worms. Much of the arable land, however, is lost from want both of capital and labour. Cattle and sheep breeding are also carried on, on a large scale.

KHERSON, or **CHERSON**, capital of the government of that name, in European Russia, lies on the right bank of the Dnieper, near to where it widens out into the estuary of the Liman, and 808 miles south-by-west from Moscow. It was built by Catharine II. in 1778, as a port for the construction of ships of war; but, in a very few years, was supplanted by Odessa and Nikolaief, both as a dock-yard and a commercial outlet. Only ships of light draught are now built at K., and only such ships can navigate the estuary. K. is the centre of the coasting and staple trade in timber and other goods, floated down the Dnieper and its tributaries, and in Crimean salt. Rope-making, tallow-melting, and wool-washing, are the chief branches of trade, and the products are largely exported. Pop. (1867) 45,926. K. has a gymnasium, naval school, school for training pilots, and an observatory.

KHI'VA (anc. *Chorasmia*), **KHAUREZM**, **KHARASM**, or **URGUNGE**, a khanate of Turkestan in Central Asia, lies between lat. 37° 45′—44° 30′ N., and long. 50° 15′—63° E., and contains about 195,000 square miles (not including that part of the Kizilkum Desert over which the khan arrogates sovereignty). It is bounded on the N. by the Russian territory and Sea of Aral, E. by the khanates of Khokan and Bokhara, S. by Persia, and W. by the Caspian Sea. The chief oasis, in which the capital, Khiva, is situated, stretches from the mouth of the Oxus or Amu-Daria for 200 miles along its banks, and is watered by artificial canals supplied from that river, to which it entirely owes its fertility. Its extent is variously estimated at from 2000 to 4000 square miles. According to a recent estimate (see *Times*, April 28, 1873), the population consists of 260,000 settled, and 240,000 nomad inhabitants. There are from 10,000 to 40,000 Persian freedmen or slaves who have been captured in Khorassan by the Turkomans.

K., in ancient times, was nominally subject to the Seleucidæ; subsequently it formed a part of the kingdoms of Bactria, Parthia, Persia, and the Califate, and became an independent monarchy in 1092 under a Seljuk dynasty. The Khivans, or, as they were then called, the Khaurezmians, after conquering the whole of Persia and Afghanistan, were obliged to succumb to the Moguls, under Genghis Khan, in 1221. In 1370, it came into the hands of Timûr. Timûr's descendants were subdued in 1511 by Shahy Beg (called Sheibani Khan by western writers), chief of the Uzbeks, a Turkish tribe, and his successors have ruled over Khiva to our times. Ever since the Russians entered Central Asia, they have complained that the Khivans fostered rebellion among their Kirghis subjects, and plundered their caravans. In 1717 Peter the Great endeavoured to conquer K., but was defeated, and in 1839 the attempt was renewed by the Czar Nicholas, but with no better success. War may be said to have recommenced when new Russian forts in 1869 and 1871 were founded on the shores of the Caspian. It was not, however, till 1873 that a great effort was made finally to crush Khiva. To diminish the difficulties of crossing the deserts, the Russian force was divided into five columns, each about 3000 strong, to approach K. by different routes. After enduring with admirable fortitude great privations and fatigue, the Russians entered K. on the 10th of June. A treaty has since been concluded with the khan, by which he engages to pay a war indemnity of 2,000,000 roubles in seven years, and to cede to Bokhara the Khivan possessions on the right bank of the Oxus. See Sir Henry Rawlinson's Account of Khiva, read to the Geographical Society of London, March 24, 1873, and the *Times*, 29th July 1873.—KHIVA, the capital of the khanate, is situated in the great oasis. It consists almost entirely of earth-huts, not excepting the residence of the khan, the only stone-buildings being three mosques, a school, and a caravansary. Pop. about 20,000.

KHOJE'ND, a town of Russian Turkestan, on the Sir-Daria, the ancient Jaxartes, about 90 miles north-west of Khokan, has a laborious and intelligent population. It is the seat of some cotton manufactures, and of a considerable transport trade between the Russian dominions and Southern Turkestan. Pop. estimated at 45,000.

KHOKA'N (originally *Kokand*), previous to 1867, a khanate of Turkestan extending east of 64° long. over the whole of the upper basin of the Jaxartes or Sir-Daria. The greater part of this territory has since been added to Russian Turkestan (see TASHKEND), and the khanate of K. is now practically a Russian dependency, and confined to the populous part of the valley of the Jaxartes, east of Khojend. The district was famous throughout the East during the middle ages for its fertility and beauty, under the name of Ferghana. Since it came under the power of Russia, Professor Fedschenko of Kazan has explored and described the country (see 'Reise in Kokan, 1871,' *Petermann's Mittheilungen*, 1872, No. 5. The inhabitants are Sarts—that is to say, of Persian or Indo-Germanic origin, with a Turkish admixture. The population of the khanate has been estimated at 3 millions. On 24th May 1868, a treaty of commerce was entered into between Russia and K.; and since then, European manufactures have been introduced, and commerce has rapidly increased. Manufactures of silks and coarse cottons are the chief industrial products. The chief town is Khokan, with about 100,000 inhabitants.

KHOLMOGO'RY, a town in the government of Archangel, European Russia, was a place of great note when the White-Sea trade was in its glory, but since the seat of government has been removed to Archangel, K. has steadily declined, and in 1871 contained only 1577 inhabitants. Peter the Great, on his return from his travels, brought to K. several specimens of the Dutch breed of cattle, by means of which the natives have so improved their own, that the K. breed is now considered to be the best in Russia.

KHONSA'R, a town of Persia, in the province of Irak-Ajemi, 80 miles north-west of Ispahan, and on the route from that city to Hamadan. Orchards abound here, and the raising of fruit, with weaving, are the chief employments of the people. Pop. about 12,000.

KHORASSA'N (anc. *Parthia*, *Margiana*, and *Aria*), the largest province of Persia, lies between lat. 31°—38° 30′ N., and long. 53°—62° 30′ E., and contains about 210,000 square miles, of which nearly one-third is a vast salt waste; of the remainder, a large portion consists of plains of shifting sand; and the rest is fertile. The fertile districts are in the north, where the high range of the Elburz crosses the province, throwing out spurs, forming a mountainous district, abounding with fertile and well-watered valleys. Artificial fertilisation by means of canals was here carried on to a great extent in ancient times, but the incessant disturbances which have unsettled the district for the last 1000 years, have almost put an end to this practice. The chief products of K. are grain, cotton, silk, hemp, tobacco, aromatic and medicinal plants, fruits, wine, salt, gold, silver, and precious stones, also camels, horses, and asses. In the more thickly-peopled districts, manufactures of silk, woollen, and camels' and goats' hair fabrics, also of muskets and sword-blades, are carried on to a considerable extent. The chief towns of the province are Meshed, the capital, Nishapûr, Yezd, and Astrabad. The inhabitants are Mohammedans of the Shiah sect.

K., in ancient times, also included the desert of Khiva or Kharasm, and the district now known as the kingdom of Herat; but the first was separated from it by the Seljuks at the commencement of the 11th c., and the latter about 1510, since which period it has been on several occasions seized and held for a short time by the Persians.

K. has been several times separated from the Persian empire, but was finally re-united to it at the commencement of the 16th c. by Ismail Sofi, the first Suffavean shah of Persia. See PERSIA.

KHORSABA'D. See NINEVEH.

KHOSRÛ, or KHÛSRÛ I., surnamed NÛSHÎRVAN (the noble soul), and known in Byzantine history as Chosroes I., the greatest monarch of the Sassanian dynasty, was the son of Kobad, king of Persia. K. mounted the throne on his father's death in 531 A. D., gave shelter to great numbers of those whom Justinian, the Byzantine emperor, persecuted for their religious opinions, in 540 commenced a war of 20 years' duration with the Roman emperor; but though the Persians reaped an abundant harvest of glory, the other results were unimportant. On the accession of Justin II., the Persian ambassadors having been ignominiously abused, and the Greeks having taken possession of Armenia, K., justly indignant, again declared war in 570, took Dara, the eastern bulwark of the empire, but was terribly defeated at Melitene (577) by Justinian, grand-nephew of the emperor of that name; this defeat was, however, counterbalanced by the victorious Greek being in his turn totally routed in Armenia. K. did not live to see the end of the contest, as he died in 579. His government, though very despotic, and occasionally oppressive, was yet marked by a firmness and energy rarely seen among the orientals. Agriculture, commerce, and science were greatly encouraged, ravaged provinces were repeopled from his conquests, and wasted cities rebuilt. His memory was long cherished by the Persians, and many a story of the stern justice of K. is still current among them. Persia, during his reign, stretched from the Red Sea to the Indus, and from the Arabian Sea far into Central Asia. —(For a full account of this prince, see Sir John Malcolm's *History of Persia.*)—KHOSRÛ II., grandson of the preceding, surnamed Purvîz (the Generous), was raised to the throne in 590, but being immediately deposed by another claimant, was, by the assistance of the Emperor Maurice, reinstated, and in gratitude surrendered Dara, Nisibis, and a great part of Armenia, to the Romans. In spite, too, of numerous and just grounds of quarrel, he preserved peace with that nation till the murder of his benefactor by Phocas. K. then invaded Mesopotamia in 604, took Dara, and during 17 years inflicted upon the Byzantine Empire a series of disasters, the like of which they had never before experienced. Syria was conquered in 611; Palestine, in 614; Egypt and Asia Minor, in 616; and the last bulwark of the capital, Chalcedon, fell soon after. At this crisis, the fortune of war changed sides. See HERACLIUS. K., driven in turn to the very gates of Ctesiphon, was deposed and murdered by his eldest son, Shiroueh, or Siroes, 28th February 628. It was to this prince that Mohammed sent a letter demanding a recognition of his mission. See MOHAMMED.

KHUZISTA'N (anc. *Susiana*), a province of Persia, in lat. 30°—33° 7′ N., and long. 47° 45′—51° E., having Fars and the Persian Gulf on the S., is divided into two almost equal portions—the one, the north-east, very hilly, the other, the south-west, so level as to be almost a stagnant sea during the rainy season, changing to an arid waste in summer. K. contains extensive pastoral districts, on which vast herds of cattle are reared, and naturally abounds in alluvial soil fitted for such crops as rice, maize, cotton, sugar-cane, indigo, &c. The silk-worm is also reared in some districts. The chief towns are Shûster, Dizful, and Mohammerah.

KHY'BER PASS, the most practicable of all the openings, four in number, through the Khyber Mountains, is the only one by which cannon can be conveyed between the plain of Peshawur, on the right bank of the Upper Indus, and the plain of Jelalabad, in Northern Afghanistan. It is 30 miles in length, being here and there merely a narrow ravine between almost perpendicular rocks of at least 600 feet in height. It may be said to have been the key of the adjacent regions in either direction from the days of Alexander the Great to the Afghan wars of 1839—1842, during which it was twice forced by a British army, in spite of an obstinate defence by the natives. The gorge is understood to be extremely unhealthy.

KHYERPU'R, a town of Sinde, stands about 15 miles to the east of the Indus, in lat. 27° 30′ N., and long. 68° 48′ E. The town owes its importance, such as it is, to its having been selected as the residence of the northern Ameers of the country. The place, however, is little better than a collection of filthy mud-hovels, and it is estimated to have only 15,000 inhabitants.

KIABOU'CCA, KIABOOCA, KYABUCA, or AMBOYNA WOOD, a beautifully mottled wood, which is found in our timber-yards in small pieces, very evidently the wens or excrescences formed on the stem of the producing tree, *Pterospermum Indicum* (natural order *Byttneriaceæ*). The colour of this wood is yellowish red, of different shades, and covered with a most elegant mottled figure in darker shades. It is much used for small ornamental articles, especially snuff-boxes, its scarcity and the small size of the pieces forbidding its employment in the manufacture of larger articles.

KIA'HTA, or KIACHTA, a town in Siberia, 150 miles south of Lake Baikal, and close to the Chinese frontier, being only separated by a piece of neutral-ground 280 yards broad from the Chinese town of Maïmatchin. The population in 1867 was 4286. Through this town began the commercial intercourse between Russia and China, which had been arranged by the treaties of 1689 and 1727. Since the middle of last century, a lively and profitable barter-trade has been carried on both in K. and in Maïmatchin; but it was not till the end of the century that the Russians were able to produce on their side any articles besides furs, but since then, cloth and cotton goods, first of English or French, and later of Russian manufacture, have in part been substituted. Formerly, the export to China of coins and the precious metals was forbidden at K., but this restriction is now in part removed. The exports from China consist chiefly of tea, of which about 100,000 cwts. finds its way into Russia by this road. This tea is very dear, on account of the enormous distance it has to be brought to K. (more than 3000 miles), and the Russian import duty, which amounts to from 40 to 70 kopeks. It is generally imported by the Russians at 1s. 9½d. per lb. But it must not be overlooked that the K. tea is the first crop, immensely superior to all that reaches Europe by any other route.

KIDDERMINSTER, a well-known manufacturing town and municipal and parliamentary borough of England, in the county of Worcester, is situated on the Stour, four miles above its junction with the Severn. The parish church is a handsome edifice, partly in the decorated and partly in the perpendicular style. K. is chiefly noteworthy on account of the carpet manufactures which are here carried on. The borough returns a member to the House of Commons. Pop. (1871) 20,814.

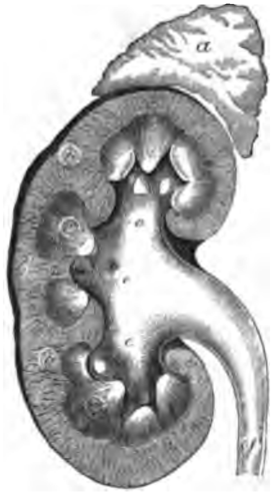
KIDNAPPING is not a legal term, but is frequently applied in popular language to the offence of stealing or forcibly carrying off a child or adult. The offence of forcibly carrying off a grown person, in general, now amounts only to an assault or false imprisonment, though formerly punishable with death. Child-stealing, where the child is under 14 years of age, if done with intent to steal any article upon or about the person of the child, or to deprive the parent or guardian of the possession of the child, is in England and Ireland a felony, punishable with penal servitude for not less than three, nor more than seven years, or with two years' imprisonment. See also ABDUCTION.

KIDNEY-BEAN (*Phaseolus*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having nine stamens united by the filaments, and one separate stamen, a downy stigma, a 2-lipped calyx, and the keel of the corolla with the stamens and style spirally twisted. The species are mostly annual herbaceous plants, natives of the warm parts both of the Eastern and Western Hemispheres. The Common K. (*P. vulgaris*) is the *Haricot* of the French. In Britain, it is sometimes called *French Bean*. In the south of Europe, and as far north as Germany, in the United States of America, and many other countries, the K. is a field-crop, and the ripe seeds are an important article of food. Within the tropics, it is sown at all seasons; but in countries subject to frost, only in spring, after the danger of frost is over. The seeds are used for food in a boiled state. In Britain, they are not regularly ripened, except in the most favourable situations in the south. The plant is therefore cultivated chiefly for the sake of the unripe pods, which, when boiled with the young seeds in them, form a well-known and very delicate dish.—The SCARLET RUNNER (*P. multiflorus*) has often been regarded as merely a larger variety of the K., with long twining stem. It is doubtful, however, if they are originally from the same native country; an American origin being assigned to the Runner, which is also a perennial—although in the climate of Britain usually destroyed by the winter's frost, and therefore treated as an annual—and has tuberous roots. The roots, in common with those of some other species of *Phaseolus*, are narcotic and dangerous; serious consequences have ensued from the accidental eating of them. The plant is cultivated for the same uses as the K., and affords, even in Scotland, a very abundant crop of green pods in the latter part of autumn, although the seed is not sown till about the 1st of May. It is a very ornamental plant, particularly the common variety with scarlet flowers. It readily covers any trellis or paling, and requires stakes of 6—10 feet in height.—Closely allied to the K., if indeed more than varieties, and cultivated for the same uses, are the *Haricot de Soissons* (*P. compressus*), the *Haricot Princesse* (*P. tumidus*), &c. In some parts of India, one of the most esteemed kinds of pulse is the MOOG, MOONG, or MUNGO (*P. Mungo*); in others, the KALA MOOG, or BLACK GRAM (*P. Max*).

KIDNEY-VETCH (*Anthyllis*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, containing a number of species, some shrubby, and some herbaceous, natives chiefly of the warmer temperate parts of the Eastern Hemisphere. They have the petals nearly equal in length, and an oval 1—3-seeded pod, enclosed in the permanent inflated and generally downy calyx. The only British species is the Common K. (*A. vulneraria*), also called *Lady's Fingers*, a herbaceous perennial, with pinnated unequal leaves, and crowded heads of yellow (or sometimes scarlet) flowers. It grows on very dry soils, and is eaten with avidity by cattle, but does not yield much produce.

KIDNEYS, THE, are two glands having for their office the secretion of the urine. That this office or function is of extreme importance, is sufficiently shewn by the facts that if, in consequence of disease, it is altogether suspended in the human subject, even for a day or two, death not unfrequently occurs, and that urinary glands corresponding in function to our kidneys are found, not only in all vertebrate animals, but in almost all molluscs, in the arachnidans, in insects, and in myriapods.

The human kidneys are situated in the region of the loins, on each side of the spine, and are imbedded in a layer of fatty tissue. Their form is too well known to require any description. The average length of each kidney is a little more than four inches, and its usual weight is from four to six ounces. The substance of the kidneys is dense, extremely fragile, and of a deep red colour. On making a vertical section of the kidney, it is seen to consist of two different substances, which are named, from their position, the external or cortical, and the internal or medullary substance.



Vertical Section of the Kidney.
(From Gray's *Anatomy*.)
a, supra-renal capsule; *bb*, cortical substance of kidney; *cc*, medullary substance of kidney; *eee*, the sinus or pelvis; *f*, the ureter, proceeding to the bladder.

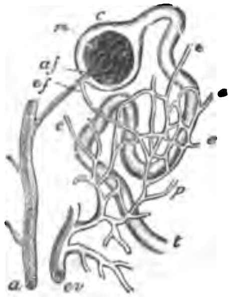
The *cortical substance* forms by far the greater part of the gland, and sends numerous prolongations inwards between the pyramids of the medullary substance. It is soft, granular, and contains numerous minute red globular bodies diffused throughout it, which are called, from their discoverer, the

Malpighian bodies, and which will be presently noticed more fully. Its substance is made up of the *uriniferous tubes* (which are described in the notice of the medullary portion), capillaries, lymphatics, and nerves, held together by an intermediate parenchymatous substance.

The *medullary substance* consists of pale-reddish, conical masses, called the pyramids of Malpighi. They are usually about twelve in number, but vary from eight to eighteen, and their apices (the *papillæ*) point towards the hollow space (termed the *sinus* or *pelvis*) which occupies the interior of the gland. The medullary structure is firmer than the cortical, and instead of being granular, presents a striated appearance, from its being composed of minute diverging tubes (the uriniferous tubes, or tubes of Bellini), which run in straight lines through this portion of the kidneys, after having run in a highly convoluted course through the cortical portion.

The cavity occupying the interior of the kidneys (the *sinus* or *pelvis*) is lined by mucous membrane, which, through the medium of the ureter, is continuous with that of the bladder, and which extends into the tissue of the kidneys, to line the uriniferous tubes. The mucous membrane forms a cup-like cavity around the termination of each pyramid, and the cavity, termed the *calyx*, receives the urine from the open terminations of the tubes, and conveys it towards the pelvis, from whence it passes down the ureter into the bladder.

Each kidney is supplied with blood by a renal artery, a large trunk which comes off at right angles to the aorta. The blood, after the separation of the various matters which constitute the Urine (q. v.), is returned into the venous system by the renal or emulgent vein, which opens into the inferior vena cava.



Plan of the Renal Circulation in Man and the Mammalia: *a*, terminal branch of the artery, giving the terminal twig, *af*, to the Malpighian tuft, *m*, from which emerges the efferent vessel, *ef*. Other efferent vessels, *e*, *e*, *e*, are seen proceeding from other tufts, and entering the capillaries surrounding the uriniferous tube, *t*. From this plexus of capillaries the emulgent vein, *ev*, springs.

The nerves are derived from the renal plexus, which is formed by filaments of the solar plexus and the lesser splanchnic nerve. They belong entirely to the ganglionic or sympathetic system.

The Malpighian bodies are found in all vertebrate animals. In mammals, which are the only animals in which there is a division into a cortical and a medullary portion, these bodies are only found in the former. In an injected specimen, they appear to the naked eye as mere coloured spots. They are for the most part of a spherical, oval, or flask-like form. Their diameter in man may range from $\frac{1}{80}$th to $\frac{1}{144}$th of an inch, the mean being $\frac{1}{101}$th. A small artery, termed the *afferent vessel*, may be traced into each Malpighian body, while a minute venous radicle, the *efferent vessel*, emerges from it close to the point at which the artery had entered. The Malpighian body itself consists of a rounded bunch or tuft of capillaries, derived from the afferent, and terminating in the efferent vessel, and enclosed in a clear and transparent capsule, lined at its lower part with epithelium, continuous with that of the uriniferous tube which springs from each capsule.

The convoluted portion of the tube which proceeds from, and is continuous with, the Malpighian capsule, is composed of a delicate basement membrane, in immediate relation externally with an abundant capillary net-work, and lined in its interior by the spheroidal or glandular variety of epithelium. The diameter of its central canal is about $\frac{1}{1000}$th of an inch. The straight portion of the tubes of which the pyramids are composed is lined with epithelium, which approaches more nearly to the scaly or tesselated variety, and which seems to serve as a protecting layer, rather than to take part in the function of secretion. The tubes unite with one another to a great degree as they pass through the structure of the pyramids, so that at the base of a pyramid there may be many thousand tubes, while the number of openings at the extremity of a papilla are comparatively few.

It now remains to consider the respective functions of these two essential elements of the kidney (as it exists in the vertebrate animals), viz., the Malpighian bodies and the tubes. From the admirable researches of Mr Bowman (*Philosophical Transactions*, 1842), and from the labours of subsequent anatomists, it appears that in animals in which the urinary excretion is passed in an almost solid form (as in birds and reptiles), the tufts are small and simple as compared with those in the kidneys of animals which (like man and most mammals) pass the urinary constituents dissolved in a large quantity of water. On these grounds, as well as from the fact, that the anatomical arrangement of the tufts is well calculated to favour the escape of water from the blood, Mr Bowman arrives at the conclusion, that the function of the Malpighian bodies is to furnish the fluid portion (the water) of the urine. The arrangement of the convoluted portion of the tubes, with a capillary net-work on one side of their basement membrane, and secreting epithelial cells on the other, is the exact counterpart of the arrangement in other secreting glands, and there can be no doubt that the functions of the cells in the convoluted portion of the tubes is to separate from the blood the various organic constituents (urea, uric acid, creatinine, &c.) and inorganic salts (chloride of sodium and phosphate of soda, &c.), which collectively form the solid constituents of the urine. It does not necessarily follow that these secreting cells undergo rapid decay and renewal; it is more probable that they have the power of selecting certain materials from the blood, and of transmitting them, without the disintegration of their own structure, to the interior of the tube.

The physical and chemical characters of the secretion yielded by the kidneys will be considered in the article Urine.

Diseases of the Kidneys.—The most important affection of the kidneys is *Bright's Disease* (q. v.), the symptoms of which have already been described. On examining the kidneys, in a case of death from this disease, it is found that there is a great increase in the size and number of the oil-globules which exist in small quantities in the epithelial cells of the healthy gland. The urinary tubes becoming thus gorged and distended, compress the capillary vessels on their exterior; and hence, in consequence of passive congestion of the Malpighian vessels, which gives rise to obstruction of the circulation, the serum of the blood exudes in place of pure water, and gets mixed with the urine, which thus becomes albuminous in this disease. *Inflammation of the Kidneys*, or *Nephritis*, is not uncommon. In acute inflammation, there is a deep-seated pain in the small of the back, on one or upon both sides, often extending downward towards the inside of the thigh. This pain is increased by pressure, sudden change of position, coughing, &c. The urine is scanty, high-coloured, albuminous, or bloody, and often deposits pus and sedimentary matter on standing. There is more or less fever, preceded by rigors; nausea and vomiting are frequent, and the bowels are usually constipated. In chronic inflammation, most of the above symptoms are present, but in a milder form, and there is little or no fever. In both the acute and chronic form, the blood may become contaminated, as in Bright's Disease (q. v.), from the want of due purification by the kidneys, and various secondary affections may arise.

The causes of inflammation of the kidney are various. It may be due to mechanical violence, exposure to cold and wet, and to the ingestion of substances which have the property of irritating the kidneys, as cantharides, oil of turpentine, &c. A gouty diathesis and the presence of concretions may also be noticed as causes. Any affection capable of producing retention of urine, may, by distending the pelvis of the kidney, occasion inflammation, as, for example, stricture of the urethra and affections of the spinal cord producing paralysis of the urinary organs.

The treatment must, on the whole, be antiphlogistic (or lowering) in the early stage of the disease, but must be considerably modified in accordance with the origin of the disease.

Nephralgia, or *Pain in the Kidney without Inflammation*, which usually but not invariably depends upon the passage of a concretion through the ureter, is one of the most painful affections to which the human frame is subject. It usually comes on when the concretion makes its way from the pelvis of the kidney into the ureter, and does not cease till it has passed into the bladder. During an ordinary fit of gravel (see LITHIASIS), or even in apparent health, a severe pain is suddenly felt in the loins, extending to the groin, thigh, or abdomen, and sometimes simulating colic. The pain comes on in paroxysms, with intervening periods of comparative ease. The paroxysm is usually accompanied by vomiting, a small and feeble pulse, and a profuse sweat. There is a frequent desire to pass urine, but the effort is usually futile. At length, usually after some hours, or even one or two days, the concretion escapes into the bladder, and the pain suddenly ceases.

This affection may be readily distinguished from inflammation by the sudden access and paroxysmal character of the pain and by the absence of fever.

As the disease is one which is very liable to return, the patient should know what steps to take before advice can be obtained. Opium is our sheet-anchor in this affection. The patient (assuming that he is an adult) may take two grains of opium, or an equivalent dose (35 or 40 minims) of laudanum or solution of muriate of morphia, when the attack comes on, and may repeat the medicine in half-doses every hour or two hours, until the pain is somewhat alleviated, or signs of the narcotic influence of the drug begin to manifest themselves. Should the stomach be so irritable as to reject the medicine, a drachm of laudanum in a little thin starch may be injected into the rectum. Hot fomentations to the abdomen and loins also give partial relief. Chloroform may be inhaled with great benefit during the paroxysms, but only under the superintendence of a physician.

Suppression of Urine, or *Ischuria renalis*, is an affection in which there is either a complete cessation of the secreting action of the kidney, or so considerable a diminution as to be clearly morbid. It is undoubtedly, in most cases, a mere symptom of some other disease, but occasionally no other disorder is obvious, and it must be regarded as an independent or idiopathic affection. If no urine be separated from the blood, coma (intense stupefaction) and death rapidly supervene from the retention of urea (or of carbonate of ammonia, into which it readily breaks up) in the blood, which thus becomes impure, and acts as a poison on the brain. The treatment, which is seldom successful, is too purely professional for notice in these pages.

For further information on diseases of the kidneys and allied affections, see the articles BRIGHT'S DISEASE, DIABETES, DROPSY, and LITHIASIS.

KIDRON, or KEDRON. See JEHOSHAPHAT.

KIEF, or KIEV, the chief town of the government of that name, on the west bank of the Dnieper, is one of the oldest of the Russian towns, and was formerly the capital. In 864, it was taken from the Khazars by two Norman chiefs, companions of Ruric, and conquered from them by Oleg, Ruric's successor, who made it his capital. In 1240 (when it ceased to be the capital), it was nearly destroyed by Batû, Khan of Kiptchak. Christianity was first proclaimed in Russia at K. in 988. In the 14th c., it was seized by Gedimin, Grand Duke of Lithuania, and annexed to Poland in 1569, but in 1686 was restored to Russia. The K. of the present time is one of the largest towns in the empire, possessing (1867) 70,591 inhabitants, one-third of whom are Poles. It is strongly fortified, has a remarkable suspension-bridge over the Dnieper, one of the best universities in Russia, a military and an ecclesiastical school. In its neighbourhood is the convent of Kievo-Petchersk, a celebrated Russian sanctuary, which annually attracts thousands of pilgrims from the most remote corners of the empire. K. is not an industrial, but a commercial centre; large fairs take place here annually, the most celebrated of which is the 'Contracts' during the winter, which is attended by all the surrounding proprietors, and by many foreign merchants. The trade is chiefly with Odessa, Poltava, and Austria.

KIEKIE (*Freycinetia Banksii*), a shrub of the natural order *Pandanaceæ*, yielding an edible, aggregated fruit, said to be the finest indigenous fruit of New Zealand. The species of this genus are tropical Asiatic, or Polynesian climbing shrubs, with sheathing, long, rather grassy leaves, usually spinous or serrated on the margin; and terminal, solitary, or clustered spadices of unisexual flowers. The K. is found in the northern part of New Zealand. It climbs the loftiest trees, branching copiously. The leaves are two or three feet long. The spadices are clustered. The fruit is a mass of fleshy berries. The jelly made of it tastes like preserved strawberries.

KIEL, capital city of the Prussian province of Slesvig-Holstein, lying on a deep fjord or bay of the Baltic, which admits large ships to anchor close to the town, is the station of the greatest portion of the German navy, and is situated in lat. 54° 20′ N., and long. 10° 7′ E. Pop. (1871) 32,899. K. is the seat of the Supreme Court of Appeal for the province, and of a university, which was founded in 1665, and has a library of 80,000 volumes, an observatory, a botanic garden, a natural history museum, and a good collection of northern antiquities. In 1872 an imperial order was issued that an academy for the benefit of all seafarers should be established at K. The town has two bridges, connecting the northern or older parts with the rapidly increasing southern suburbs. The most ancient of its five churches is St Nicholai, which dates from the 13th century. The castle has a good sculpture-gallery, containing, among other copies of the best works of art, casts of the Elgin marbles, and of Thorwaldsen's best productions. The public gardens and the wooded shores of the fjord, together with the woods of Düsternbrook (where a bathing establishment has existed since 1822), afford numerous pleasant walks. K., which became a member of the Hanseatic League in the 14th c., was formerly the chief mart for the farm and dairy produce of the Danish islands; and the very ancient annual fair, which was held for four weeks after Epiphany, was attended by buyers of all classes from every part of the duchies. K. has manufactures of tobacco, oil-colours, sugar, machinery, ironmongery, &c. Butter is extensively exported. It is an important link in the line of communication between Germany and the Baltic islands and ports; and steam-packets daily convey passengers and mails to and from the ports of the Baltic and North Sea.

KIEV, a government of Little Russia, lies immediately north of the government of Kherson, and is bounded on the north-east by the river Dnieper. Area, 19,546 square miles, more than one-half of which is arable, and one-fifth under wood. Pop. (1867) 2,144,276. In the northern portions, the surface is flat and marshy; the south is covered with ranges of hills, branches of the Carpathian Mountains, running from north-west to south-east. The chief river is the Dnieper, with its tributaries, the Pripet and the Teterev. The soil, chiefly loam, and partly clay and sand, is very fertile; so that, although agriculture is backward, the returns are considerable. The climate is exceedingly mild; everything is in blossom in April, and frosts do not set in till November. Agriculture and horticulture are the chief occupations of the inhabitants. Wheat is extensively exported to Odessa. There are numerous distilleries, and beet-root sugar, tobacco, cloth, china, and delft are manufactured. Large cargoes of timber and firewood are floated down the Dnieper to the ports of the Black Sea annually.

KI'LDA, ST, a small island, lying off the west coast of Scotland, in lat. 57° 49′ 20″ N., sixty miles west of the peninsula of Harris, to the parish of which it is reckoned as belonging. It presents bold and lofty precipices to the sea, except at two points, one on the south-east, the other on the west side of the island. At each of these points there is a bay with a low shore. Besides the main island, there are several small islets, and the whole group has an area of from 3000 to 4000 square acres. Pop. (1871) 71. Situated in the midst of the Gulf Stream, St K. enjoys a mild climate, although the weather is often boisterous. On the main island, there are eighty or ninety head of black cattle, and nearly 2000 sheep (among which is a Spanish breed, whose wool is highly prized) are grazed on it and on the surrounding islets. Immense numbers of wild-fowl are killed annually, the flesh of which is very generally eaten and the feathers sold. The sea abounds in delicious fish, easily caught from the rocky shore without the use of boats. The inhabitants formerly were able to export more or less grain annually; but although the population has decreased within late years, they now consume all the cereal produce of the island, besides an additional quantity, which they import. The present inhabitants habitually consume much more farinaceous food than their forefathers did. They do not receive, nor do they require, any regular gratuitous assistance from the proprietor, as is often represented. The principal exports are wool, woollen cloth, feathers, oil, and salted fish.

KILDA'RE (Hib. *Kill-dara*, Church of the Oaks), an ancient episcopal and market town in the county of the same name in Ireland, 25 miles south-west of Dublin. It owed its origin to a monastery, founded, according to the annalists, in the end of the 5th c., by St Bridget, the daughter of an Irish chieftain, who received the veil from St Patrick himself. Around the monastery, a town of some importance sprang up, which, as well as the abbey, was repeatedly plundered by the Danes. After the English invasion, it rose to considerable importance, and a parliament was held in it in 1309. In the wars of Elizabeth, and subsequently in the Great Civil War, it suffered almost complete ruin, from which it but partially recovered. Prior to the Union, K. returned two members to the Irish parliament. At present, it is much decayed, consisting of but 246 houses. The population in 1851 was 1298; it is now slightly increased, being (1871) 1333. The see of K., together with that of Leighlin, in the Protestant Church, is united to that of Dublin. In the Roman Catholic the united sees of Kildare and Leighlin form a distinct diocese. Notwithstanding its present decayed condition, K. is exceedingly interesting for its antiquities, which comprise the ruined cathedral, a Franciscan and a Carmelite abbey, a portion of the chapel of St Bridget, popularly called 'The Firehouse,' from a perpetual fire anciently maintained there, and, above all, the round tower, 130 feet in height, which crowns the elevation on which the town is built, and is seen from a great distance.

KILDARE, an inland county of the province of Leinster, Ireland, distant, at its eastern border, about 14 miles west from the English Channel. Its greatest length from north to south is 40 miles; from east to west, 27 miles; area, 458,436 acres, of which 356,787 are arable. Its surface is almost one unvaried plain, with the exception of the south-east border, which meets the range of Dublin Hills, and the southern border, which likewise is slightly elevated. Its principal rivers are the Liffey and the Barrow, the latter of which forms in part its boundary. The Boyne has its source in K., as has also the Blackwater. It is traversed by the Grand and Royal Canals. The most remarkable features of K. are the celebrated plain called the 'Curragh of Kildare'—an undulating down, six miles long, and two broad, the site of the well-known race-course, the Newmarket of Ireland—and the Bog of Allen. The solitary hill called Allen, which rises in the great central limestone plain, is a mass of granular compact greenstone and porphyry, with some red sandstone conglomerate, which is quarried for millstones. The soil is generally a rich loam, resting on limestone or slate. The total extent of land under tillage, in 1853, was 140,837 acres; but the proportion of pasture land to tillage has been much increased, the acres under crop in 1872 being only 131,290. The pop. (1871) was 84,198, of whom 71,972 were Roman Catholics, 10,615 Episcopalians, and the rest of other denominations. The principal towns are Naas, Athy, and Kildare; but the number of minor towns is beyond the average of Irish counties. K. sends two county members to the imperial parliament. In antiquities of all historical periods, K. is peculiarly rich. In the time of Geraldus Cambrensis, the plain of the Curragh had a stone circle similar to that of Stonehenge. Of the round tower there are no fewer than five examples. Some stone crosses also are still preserved, and many castles of the Anglo-Norman period, three of which are still inhabited. The well-known Roman

Catholic college of Maynooth (q. v.) is situated in this county, as is also the Jesuit college of Clongowes Wood.

KI'LIA, a fortified town of European Turkey, in the province of Bessarabia, is situated on the left bank of the Kilia branch of the Danube, 25 miles north-east of Ismail. Commerce is carried on here to some extent, and there is a population of 6400.

KI'LIAN, a saint of the Roman Catholic Church, and Bishop of Würzburg in the 7th century. He was a native of Ireland, and a member of that distinguished body of Irish missionaries among the Teutonic nations, to whose labours, in the 6th and 7th c., Christianity and civilisation were so largely indebted in the southern and south-eastern countries of Europe. He was of a noble family, and while yet young, entered the monastic life in his native country. Having undertaken, in company with several of his fellow-monks, a pilgrimage to Rome, he was seized in his journey through the still pagan province of Thuringia, with a desire to devote himself to its conversion, and being joined by his fellow-pilgrims, Colman and Donatus, he obtained for the project at Rome, in 687, the sanction of the then pope, Conon, by whom he was ordained bishop. On his return, he succeeded in converting the Duke Gosbert, with many of his subjects, and in opening the way for the complete conversion of Thuringia; but having provoked the enmity of Geilana, who, although the widow of Gosbert's brother, had been married to Gosbert, by declaring the marriage invalid, and inducing Gosbert to separate from her, he was murdered at her instigation, during the absence of Gosbert, in 789, together with both his fellow-missionaries. The work which K. commenced was completed some years later by Boniface and his fellow-missionaries.

KILIMANJARO' (the Great Mountain), supposed to be the highest known mountain of Africa, is situated on the western border of Zanzibar, in lat. 3° 40′ S., and long. 36° E. It is covered with perpetual snow, and is supposed to reach an elevation of 20,000 feet above sea-level.

KILKE'NNY, CITY OF (Gael. 'Church of St Kenny, or Canice'), the capital of the county of that name, and a county of itself, is situated on the river Nore, 81 miles south-south-west from Dublin by the Great Southern and Western Railway. Pop. in 1861, 14,081. In 1871, it had decreased ten per cent., having fallen to 12,664; of whom 11,315 were Roman Catholics, 1188 Episcopalians, and the rest Protestants of other denominations. The county of the city comprises an area of 17,012 acres, of which 16,091 are external to the city. K. returns one member to the imperial parliament. This city owes its origin to the cathedral church of the diocese of Ossory, which dates from the 12th century. Almost from the time of the invasion, K. was a strong seat of the English power, its castle dating from the time of William, Earl of Pembroke, in 1195. From an early date, K. was a place of much political importance, as well as the seat of numerous religious establishments. Being seated on the southern frontier of the Pale, it was strongly walled in the end of the 14th c., and several parliaments were held in it, of which the most notable was that of 1367, in which was enacted the well-known 'Statute of Kilkenny,' the great nucleus of all the distinctively English legislation for Ireland. The cathedral dates in part from the 13th c.; and the abbey church of St John's, called the Black Abbey, has been partially restored, and is one of the very few ancient Irish churches now in actual occupation for the religious use of the Roman Catholics. A handsome Roman Catholic cathedral also has been recently completed. The so-called college or grammar-school of K. was founded by the Butlers in the 16th c., and was further endowed by the great Duke of Ormond. St Kyran's College is an educational establishment for the Roman Catholics, and is interesting as one of the first opened by that religious community after the repeal of the law which made Catholic education penal in these countries. K. formerly possessed considerable manufactures of blankets and coarse woollen and linen cloths, but of late they have much declined. It is the seat of tolerably extensive marble-works, and has a large and active provision-trade, the chief outlet of which is Waterford, with which K. is connected both by river and by the Kilkenny and Waterford Railway.

KILKENNY, an inland county of the province of Leinster, in Ireland, bounded on the S. by Waterford, is 46 miles in its greatest length from N. to S., and 24 in its greatest width from E. to W. Its area is 796 square miles, or 509,732 acres, of which 470,102 are arable. The population has been steadily decreasing since 1841, when it was 189,312. In 1851 it was 138,775; in 1861 it had fallen to 110,341, and in 1871 to 96,638; of whom 91,897 were Roman Catholics, 4514 Episcopalians, and the rest of other denominations. The surface of the county is very varied, the southern portion being especially elevated, the hills rising to a height of 1696 feet in the summit of Mount Brandon. In the western district are situated the Walsh Mountains. The principal rivers are the Nore, which traverses the whole length from north to south-east, and falls into the Barrow; the Barrow, and Suir, which form the eastern and southern boundary. The surface of K., except the mountains in the S., is mainly of the limestone formation, overlaid in the N. districts by shale and sandstone. In the hilly districts is an extensive deposit of anthracite coal, but of inferior quality. In the neighbourhood of the city of K., a valuable black marble, interspersed with fossil shells, is quarried, of which a considerable manufacture of chimney-pieces and similar objects is carried on. Marl is generally found throughout the county. The soil is generally fit for tillage. In 1872, the number of acres under crop was 171,027. The live-stock in 1872 was—horses, 16,552; cattle, 112,377; sheep, 109,284; pigs, 56,966. The capital is the city of Kilkenny (q. v.). The towns of secondary importance are Callan, Thomastown, Freshford, Urlingford, and Castlecomer, which is the centre of the coal-district. K. has two county members, and the city a third. K. having been, from an early period after the invasion, the seat of the great Anglo-Norman families of Fitzgerald, Butler, Grace, Purcell, and others, has been the scene of much of the conflict of the English and Irish races, and is still thickly studded with remains of the military strongholds of the English settlers. The ecclesiastical remains are no less numerous; and it possesses five round towers, and a considerable number of raths or tumuli, cairns, stone-circles, and pillars. The most remarkable natural curiosity is the cave of Dunmore, between Castlecomer and Kilkenny, opening by a natural arch of 50 feet in height, and containing several chambers encrusted with stalactites. It is traversed by a subterranean stream.

KILLA'RNEY, a small market-town of Ireland, in the co. Kerry, Munster, is situated 1½ mile from the Lower Lake of the same name, 17 miles S.E. of Tralee, and 46 miles W.N.W. of Cork. It contains an imposing Roman Catholic cathedral, a Dominican friary, and a nunnery, has little trade, is exceedingly dull in winter, though it wakes up into animation in spring and summer, when it is visited by crowds of tourists, attracted by the beauty of the scenery in the vicinity. Pop. (1871) 5064.

KILLARNEY, Lakes of, a series of three connected lakes, near the centre of the county of Kerry, Ireland. The surplus waters are conveyed by the river Leane north-west to Castlemain Harbour. The Upper Lake is 2⅛ miles long and ⅜ths of a mile broad, and contains several islands. The Long Range River, leading to the Middle Lake, is about three miles in length. The Middle Lake is 2 miles long by 1 mile broad; and the Lower Lake, with about thirty islands, is 5 miles long by 3 broad. The beauty of the scenery, which is widely celebrated, consists in the gracefulness of the mountain outlines, the rich and varied colouring of the wooded shores, deepening through gray rock and light-green arbutus to brown mountain heath and dark firs.

KILLIECRA'NKIE, Battle of. See Graham, John, Viscount Dundee.

KILMAI'NHAM HOSPITAL, an establishment near Dublin for the reception of wounded and pensioned soldiers. It was originally founded by King Charles II., and is conducted on similar principles to the sister institution, Chelsea Hospital (q. v.). K. H. is maintained by an annual parliamentary grant, and provides everything necessary for the comfort of upwards of 250 veterans and officers. The general commanding the forces in Ireland for the time being is *ex officio* the master of K. H., and has his residence on the estate.

KILMA'RNOCK, the largest town in the county of Ayr, Scotland, and one of the chief stations on the Glasgow and South-western Railway, is situated on a small stream of the same name, 12 miles north-north-east of Ayr. K. was once celebrated for its manufacture of 'cowls;' in the days of hand-loom-weaving, the 'Kilmarnock wabsters' were a notable class, and have received from the satiric pen of Burns a not altogether enviable immortality; but the introduction of machinery has reduced the class to insignificance. Later, the town became one of the chief seats of calico-printing in Scotland; but though this manufacture is still carried on, it has ceased to be as important as formerly. It has also several large engineering establishments, woollen mills, carpet manufactories, tanneries, breweries, &c. The country round about is one of the richest in Scotland in coal and iron, and its dairy produce is also extensive. The largest cheese show in Scotland is held here. In 1872, the value of the cheese exhibited and sold amounted to nearly £25,000. K. is a parliamentary burgh, and unites with Rutherglen, Dumbarton, Port-Glasgow, and Renfrew in sending one member to parliament. Pop. (1871) 22,952.

KILOGRAMME. See Gramme.

KILRU'SH, a small market and seaport town of Ireland, in the county of Clare, is situated on an inlet of the same name, on the northern shore of the estuary of the Shannon, 50 miles west of Limerick. It is much resorted to for sea-bathing, has a good harbour with secure anchorage from westerly gales, and carries on considerable trade in corn, butter, pigs, fish, feathers, hides, flags, Irish moss, and in turf cut in the vicinity. Stone and slate are quarried here, and there are manufactures of flannels, friezes, and linen-sheetings. Pop. (1871) 4118.

KILSY'TH, a burgh of barony in Stirlingshire, Scotland, is distant about 12 miles north-east from Glasgow, with which it is connected by railway. There are here several factories, and coal and iron works. Pop. (1871) 4895.

KILWI'NNING, a town in the county of Ayr, Scotland. It consists chiefly of one long, irregular street. Hand-loom weaving, which at one time was carried on to a large extent, is now comparatively nothing. Hand-sewing or embroidery, introduced about a century ago, was the source from which a large portion of the female community derived their support, but very few are now employed in this branch of industry. The prosperity of the town now depends mainly on the numerous coal-pits in its vicinity, and on its proximity to the Eglinton Ironworks, which alone afford employment to 1700 miners and others. The parish church, built in 1775, occupies part of the site of the famous Abbey of Kilwinning. The town is noted as being the birthplace of freemasonry in Scotland, and until the institution of the Grand Lodge in 1736, all other lodges in Scotland received their charters from 'Mother Kilwinning;' even after 1736, down to 1807, when the disputes between the two lodges were adjusted, many charters were issued by the mother-lodge. It is also celebrated for its archery, and is the only place in Scotland where shooting at the papingo is practised. Pop. in 1871, 3598. About a mile and a half to the south-east of the town, in the midst of extensive and beautiful policies, stands Eglinton Castle, the principal residence of the family of Montgomerie, Earls of Eglinton, and the scene of the renowned 'Tournament' in 1839.

KIMCHI, David (generally quoted by his initials, *ReDaK*), the most eminent Jewish grammarian and exegete, was born towards the end of the 12th c., probably at Narbonne, where he spent the greater part of his life. He died in Provence about 1240. His father, Joseph Kimchi, was the author of a number of commentaries and other theological works. His brother Moses is renowned for works of a similar description, more especially a Hebrew Grammar, *Mahalach Shebile ha-Daat*, of which there are several editions. His own celebrity, however, far exceeds theirs. His Grammar, *Michlol*, and his Lexicon, *Shorashim*, have, to a certain degree, been the basis of all subsequent Hebrew grammars and lexicons. He wrote also commentaries on almost all the books of the Old Testament, most of which have been separately printed, and translated into Latin by Nelo, Pontaco, Leusden, Muis, Janvier, &c., besides several polemical works, such as the *Vikuach*, *Teshuboth le-Nozrim*, &c. He was also made arbiter in the great Maimonides controversy (1232).

KI'MMERIDGE CLAY, the lowest series of the Upper Oolite, consists chiefly of a bituminous shale, in some places passing into an impure brown shaly coal, and in others having beds of sand or calcareous grit, with layers of nodules of septaria scattered through them. The series attains a maximum thickness of 500 or 600 feet. The beds occur in the vale of Pickering, in Yorkshire, and continue as a narrow band south through Lincoln and Norfolk, then south-east through Huntingdon, Buckingham, and Wilts, to Dorset, where they terminate near Weymouth, and eastward at the village of Kimmeridge, which has given its name to the series. The fossils are chiefly mollusca, with a few placoid and ganoid fish, and several reptiles. In many places, layers of an oyster (*Ostrea deltoidea*), without any other organic remain, occur in broad continuous floors parallel to the stratification: the valves are usually together, and young specimens are occasionally attached to the older ones.

KIN, Next of. When a person dies intestate, leaving personal property, such property devolves upon and belongs to the next of kin, who are the blood-relatives of the deceased. The law has declared a certain order of precedence among next of kin, which is not exactly the same in the three kingdoms. The degrees of kindred are divided into lineal and collateral. The lineal consists of the ascending, such as father, mother, grandfather, grandmother, paternal and maternal, and so on *ad infinitum;* and the descending, such as son, daughter, grandson, granddaughter, and so on *ad infinitum.* The collateral kindred consists of brothers, sisters, uncles, aunts, and the children of such *ad infinitum.* The mode by which the civil law computed the propinquity of degree was this; it allowed one degree for each person in the line of descent exclusively of him from whom the computation begins, and in the direct line counted the degrees from the deceased to his relative; but as regards collaterals, it counted the sum of the degrees from the deceased to the common ancestor, and from the common ancestor to the relatives. Thus, a brother was in the second degree, counting one to the father, and one from the father to the brother; a nephew, and also an uncle, a great-grandfather and a great-grandson, were all in the third degree; a son and a father were in the first degree; and so on. This mode of computing the degrees of kindred has been adopted in the law of England and Ireland.

When a person dies intestate, leaving personal property, there are two classes of rights to which the next of kin are entitled: one is the right to administer the estate, or to take out letters of administration; the other is the right to a share of the property itself. As regards the right of administration, the widow or next of kin may be selected, both or either. But among the next of kin, those are to be preferred who are nearest in degree according to the above computation: thus, a son or father is preferred to a brother, grandfather, or grandson; and these to a nephew, uncle, great-grandson, or great-grandfather; and so on. As regards the more valuable right of a share in the property, the rule is, that if there is a widow surviving, and also issue of the deceased, who are in that case the next of kin, then two-thirds of the property go to the next of kin; if there are no issue, but a widow survives, then one-half only goes to the next of kin; but if there is no widow surviving, then the whole goes to the next of kin. But the next of kin take according to the statute of Distributions, which slightly differs from the order of the civil law as to the degrees of priority: thus, the children exclusively take the whole, if children survive; if some of the children are dead, leaving issue, then the issue collectively of each dead child take an equal share with the living children, by what is called the principle of Representation. If there are none nearer than grandchildren, all take an equal share, and the issue of a deceased grandchild also take one of such shares. After all the children and grandchildren are dead without issue, then the father, if alive, is entitled to the whole. If he also is dead, then the mother, the living brothers and sisters (together with the issue of deceased brothers and sisters collectively), take each one share. After these are dead, then grandfathers and grandmothers, paternal and maternal, and nephews and nieces, if alive, take each a share. The right of representation, i. e., the right of the children of a deceased person being one of a class (and who, if alive, would have been one of the next of kin), to represent him, and take his share, applies as far as the children of brothers and sisters, but no further. The heir-at-law, if of equal degree, is one of the next of kin, and takes his share with the rest, though he also gets all the real estate. The half-blood counts among the next of kin equally with the whole blood.

In Scotland, the rules of priority among the next of kin vary considerably from the above order, which prevails in England and Ireland. The children being entitled to an absolute legal share called Legitim (q. v.), take the father's property in two characters—one part as legitim, the other as being next of kin—and the result is often different from what obtains in England. Moreover, in Scotland, though the heir-at-law may be one of the next of kin, still he is not entitled to take such share unless he Collate (q. v.) the heritable estate. The degrees of kindred are not counted in exactly the same way. The father never can take more than one-half, nor the mother than one-third, while any of the brothers and sisters, or their issue, are alive. The half-blood does not share equally with, but in an inferior degree to the full blood.

KINA BALU, an interesting mountain in the northern angle of the island of Borneo, reaches a height of 13,000 feet. It was twice ascended by Mr Spenser St John, F.R.G.S., author of *Life in the Forests of the Far East.*

KINBU'RN, a small fort of South Russia, in the government of Kherson, is situated at the extremity of a long narrow sand-bank, which forms the southern boundary of the estuary of the Dnieper. During the Crimean War, it fell before a naval expedition of the allies, October 17, 1855. About a mile from the fort stands the little fishing-village of Kinburn.

KINCA'RDINESHIRE, or THE MEARNS, a maritime county of Scotland, with Aberdeenshire and the Dee on the north, Forfarshire and the North Esk on the south and west, and the North Sea on the east. The rocks are granite, gneiss, sandstone, conglomerate, mica-slate, clay-slate, limestone, and trap. Area, 252,250 acres, of which 118,700 are in cultivation, and 23,153 acres in wood. The county may be divided into five sections—viz., the Coast, Garvock, the 'How o' the Mearns,' the Grampians, and Deeside. The coast-land and much of the 'How' is of superior quality, and rents from £2 to £3, 10*s.* an acre. The 'How' forms part of the Valley of Strathmore (q. v.). The Grampians, running across the county from east to west, parallel to the Dee, with an average breadth of from seven to eight miles, cover about 80,000 acres. One of the peaks, Mount Battock, is 2555 feet high. The Deeside portion of the county is a comparatively narrow strip of light sharp soil. The rainfall is from 23 to 27 inches; in 1872, it was 50 per cent. above the average. The produce of the county and the condition of the inhabitants have improved vastly since the middle of the 18th c., when there was little to be seen but poor huts and starved cattle, and when the value of the largest ox was not more than 20*s.* In 1872, K. had 1216 acres wheat, 12,111 acres barley and bere, 31,518 acres oats, 401 acres rye, 530 acres beans, 54 acres peas, 3226 acres potatoes, 19,227 acres turnips. Of live-stock, there were 4356 horses, 28,179 cattle, 28,339 sheep, and 3090 swine. There are few manufactures in the county. The principal towns and villages are Stonehaven (q. v.), the county town; Bervie, a royal burgh; Lawrencekirk, a burgh of barony; and Johnshaven. In the beginning of the 19th c., about 1 in 50 of the population was on the poor-roll, the average expenditure for each being £1, 16s. In 1872, 17 parishes of the 19 in K. were assessed for the poor, and had 1530 paupers, costing £8545. Of the objects of antiquarian interest, the most noted is Dunnottar Castle (q. v.). K. was the birthplace of George Wishart, Robert Barclay, Bishop Burnett, Dr J. Beattie, and Dr Thomas Reid. The pop. in 1871 was 34,651, who return one member to parliament. Valued rent, £250,623 in 1872—1873.

KING (Saxon, *Cyning;* Sanscrit, *Ganaka*, father, from the root *Gan*, to beget: 'what the husband was in his house, the lord, the strong protector, the king was among his people'—*Max Müller*), the person vested with supreme power in a state. According to feudal usages, the king was the source from which all command, honour, and authority flowed; and he delegated to his followers the power by which they exercised subordinate rule in certain districts. The kingdom was divided into separate baronies, in each of which a baron ruled, lord both of the lands, which he held under the obligation of rendering military service to the king, and in many cases also of the people, who were vassals of the soil, and his liege subjects. In modern times, the kingly power often represents only a limited measure of sovereignty, various constitutional checks being in operation in different countries to control the royal prerogative. The king may succeed to the throne by descent or inheritance, or he may be elected by the suffrages of the nation, or by the suffrages of some body of persons selected out of the nation, as was the case in Poland. Even when the kingly power is hereditary, some form is gone through on the accession of a new king, to signify a recognition by the people of his right, and a claim that he should pledge himself to perform certain duties, accompanied by a religious ceremony, in which anointing with oil and placing a crown on his head are included as acts. By the anointing, a certain sacredness is supposed to be thrown round the royal person, while the coronation symbolises his supremacy. There is now no very clearly-marked distinction between a king and an Emperor (q. v.). A queen-regnant, or princess who has inherited the sovereign power in countries where female succession to the throne is recognised, possesses all the political rights of a king.

In England, it is said that the king never dies, which means, that he succeeds to the throne immediately on the death of his predecessor, without the necessity of previous recognition on the part of the people. He makes oath at his coronation to govern according to law, to cause justice to be administered, and to maintain the Protestant Church. He is the source from which all hereditary titles are derived, and he nominates judges and other officers of state, officers of the army and navy, governors of colonies, bishops and deans. He must concur in every legislative enactment, and sends embassies, makes treaties, and even enters into wars, without consulting parliament. The royal person is sacred, and the king cannot be called to account for any of his acts; but he can only act politically by his ministers, who are not protected by the same irresponsibility. A further control on the royal prerogative is exercised by the continual necessity of applying to parliament for supplies of money, which practically renders it necessary to obtain the sanction of that body to every important public measure.

The Crown (q. v.) now in use as the emblem of sovereignty differs considerably in form in different countries of modern Europe; but in all cases it is distinguished from the coronets of the nobility in being closed above. The royal crown of Great Britain, here represented, is described under article CROWN. The helmet placed by the sovereign over his arms is of burnished gold, open-faced, and with bars. For the arms of the sovereign, see GREAT BRITAIN.

Crown of Great Britain.

KING-AT-ARMS, or KING-OF-ARMS. The principal heraldic officer of any country. There are four kings-at-arms in England, named respectively Garter, Clarencieux, Norroy, and Bath, but the first three only are members of the College of Arms.

Garter principal king-of-arms was instituted by Henry V., 1417 A.D., for the service of the order of the Garter. His duties include the regulation of the arms of peers and the knights of the Bath. In the capacity of king-of-arms of the order of the Garter, he has apartments within the castle of Windsor, and a mantle of blue satin, with the arms of St George on the left shoulder, besides a badge and sceptre. His official costume as principal king-of-arms of England is a surcoat of velvet, richly embroidered with the arms of the sovereign, a crown, and a collar of SS. The insignia of the office are borne by Garter impaled with his paternal arms, the latter on the dexter side of the shield. These are argent, St George's cross, on a chief gules a ducal coronet encircled with a garter, between a lion of England on the dexter side, and a fleur-de-lis on the sinister, all or.

Clarencieux and Norroy are provincial kings-of-arms, with jurisdiction to the south and north of the Trent respectively. They arrange and register alone or conjointly with Garter the arms of all below the rank of the peerage. The official arms of Clarencieux are argent St George's cross, on a chief gules a lion of England ducally crowned or. Those of Norroy are argent St George's cross, on a chief per pale azure and gules a lion of England ducally crowned between a fleur-de-lis on the dexter side, and a key, wards in chief, on the sinister, all or. Both provincial kings have a crown collar and surcoat. The crown is of silver gilt.

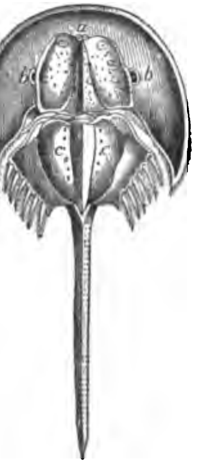
The crown of a king-of-arms is of silver gilt, and consists of a circle inscribed with the words, *Miserere mei Deus secundum magnam misericordiam tuam*, supporting 16 oak leaves, each alternate leaf higher than the rest. Within the crown is a cap of crimson satin turned up with ermine, and surmounted by a tassal wrought of gold silk. Kings-of-arms were formerly entitled to wear their crowns on all occasions when the sovereign wore his; now they assume them only when peers put on their coronets. The installation of kings-at-arms anciently took place with great state, and always on a Sunday or festival-day, the ceremony being performed by the king, the earl-marshal, or some other person duly appointed by royal warrant.

Bath King-of-arms, though not a member of the college, takes precedence next after Garter. His office was created in 1725 for the service of the order of the Bath. On the 14th January 1726, he was constituted Gloucester King-of-arms (an office originally created by Richard III., in whose reign it also became extinct), and principal herald of Wales. He was at the same time empowered, either alone, or jointly with Garter, to grant arms to persons residing within the Principality.

The chief heraldic officer for Scotland is called Lyon King-of-arms (q. v.), who since the Union has ranked next to Garter. His title is derived from the lion rampant in the Scottish royal insignia, and he holds his office immediately from the sovereign, and not as the English king-at-arms, from the Earl Marshal. His official costume includes a crimson velvet robe embroidered with the royal arms, a triple row of gold chains round the neck with an oval gold medal, with the royal arms on one side, and St Andrew's cross on the other; and a baton of gold enamelled green, powdered with the badges of the kingdom. His crown is of the same form with the Imperial crown of the kingdom, but not set with stones. Before the Revolution he was crowned by the sovereign, or his commissioner, on entry on office.

There is one king-of-arms in Ireland, named Ulster. In the 14th c., there existed a king-of-arms called Ireland, but the office seems to have become extinct, and Edward VI. created Ulster to supply the deficiency. His arms are argent, St George's cross, upon a chief gules a lion between a harp and a portcullis, all or. The royal ordinance relative to the order of St Patrick, issued 17th May, 1833, declares that in all ceremonials and assemblies, Ulster King-of-arms shall have place immediately *after* the Lyon.

KING-CRAB (*Limulus*), a genus of *Crustacea*, ranked by Cuvier among the *Entomostraca;* but so widely differing from all the rest of the *Crustacea*, that Milne-Edwards makes it a sub-class by itself. The head and thorax are united together, and are covered by a shield, which is convex above, and concave beneath. The abdomen is more or less hexagonal, no division into rings appears in it, and it is covered by a shield not so broad as that of the head and thorax. On each side it has along the margin six movable spines directed backward and outwards; and attached to it is a tail, which forms a long and strong dagger-like spine, sometimes exceeding in length the whole body of the animal. The legs are not large enough to be visible beyond the shield when the animal moves along the ground.—These remarkable animals are found only on the shores of tropical Asia, the Asiatic Archipelago, and tropical America. They feed on animal food; and are said to be themselves less agreeable food than crabs or lobsters. Some of them exceed two feet in length, and the strong and jagged spine is a formidable weapon. In some of the Asiatic islands, the spine is often used for pointing arrows. In tropical America, the K. is called *Casserole Fish*, and the shell is used as a ladle. The number of species of K. is not great.—Fossil species are pretty numerous. Trilobites are supposed to have been allied to the *Limuli*.



King-Crab (*Limulus Polyphemus*):
Copied from *English Cyclopædia*.
a, position of the two smooth eyes; *b*, *b*, lateral composite eyes; *c*, *c*, respiratory apertures.

KINGFISHER (*Alcedo*), a genus of birds of the order *Insessores*, and family *Halcyonidæ*. The name is often extended to the whole family; the only British and almost the only European species of which is the Common K. (*A. ispida*), a bird not much larger than a sparrow, in brilliancy of colour rivalling the finest tropical birds—blue and green being the prevailing colours. The K. is generally distributed over Britain and Ireland, but is not so common in Scotland. It is not a bird of passage, although in many places it appears only as an occasional visitant. It is found in all parts of Europe except the most northern, and over a great part of Asia and Africa. It frequents the banks of rivers and streams, and is often seen flying near the surface of the water. Its food consists of small fishes, such as minnows, sticklebacks, and trout or salmon fry, and of leeches and water-insects. When it has caught a fish, it often kills it by beating on a branch, and always swallows it head foremost. The indigestible parts are afterwards disgorged.

Kingfisher (*Alcedo ispida*).

It seems probable, although not quite certain, that the K. is the *Halcyon* of the ancients, about which many wonderful fables were current among them: of its having power to quell storms, of its floating nest, and the stillness of the winds during the time necessary for its safety, &c. Shakspeare makes repeated allusion to the popular notion, that if the stuffed skin of a K. or Halcyon is hung up by a thread, the bill will always point to the direction from which the wind blows.

The **Belted K.** (*Alcedo Halcyon* or *Ceryle Halcyon*) of North America is a much larger bird than the K. of Britain, being fully twelve inches in length. It is common on most of the rivers of North America, to the 67° N. lat. in summer, but migrates southward in winter, and is then to be found in the West Indies. Its colours are dull when compared with those of the common kingfisher.

Many species of K. are found in the warmer parts of the world. Some of them, forming the genus *Ceyx*, want the hind toe. The common European K. may be regarded as the type of the family, which belongs to the group called *Syndactyle Birds*, and is characterised by the much-united toes. The form is bulky; with long, straight, quadrangular, sharp, heron-like bill, short wings, very short square tail, short legs, and small feet.

KING GEORGE'S SOUND, an inlet of the Indian Ocean, at the south-west angle of Australia. Independently of an excellent roadstead, it contains two landlocked recesses, Princess Royal and Oyster Harbours. The entrance is in lat. 35° 6′ S., and long. 118° 1′ E.

KINGLAKE, Alexander William, was born at Taunton, Somersetshire, in 1802, studied at Eton and Trinity College, Cambridge, and—having chosen the law as a profession—was called to the bar in 1837. His practice soon became very great; nevertheless, he found time to make a tour in the east of some length, the result of which was a book entitled *Eothen*, descriptive of his adventures and impressions. It was published in 1844, and at once attained an astonishing popularity, passing through many editions both in England and America, and being also extensively translated on the continent. The graceful vigour and liveliness of the style have made *Eothen* a model for subsequent works of a similar kind, but none have yet reached the exquisite talent of the original. In 1857, K. entered parliament as member for Bridgewater. Vols. I. and II. of his *Invasion of the Crimea* appeared in 1863, and fully sustained his literary reputation; but the virulent antipathy shewn towards the French emperor and all the actors in the *coup d'état* was not calculated to beget confidence in him as a historian. Vols. III. and IV. were published in 1868, and Vol. V. in 1875. In 1868, he was again elected for Bridgewater, but, on petition, was unseated.

KINGPOST. See Roof.

KINGWOOD, a very beautiful wood, in small pieces, used for ornamental work. It is brought from Brazil, and is believed to be the wood of a species of *Triptolomia* (nat. ord. *Leguminosæ*, sub-ord. *Papilionaceæ*).

KINGS, BOOKS OF (*Melakim*), the name given to two of the canonical books of the Old Testament. Originally, they were but one, and were first separated by the Seventy, by whom they are designated 'the third and fourth of the kingdoms'—the Books of Samuel forming the first and second. This division was copied by the Vulgate, and passed thence into the general usage of Christendom. The exact titles of these books in the English Authorised Version are—*The First Book of the Kings, commonly called the Third Book of the Kings*, and *The Second Book of the Kings, commonly called the Fourth Book of the Kings*. They embrace (1) the reign of Solomon, (2) the history of the divided kingdoms of Judah and Israel, (3) the history of the kingdom of Judah after the dispersion of Israel, until the Babylonian captivity—a period of about 570 years in all. The books do not appear to be merely vague compilations from royal annals and other—rather contradictory—sources, as is held by some, but rather the diligent work of a historian—with a clear and distinct tendency—who gathered together all the written and unwritten information, provided it could be made useful for his purpose. The unity of style and language is indeed palpable throughout, nor are any later alterations of consequence apparent. The principal sources quoted are a *Book* [of the Chronicles] *of Solomon*, further a *Book of the Chronicles of the Kings of Israel*, and another *of the Kings of Judah*. The Talmud, and some of the earlier Christian theologians, ascribe it to Jeremiah; this view is also maintained by Hävernick in modern times. Huet and Calmet are in favour of Ezra, but all that can be safely asserted is, that the compiler lived during the second half of the Captivity, and after the death of Joiachin, and probably in Babylon. The spirit of the work is *theocratico-prophetic* in a high degree (its historical fidelity with respect to the political events is generally recognised, but the stories relating to the prophets Elijah and Elisha are by most critics referred to the province of legend); while that of Chronicles (which goes over much the same ground) is held to betray the predominance of priestly influence. One of the best modern commentaries is that by Thenius (Leip. 1845).

KING'S BENCH. See QUEEN'S BENCH.

KING'S COLLEGE, Cambridge, was founded in 1441 by Henry VI., for a provost, seventy fellows and scholars, three chaplains, with clerks, choristers, servitors, and poor scholars—in all, 140. Its revenues were seriously diminished by Edward IV. The chapel is the work of the three Henries, VI., VII., VIII. The architect is supposed to have been Nicholas Cloos, or Klaus, Fellow of the college, and Bishop of Lichfield, or, as others say, his father. It is perhaps the finest specimen of perpendicular Gothic in the world. Its internal dimensions are 290 feet long, 45 wide, and 78 high. There is an inner roof of stone, which, though of enormously massive structure, has, from its proportions, and the beauty of the groining, the most airy and pleasing effect. Under the statutes of 1861, the foundation consists of forty-six fellows, and not less than forty-eight scholars, governed by a provost. Twenty-four of the scholarships are appropriated to the scholars of Eton College. The fellowships are open to all members of the college of sufficient standing. In 1871, a scholarship of £80, tenable for three years, was established for natural science.

KING'S COLLEGE, London, a proprietary institution occupying the east wing of Somerset House, and founded in 1828 on the fundamental principle:—'that instruction in the Christian religion ought to form an indispensable part of every system of general education for the youth of a Christian community.' The college being strictly in connection with the Church of England, church service is a regular part of its routine. The course embraces theology, general literature and science, applied sciences, and medicine. A limited number of matriculated students reside within the walls. The museum contains the calculating-machine of Mr Babbage, and George III.'s collection of mechanical models and philosophical instruments, the latter presented by the Queen. There is a school in connection with the college.

KING'S or QUEEN'S COUNSEL are certain barristers at law, in England and Ireland, who have been appointed by letters-patent to be her Majesty's Counsel. The office is entirely honorary, but it gives a right of preaudience in all the courts, according to the date of appointment. The appointment practically belongs to the Lord Chancellor. Though called her Majesty's Counsel, they are not prevented from being retained and acting for ordinary clients, except that in defending prisoners and acting in suits against the crown,. they require a special licence from the crown, which, is however, never refused. In Scotland, there is no distinction of Queen's Counsel, but the Lord Advocate and Solicitor-general are so in reality. The appointment of Queen's Counsel is for life, but in case of disgraceful conduct. the letters-patent are revoked, as was done in 1862 to Edwin James, who, in 1873, applied in vain for restitution.

KING'S COUNTY, an inland county of Ireland, is bounded on the E. by Kildare, and on the W. by the Shannon, which separates it from Roscommon and Galway. Area, 493,985 statute acres, of which 337,256 are arable and 8258 in plantations. In 1872, 128,725 acres were under crops, and only 1450 were lying fallow. The population has steadily decreased—(1851) 112,076; (1861) 90,013; (1871) 75,781; of whom 67,301 were Roman Catholics, 7561 Episcopalians, and the rest of other denominations. The surface is in general flat; it includes, however, in the south, a portion of the Slieve Bloom Mountains, from which a line of low limestone hills extends north-east through the centre of the county, forming a water-shed between the basin of the Shannon on the west, and those of the Boyne and Barrow on the east. The soil, a light loam of medium depth, resting on limestone gravel, is of average fertility. The Bog of Allen (q. v.) extends from west to east the whole length of the county. The Grand Canal traverses the north portion of this county. Notwithstanding great tracts of bog, the climate is not unhealthy. Two members are returned to the imperial parliament for the county. In the north-west of the county are the ruins of the abbey Clonmacnoise, founded in 548, exceedingly rich in ancient monumental remains, and forming one of the most interesting of those ruined ecclesiastical structures in which Ireland is so rich. The county contains also many other religious foundations, as well as numerous feudal castles, chiefly of the Elizabethan period, and some of them still inhabited.

KING'S EVIDENCE (or Queen's), the name given to a person, who, having been an accomplice in some crime, has confessed, and offered to give evidence, and make full confession. The usual practice of the crown, in such cases, is to pardon the person so acting, though he is not absolutely entitled to a pardon; and an application is generally made to the judge, to admit the party as a witness, on the trial of the fellow-criminals. A similar practice exists in Scotland, the public prosecutor having the power and discretion to admit the confessing party.

KING'S EVIL. See SCROFULA.

KING'S LYNN. See LYNN.

KING'S SILVER, an ancient fine paid to the king, in the Court of Common Pleas in England, on alienation of certain lands.

KING'S YELLOW is the term applied to a pigment, which is a mixture of orpiment (tersulphide of arsenic) and arsenious acid.

KINGSLEY, REV. CHARLES, formerly Chaplain in Ordinary to the Queen, was born at Holne Vicarage, Devonshire, in 1819. He entered Magdalen College, Cambridge, in 1840, where he highly distinguished himself in classics and mathematics. In 1844, he became curate, and shortly after, rector of Eversley, in Hampshire. In the same year, he published *Village Sermons*, characterised as honest, downright wisdom, conveyed in a plain and simple style. In 1848, appeared *The Saint's Tragedy, or the True Story of Elizabeth of Hungary*, an admirable and truly catholic representation of medieval piety. The next two or three years of his life were devoted—in company with his friend Mr Maurice and others—to a series of efforts for the amelioration and christianisation of the working-classes. To these efforts may be traced the origin of those co-operative associations in which the workmen are also the masters, the results of which have proved in every way beneficial. His opinions on the social anarchy of modern times are to be found in his *Alton Locke, Tailor and Poet* (1849), a novel of extraordinary power and fascination, the hero of which is sought for in a London workshop. This was followed, in 1851, by *Yeast, a Problem*, in which K. handles, among other questions, the condition of the English agricultural labourer; and in 1853, by *Hypatia, or New Foes with an Old Face*, a most vigorous and brilliant delineation of Christianity in conflict with rude Gothic paganism and the expiring philosophy of Greece, in the early part of the 5th century. Both of these works appeared in *Fraser's Magazine*. Two years after, he published *Westward Ho!* probably the greatest of his works. Its glowing pictures of South American forests are said to have excited the admiration of Humboldt, who had himself really *seen* what K. only *imagined*. Other works of his are—*Message of the Church to Labouring Men; Sermons on National Subjects, preached in a Village Church; Phaethon, or Loose Thoughts for Loose Thinkers; Alexandria and her Schools; Sermons for the Times; Glaucus, or the Wonders of the Shore; The Heroes, or Greek Fairy Tales; Two Years Ago; Good News of God.* He also published *Hereward, the Last of the English* (1866); *The Hermits* (1867); *How and Why* (1869); *At Last, a Christmas in the West Indies* (1871). He was appointed Professor of Modern History at Cambridge, in 1859; and after resigning that post, was made, in 1869, Canon of Chester. He died in 1875.

KINGSTON, chief town of the county of Frontenac, and the fifth city of Upper Canada, lies in lat. 44° 8′ 30″, long. 76° 30′ 1″, on the north-east shore of Lake Ontario, at the mouth of the Cataraqui and of the Bay of Quinté, where the waters of the Canadian lakes issue into the St Lawrence. It is distant from Montreal 198 miles; from Toronto, 165; and from New York, 274. A gathering-place of old to the neighbouring Indian tribes, occupied by a French fort from 1673 till 1758, it began to be settled by the British about 1783, was laid out in 1793, was incorporated as a town in 1838, and as a city in 1846. On the union of the two Canadas, in 1840, the seat of government was established at K., but was removed again in 1845. The city has, in consequence, grown more slowly than many others in the New World, but it numbers already among its buildings some of the finest in Canada. Its harbour, sheltered by Wolfe and Garden Islands, which lie two or three miles off, lined with a row of about twenty wharfs, furnished with a grain-elevator capable of unloading 3000 bushels per hour, is always busy, while navigation is open, especially with the transhipment of cargoes between the vessels which ply on the lakes and those of the St Lawrence and the Rideau Canal. The ship-building of K. is second in Canada only to that of Quebec. The Canadian Engine and Machinery Company manufactures railway rolling-stock on the most approved principles. Besides it, there are several large foundries for the manufacture of engines, locomotive and stationary, of agricultural implements, edge-tools, axles, nails, &c. There are also large tanneries and breweries. Besides its outlets by water, K. communicates with all parts of the country by the Grand Trunk Railway, which passes within two miles of the city, and was in 1863 connected with it by a branch-line. Next to Quebec and Halifax, K. is the most important military position in British America. Queen's University and College at K., incorporated by royal charter in 1841, for the education of a Presbyterian ministry, has since instituted the additional faculties of Law and Medicine, is now equipped with 11 professors and lecturers, and attended by an average of 150 students. There are also a Roman Catholic institution, called Regiopolis College, the county grammar-school, and the common schools, besides several private academies. In 1862, K. became the seat of the new English bishopric of Ontario. Its population in 1871 was about 15,000, who return one member to the provincial parliament. The value of the yearly exports and imports for 1872 was—exports, 1,435,400 dollars; imports, 7,923,387; duties collected, 13,638,745.

KINGSTON, a township and village of New York, U.S., situated on the west bank of the Hudson River, at the terminus of the Delaware and Hudson Canal, 57 miles below Albany. The township contains 3 villages, 18 churches, 3 banks, 4 newspaper offices, and has a large commerce in coal, stone, ice, lime, and cement. The village was burned in 1777 by Sir Henry Clinton. Its population in 1870 was 6315.

KINGSTON, the commercial capital of Jamaica (q. v.), stands on the north side of a landlocked harbour, the best in the island, and, for its size, one of the best in the world. It was founded in 1693, after the neighbouring town of Port Royal had been destroyed by an earthquake. From this place, afterwards rebuilt, it is separated by its noble haven; while, with Spanish Town, towards the interior, it has, since 1846, been connected by a railway of about 10 miles in length. An irrigation canal is in progress, which will fertilise the plain lying between these two towns. K. contains about 32,000 inhabitants. Though the city, as a whole, is like the generality of mere seaports, filthy and disorderly, it yet presents several handsome features. A large square, called the Parade, contains spacious barracks, a Wesleyan chapel, a theatre, and some tolerable dwelling-houses. The negro market for fruits and vegetables is described as a lively and interesting scene. The temperature, which is generally oppressive on the immediate margin of the bay, becomes gradually mitigated towards the head of the sloping streets, which rise into the region of the sea-breezes. Most of the trade of Jamaica passes through Kingston.

KINGSTON, or **KINGSTOWN**, capital of the British island of St Vincent, in the West Indies, stands on the south-west coast, with a population of about 5000.

KINGSTON-ON-HULL. See Hull.

KINGSTON-UPON-THAMES, a municipal borough and market-town of England, in the county of Surrey, is situated 10 miles south-west of London, on the right bank of the Thames, here crossed by two handsome bridges, one of stone, and the other an iron viaduct on the London and South-western branch railway connecting Twickenham with Wimbledon. The county spring assizes are held in K., alternately with Croydon and Guildford. Educational and benevolent institutions are numerous; there are flour, cocoa-nut fibre, and oil mills, and brick and tile works. Pop. (1871) 25,155. Around the Surbiton Station, on the main line of the London and South-western Railway, distant about a mile and a half from Kingston market-place, has grown up, since 1838, the elegant suburb of Surbiton, now joined to the town. In the neighbourhood are Hampton Court Palace, and Bushy and Richmond Parks. Numerous Roman remains have been discovered in the vicinity of K., and during the Saxon period it had already risen into importance. Here, in 838, a great council was held under Egbert of Wessex and Ethelwolf of Kent, and a treaty agreed to; and here also seven of the Anglo-Saxon kings were crowned. The name is said to be derived from the stone on which the ceremony was performed, which stands in one of the streets, enclosed by a railing. Hampton Wick (pop. 2207) is really part of K., being connected by the bridge, though situated across the Thames, and in Middlesex.

KINGSTOWN, a thriving and important seaport of Ireland, on the S. shore of Dublin Bay, six miles S.E. of the city of that name. Previous to 1817, when the harbour-works were commenced, it was merely a fishing-village. At the visit of George IV. in September 1821, its former name *Dunleary*, was changed to Kingstown. The area of the harbour is 250 acres, with a depth of from 13 to 27 feet. The situation of the town, and the invigorating air, have made K. an important watering-place. The mail-packets sail from K. to Holyhead twice a day, and there is regular communication by steamer between it and the principal Irish and British seaports. Coal, iron, and timber are imported, and cattle, corn, lead ore, and granite are exported. About 1450 vessels of 220,000 tons on an average anchor in the harbour yearly. Pop., which, in 1861, had been 11,584, had risen in 1871 to 16,378. The houses numbered 2964.

KI'NIC or **QUINIC ACID** ($2HO,C_{28}H_{20}O_{20}$) is an acid existing in combination with quinia in the bark of the cinchonas.

KINK, a twist in a rope or cord, caused by the tightness of the coil, and a relaxation of pressure in the direction of its length. The best rope, however, rarely kinks.

KI'NKAJOU (*Cercoleptes candivolvulus*), a quadruped of the family *Ursidæ*, and allied to the racoons and coatis. By some naturalists it is referred to *Viverridæ*. It has six incisors, one canine tooth, and five molars in each jaw, the three hinder molars tuberculous. The K. is larger than a pole-cat, has a yellowish woolly fur, climbs trees, feeds on fruits, honey, &c., as well as on small animals, and from its ravages among the nests of wild-bees, is in some countries called *Honey Bear*. It is a native of the warm parts of America. The negroes have transferred to it the name Potto, from a lemurine animal of Africa. It is easily tamed.

Kinkajou (*Cercoleptes candivolvulus*).

KINKEL, Johann Gottfried, a German author, born at Oberkassel, 11th August 1815. He studied theology at Bonn, and was for some time a distinguished Protestant preacher; but becoming involved in the revolutionary movements of 1848, he was imprisoned in the fortress of Spandau, whence, however, he escaped. K. then went to America, but soon after returned to London, where he has since resided as a public teacher. Both as a poet and as a writer on art, K. holds a distinguished rank. His principal works are—*Predigten über ausgewählte Gleichnisse und Bildreden Christi* (Cologne, 1842); *Gedichte* (Stutt. 1843); *Otto der Schütz, eine Rhein. Geschichte in zwölf Abenteuern* (Stutt. 1843, 9th edit. 1852), a very beautiful narrative poem; *Die Altchristliche Kunst* (Bonn, 1845), which forms the first part of a still unfinished *Geschichte der bildenden Künste bei den Christlichen Völkern; Die Ahr, Landschaft, Geschichte und Volksleben* (Bonn, 1846); *Nimrod, ein Trauerspiel* (Hamb. 1857).—K.'s wife, Johanna K., a distinguished musician, wrote *Acht Briefe über den Clavierunterricht* (Stutt. 1849); and together with her husband, *Erzählungen* (Stutt. 1849). After her death (in 1859) appeared her novel, *Hans Ibeles in London* (Stutt. 1860).

KINNAI'RD'S HEAD, a promontory with a light-house, on the north-east coast of Aberdeenshire, Scotland, near Fraserburgh, in lat. 57° 42′ N., long. 2° W.

KI'NO, an astringent substance, resembling Catechu (q. v.) and Gambir (q. v.), the concrete exudation of certain tropical trees, especially of *Pterocarpus marsupium*, a native of the mountains of Coromandel, which yields East Indian K., and of *P. erinaceus*, a native of Gambia, which yields African Kino. The genus *Pterocarpus* belongs to the natural order *Leguminosæ*, sub-order *Papilionaceæ*, and has a 5-toothed calyx, and an irregular, nearly orbicular one-seeded pod, surrounded with a wing.

East Indian K. is the kind which now chiefly occurs in commerce, and is the ordinary K. or *gum kino* of the shops. It is in small angular glistening fragments, the smaller reddish, the larger almost black. Thin pieces are ruby red. It is brittle and easily powdered, has no smell, but has a very astringent taste. Bengal K. is a similar astringent substance, produced by *Butea frondosa*. See Butea. It has been found capable of the medicinal uses of true kino. Botany Bay K. is the produce of *Eucalyptus resinifera*. See Eucalyptus.

The astringency of kino is mainly due to its containing tannic and catechuic acid, and in consequence of this property, it is employed in medicine in certain forms of diarrhœa (especially when a flux seems to be kept up by want of tone in the intestinal capillaries), the best mode of prescribing it being as *compound kino powder*, which is a mixture of kino, cinnamon, and opium, and the dose for an adult ranging from ten grains to a scruple. There is also a *tincture of kino*, which, when properly diluted with water, forms an excellent gargle for relaxation of the uvula.

Kino is employed to a considerable extent in the East Indies as a cotton dye, giving to the cotton the yellowish-brown colour known as nankeen.

KINRO'SS-SHIRE, after Clackmannanshire, the smallest county of Scotland, lies between the counties of Perth and Fife. Area, 49,812 acres. Pop. (1871) 7198. It is 12 miles in length from east to west, and about 10 miles in breadth. Of its entire area, 30,000 acres are arable, 3000 in wood, and 4500 under water. See Loch Leven. Its surface is elevated and gently undulating; its boundaries are hilly, with occasional level openings. On the north and north-west are the Ochil Hills; on the north-east, the Lomonds; and on the south-east and south, Benarty and the Cleish Hills. The streams flow into Loch Leven (q. v.), and issue by the river Leven. The soil inclines to gravel, but is clayey in the districts north and west of the loch. Excellent pasture occurs on the moorlands. For the year 1872, the total acreage under all kinds of crops, bare and fallow grass, was 34,424; under corn crops, 9262; under green crops, 4885; the number of cattle returned was 7082; sheep, 26,627; pigs, 722. This county unites with that of Clackmannan, and with portions of Perthshire, in sending a member to parliament. The capital of the county is the town of Kinross, with a population (1871) of 1926, who are employed chiefly in the weaving of tartan shawls, and in spinning, scouring, and dyeing.

KINSA'LE, a municipal and parliamentary borough and seaport of Ireland, in the county of Cork, is at the head of Kinsale harbour, which is formed by the estuary of the river Bandon, fourteen miles south-south-west of Cork. A railway to Cork was opened here on the 16th May 1863, and the foundation-stone of a large marine hotel, with floating baths attached, was laid on the same day. The harbour, which is landlocked, is about two miles long, half a mile in average breadth, and is capable of containing 300 ships. K. exports agricultural produce, and imports coal, iron, and timber; its trade, however, owing to the neighbourhood of Cork, is small. Valuable fisheries, estimated at £500 per week in value, are carried on in the district. On the Old Head of Kinsale, a promontory stretching southward into the Atlantic, is a light-house, seen from a distance of twenty-three nautical miles. Pop. (1871) 5248.

KINTY'RE. See Cantire.

KIO'LEN, or **KJOLEN**, an extensive plateau in Scandinavia (q. v.).

KIO'SK, a small ornamental pavilion, much used in India in the decoration of the tombs, ghâts, dams, and other works. It consists of a dome, supported on four or more detached columns, the space under the dome being left open, like the open niches under canopies in Gothic architecture.

KIPTCHA'K, or **KEPTCHAK**, a term which, in the middle ages, designated that vast territory stretching, north of the Caspian Sea, from the Don to Turkestan, and occupied by the Kumans and Polovises. This tract formed one of the four empires into which the huge dominion of Genghis Khan was divided, and was the portion of his eldest son Jûjy, under whose son and successor, Batû Khan, it became the terror of Western Europe, and held Russia in iron subjection from 1236 till 1362. Batû also conquered Bulgaria, and invaded Hungary, Austria, and Eastern Germany, but made no permanent conquests in this direction. This extensive empire was dismembered towards the end of the 15th c., and gave rise to the khanats of Kazan, Astrakhan, and Krim-Tartary. The Mongols of K. were also known as the 'Golden Horde.' Ruins of villages are to be seen in many places, especially near the Volga, and have been visited and described by Pallas, Klaproth, Göbel, &c. They no doubt partly belong to the era of the K. empire, but many are of more ancient date.

KIRÂTÂRJUNÎYA, the name of one of the celebrated poems of Sanscrit literature. Its author is Bhâravi, and its principal subject is the conflict of *Arjuna* with the god Siva in his disguise of a *Kirâta*, or mountaineer.

KIRBY, Rev. William, an eminent English naturalist, was born at Witnesham Hall, Suffolk, 19th September 1759. He was educated at Caius College, Cambridge, and was afterwards appointed to the curacy of Barham, which he held for fourteen years, when he was preferred to the rectory. This office he held until his death, which happened on the 4th of July 1850, when he had nearly reached the great age of 91. His principal works are *Monographia Apum Angliæ* (Ipswich, 1802), and *Introduction to Entomology* (4 vols. 1817—1826), published conjointly with Mr Spence. The first was very favourably received both at home and abroad, and at once secured for K. a distinguished place among European savants. The second work is written in the form of letters, and was and still is remarkably popular. K. also contributed a variety of very important entomological papers to the Linnæan Transactions. His greatest discovery in this department of science is that of the genus *Stylops*—the type of a new order of insects, living for a time parasitically in the bodies of bees. He also wrote one of the Bridgewater Treatises, entitled *Habits and Instincts of Animals*. K. was one of the first members of the Linnæan Society (founded in 1788), honorary president of the Entomological Society (founded in 1833), and Fellow of the Royal and Geological Societies.

KI'RCHENTAG, an association of ministers and laymen of the Lutheran, German Reformed, United Evangelical, and Moravian Churches in Germany, for the promotion of the interests of religion, without reference to their denominational differences. It holds an annual meeting; the place of which is changed from year to year. The first meeting took place in 1848, at Wittenberg, in the church to which Luther affixed his theses. Its discussions and resolutions have exercised a considerable influence in Germany.

KIRGHI'S, or **KIRGHIS-KAISAKI**, or **Cossacks of the Steppes**, a people spread over the immense territory bounded by the Volga, desert of Obshtchei (in 55° N. lat.), the Irtish, Chinese Turkestan, Ala-Tau Mountains, the Sir-Daria, and Aral, and Caspian Seas. A few tribes of Kalmucks also live within these boundaries. Over this vast tract reigns a dismal monotony; the country has scarcely any important elevation or depression, no river of consequence runs through it, no great forest breaks the uniformity of the scene; it is a vast steppe, containing 850,000 English square miles, sterile, stony, and streamless, and covered with rank herbage of five feet high. It abounds in lakes and marshes, the water of which is generally brackish and unserviceable, and in the southern portion lies the Kara-Kum, an extensive salt desert.—The K. are a Turkish race, and speak the dialect of the Uzbeks, from whom they profess to be descended. They have, from time immemorial, been divided into the *Great*, *Middle*, and *Little Hordes*. The first of these wanders in the south-west portion of the Russian steppe, partly in the Russian provinces north of the Ala-Tau, and partly in the territories of China and Khokan. They are subject to the rulers within whose bounds they dwell. The Middle Horde possesses the territory (called the *country of the Siberian Kirghises*) between the Ishim, Irtish, Lake Balkhash, Khokan, and the territory of the Little Horde; and also a great portion of the Russian province of Semipolatinsk. Russia has gradually absorbed them, the result being finally achieved by the victory over Khiva in 1873, and the formation of the new province of Amu Daria. The Little Horde (now more numerous than the other two together) ranges over the country bounded by the Ural, Tobol Siberian K., and Turkestan. Like the Middle Horde, they are claimed as subjects of the czar, though completely independent. This horde is partly agricultural, partly nomad. A small offshoot of the Little Horde has, since 1801, wandered between the Volga and the Ural river, and used to be under rule of the governor of Astrakhan. South of Lake Issikul, is a wild mountain tribe called the *Diko-Kamennaja*, the only tribe which calls itself Kirghis. They are called by their neighbours Kara-K. or Black K., and are of Mandshûr stock. All of them are now subject to Russia. Their collective numbers are estimated at upwards of 1¼ million of souls, more than half of whom belong to the Little Horde.

KIRKCALDY, a royal and parliamentary burgh, seaport, and market-town in the county of Fife, Scotland, a place of growing commercial importance. Including the suburbs of Linktown and Newtown of Abbotshall on the west, and Pathhead, St Clairtown, and Gallatown on the north-east, it is fully three miles in length; hence the name of the 'Lang Toun.' Its harbour is commodious, and there is wet-dock accommodation for ships of considerable burden. There is regular communication by steamers with London, Newcastle, Leith, and Glasgow. Its manufactures are spinning flax, tow, and jute, and bleaching and weaving linen yarns, which are extensively carried on, the products being the usual varieties of linen cloth; mechanical (including marine) engineering on a great scale; iron-founding; brewing; and tanning. There are also several potteries. The manufacture of floor-cloth and wax-cloth has been recently developed into a great trade, and K. is the chief seat of this growing and important manufacture. There is a very ample supply of water by gravitation. In 1872, 651 vessels of 38,923 tons entered and cleared the port. Pop. of parl. burgh in 1871, 12,422. K. is the birthplace of the author of the *Wealth of Nations;* and more recently, Edward Irving and Thomas Carlyle were teachers here.

KIRKCU'DBRIGHTSHIRE, more properly the Stewartry of Kirkcudbright, a county in Scotland, comprehending the eastern district of Galloway, is bounded on the N. and N.E. by the counties of Ayr and Dumfries, on the E. and S. by the Solway Firth and the Irish Sea, and on the W. by the county of Wigton. Its length from east to west is from 45 to 50 miles, and its breadth is about 40 miles. Its area is 954 square miles, or 610,734 acres, of which there are 184,761 acres under rotation of crops and grass. The rest is composed of hilly and mossy ground, and lakes, of which there is one in almost every parish. Some of the hills, one-fourth of which are of granite, are of considerable altitude; among which are Meyrick, 2764 feet; Cairnsmore, 2597 feet; and Criffel, 1867 feet. There are several considerable rivers, the principal of which are the Cree and the Dee; the latter of which is navigable for two miles above Kirkcudbright.

There are upwards of 400 landowners, many of whom possess small bounds, and farm their own land. One-half of the land is under entail. The occupants number 1377. The valued rent for 1674 was £9549. The valuation for 1872–1873 (exclusive of royal burghs) was £322,752; that of railways was £29,460. In the year 1872 the total acreage under all kinds of crops, bare and fallow grass, was 168,735; under corn crops, 34,223; under green crops, 18,850. The total number of cattle returned was 40,030; sheep, 390,510; pigs, 8954; horses used solely for agriculture, 5114. The condition of the rural inhabitants, and the state of agriculture of this county, up to almost the end of last century, was very primitive; the principal food of the people in the early part of the century, was kail, and oats ground in querns turned by the hand, and dried in a pot; but arable husbandry has been improved of late, while great attention is being paid to the rearing of cattle. The principal towns are Kirkcudbright, the county-town, with a pop. (1871) of 2470. New Galloway, Creetown, Gatehouse, Castle-Douglas, &c. Before the Reformation, the stewartry possessed more monasteries than any other county of Scotland. There have been a few eminent men of letters connected with this county, of whom the most celebrated were Dr Alexander Murray, the linguist, and Dr Thomas Brown. The population in 1871 was 41,859. The constituency number 2014, who return one member to parliament.

KI'RKDALE CAVE, near Kirkdale Church, in the vale of Pickering, Yorkshire, is famous for the numerous remains of Tertiary mammals which have been found in it. It was discovered in 1821, in the cutting back of an oolitic limestone rock in which it is situated. It was examined by Buckland, and fully described by him in his *Reliquiæ Diluvianæ*. Its greatest length is stated at 245 feet, and its height generally to be so inconsiderable, that there are only two or three places where a man can stand erect. The fossil bones are contained in a deposit of mud that lies on the floor of the cave: this is covered by stalagmite formed by the water, highly charged with carbonate of lime, dropping from the roof. The remains of the following animals have been discovered: hyæna, tiger, bear, wolf, weasel, elephant, rhinoceros, hippopotamus, horse, ox, deer, hare, rabbit, water-rat, raven, pigeon, lark, and duck.

KI'RKHAM, a market-town of England, in the county of Lancaster, is situated on a small tributary of the estuary of the Ribble, 8¼ miles west-north-west of Preston. Sail-cloth, sacking, cordage, and cotton fabrics are manufactured. Pop. (1871) 3593.

KIRKINTI'LLOCH, a burgh of barony and market-town in Dumbartonshire, Scotland, is situated on the Forth and Clyde Canal, about six miles north-north-east of Glasgow. It had its origin in a fort on Antoninus' Wall, and is said to have been called at first *Caerpentulach* (the fort at the end of the ridge), of which its present name is supposed to be a corruption. It became a burgh of barony in the time of William the Lion. Hats and cotton cloths are manufactured here, and there are bleaching and printing works, collieries, iron-stone mines, and quarries. Pop. (1871) 6139.

KIRK-ROAD, in the Law of Scotland, means a road used by the inhabitants of a district (generally a short cut) for the purpose of going to church. Such a right to a road, if ancient, is recognised as valid in Scotland, and also in England and Ireland.

KIRK-SESSION, in Scotland, &c., the lowest court in Presbyterian churches; being the governing body of a particular congregation, and composed of the 'minister' and 'elders' of the congregation. An appeal may be taken from the kirk-session to the presbytery, and thence to the higher courts of the church. Subject to this appeal, the kirk-session exercises discipline in regard to all members of the congregation, suspending from or restoring to the *privileges* of the church; and questions of this kind must originate in the kirk-session, and be primarily determined there. The functions of the kirk-session were, in former times, too often inquisitorially exercised; but this is now less frequently attempted, and the danger of it is continually diminishing through the growth of an enlightened public opinion. In former times, also, the kirk-session in Scotland often imposed fines, chiefly for offences against the seventh commandment; but this practice had no recognition in civil nor even in ecclesiastical law, and is now wholly relinquished. The kirk-session of the Established Church in each parish is fully recognised in Scottish law as having certain rights and duties with respect to the poor, but recent legislation has very much deprived it of its former importance in this relation.

KI'RKWALL, a royal and municipal burgh, seaport, and market-town of Scotland, capital of the county of Orkney, is situated on the north-east coast of Mainland, about 26 miles north-north-east of John O'Groat's House. Its chief building is the cathedral of St Magnus, a fine cruciform structure, in mixed Norman and Gothic, dating from about the year 1138. In the choir of this cathedral, service is still held. Around it are the ruins of the King's Castle, the Earl's Palace, and the Bishop's Palace. The town has been greatly improved within recent years. Numerous shops have been established, so that the commercial transactions are now not confined to the annual fair in August, as they were formerly. The export-trade, chiefly in agricultural produce, is increasing rapidly. K. unites with the Wick burghs in sending a member to parliament. Its parliamentary and municipal constituency numbers 434, and the annual value of real property at the valuation 1872–1873 was £7011. Pop. (1871) of parliamentary burgh, 3434.

KIRSANOFF, a town of Great Russia, in the government of Tambov, in lat. 52° 39′ N., long. 44° 44′ E. Horses and fine fleeced sheep are reared here, common cloth is manufactured, and there are two annual fairs. Pop. (1867) 7204.

KI'RSCHWASSER (Ger. cherry-water) is a liqueur made from cherries, and highly esteemed in Germany. The cherries, gathered when quite ripe, and freed from their stalks, are pounded in a wooden vessel, but so that the stones are not broken. They are then left to ferment, and when fermentation has begun, the mass is stirred two or three times a day. The stones are afterwards broken, and the kernels broken and thrown in. By distillation, kirschwasser is obtained. Kirschwasser is sometimes called *Cherry Brandy*, but the common cherry brandy is made by mixing brandy with the juice of cherries.

KISFALUDY, Sandor (Alexander), a Hungarian poet, who exercised a great influence on the development of the language and literature of his native country, was born at Sümegh (county of Szalad), 22d September 1772. He studied at Raab and Presburg, and after serving for several years in the Austrian army, retired to his paternal estate, to devote himself to literature and farming. The first part of his lyrical master-piece, *Himfy' Szerelmei* (Himfy's Love), which appeared anonymously in 1800, was received with unbounded applause. K. was spoken of as the 'Great Unknown.' On the publication of the second part in 1807, the author threw aside his mask. In the same year, he published his *Regék á Magyar Elöidlőből* (Legends of the Olden Time in Hungary), which are marked by depth of feeling, and by elegance and simplicity of style. K. now attempted tragedy, and took Schiller as his model. Some of his historical dramas are worthy of mention, for example, his *János Hunyadi*, and *Ladislaus the Cumanian*. Some of his pieces, illustrating the family life of his countrymen, are among the best on the Hungarian stage. A complete edition of his writings appeared at Pesth, in 8 vols., 1833—1838. He died at Sümegh, 30th October 1844.

KISFALUDY, Karoly (Charles), younger brother of the preceding, was born 19th March 1790. He is of greater importance in connection with the development of the Hungarian theatre than his brother, being regarded as the founder of the national drama. In 1817, he took up his residence in Pesth, and published in rapid succession a series of poems, tales, dramas, and comedies, which secured for him the highest popularity as an author. Of these, his comedies are by far the most valuable. The best of them were translated into German by Gaal (*Theater der Magyaren*, Bonn, 1820). K. died at Pesth, 21st November 1830.—The *Kisfaludy Society*, so named in honour of the brothers, was established in 1817, and has rendered important services to Hungarian literature.

KISHM (the ancient *Oaracta*), an island of Persia, belonging to the Imaum of Muscat, is situated at the mouth of the Persian Gulf, and is about 70 miles in length by 12 in average breadth. It is separated from the mainland by a deep and dangerous strait, in which are several small wooded islets. K. yields in abundance grain, timber, dates, and vegetables, and supports numerous cattle. At its eastern extremity is a town of the same name, the capital of the island. Entire pop. estimated at 5000.

KISS, August, a distinguished German sculptor, was born at Plesz, in Upper Silesia, 11th October 1802. He studied under Rauch at Berlin, and gradually acquired a high reputation, which was greatly increased on the completion, in 1839, of the model of his celebrated colossal group of the 'Amazon attacked by a Panther,' for the execution of which in bronze, now the ornament of the Museum Stairs in Berlin, the sum of 40,000 thalers was subscribed with the greatest enthusiasm on the part of the public. Among his other works are 'St Michael overthrowing the Dragon,' 'A Tiger destroying a Serpent,' and a statue of Frederick the Great. He died in 1865.

KI'SSINGEN, a town of Bavaria, in Lower Franconia, celebrated for its mineral waters, is situated in the valley of the Saale, 30 miles north-north-east of Würzburg. Of its three mineral springs, the *Rakoczy* and the *Pandur* furnish saline and chalybeate waters, the *Maxbrunnen* are acidulous and alkaline. A spring called the *Soolen-Sprudal* is remarkable for the periodical ebb and flow of its waters, caused apparently by the accumulation and discharge of carbonic acid gas. The waters are both drunk and used as baths by the patients, and are considered specially efficacious in cases of chronic disease, gout, &c. Mud baths, of the sediment of some of the springs, are also in use. Since 1848, gaming-tables have been forbidden here by the Bavarian government. Pop. (1871) 5951.

KI'STNAH, or **KRI'SHNA**, a river of the peninsula of Hindustan, rises within 40 miles of the Arabian Sea, at a height of 4500 feet, in lat. 18° 1′ N., and flowing eastward, falls into the Bay of Bengal, after a course of 800 miles. It forms a considerable delta at its mouth.

KIT, in military language, the equipment in necessaries, such as shirts, boots, brushes, &c., of a soldier, but not applicable to his uniform, arms, or accoutrements. Formerly, a high bounty was given, and then severely encroached upon, by making the recruit pay for his kit. The fairer principle is now adopted of issuing a free kit to each recruit, with a smaller bounty. The soldier has still to replace necessaries, worn out or lost, at his own expense, but he obtains the articles at wholesale, and very low, prices. As these necessaries are so cheaply procured, it is held a very heavy military offence to make away with them.

KIT, a small narrow-bodied violin, about 16 inches long, capable of being carried in the coat-pocket, and used chiefly by teachers of dancing.

KIT-CAT CLUB, an association instituted in London in 1703, consisting of noblemen and gentlemen favourable to the succession of the House of Hanover, and whose ostensible object was the encouragement of literature and the fine arts. Jacob Tonson, an eminent publisher, was founder and secretary. The club derived its name from having met for some time in the house of Christopher Cat, a pastrycook. The club was dissolved about 1720, previous to which each of the members presented his portrait (half-length figure) to Tonson, painted a uniform size by Sir Godfrey Kneller. These interesting portraits, forty-two in number, are now in possession of Mr W. R. Baker, Hertfordshire.

KITCHEN-GARDEN, a garden devoted to the cultivation of culinary vegetables, or that part of a large garden which is specially appropriated to this use. As the crops of the kitchen-garden are not generally very pleasing to the eye, care is taken, if possible, that it may not be within view of the principal windows of a mansion-house, or otherwise obtruded on notice. But regard must also be had, in the selection of a situation for the kitchen-garden, to exposure, shelter, &c., in which it needs and deserves every advantage that can be obtained. Nor, in order to hide it from view, ought it to be so surrounded with trees as to deprive it either of sunshine or of free access of air.

The general remarks made in the article GARDENING as to soil and the preparation of it, manuring, water, gardening operations, &c., are all applicable to the kitchen-garden; a part of which, or a place close beside it, is always allotted to compost heaps and the processes connected with them. The successful cultivation of a kitchen-garden requires constant care and labour. Many crops require frequent digging and hoeing during the period of their growth, and the ground must be kept free of weeds as perfectly as in the flower-garden itself. A rotation of crops is of as much importance in the kitchen-garden as in the farm; cabbages and their congeners, potatoes, leguminous crops, &c., must not from year to year be grown on the same ground. But there are some perennial plants which occupy the same ground for years, as artichoke, asparagus, and sea-kale, and attention must be paid to this in laying out the garden.

The crops cultivated depend, of course, on climate. It will be enough to enumerate here the most important kitchen-garden crops of Britain, referring for further information to each as a separate head. The capitals indicate those most generally cultivated. The varieties of *Brassica oleracea;* KALE, CABBAGE, COLEWORTS, SAVOYS, BRUSSELS SPROUTS, CAULIFLOWER, BROCCOLI, Kohl-rabi, &c. POTATO, JERUSALEM ARTICHOKE, TURNIP, CARROT, PARSNIP, RADISH, RED BEET, Skirret, SALSAFY, Scorzonera, BEAN, PEA, KIDNEY-BEAN, SCARLET-RUNNER, ONION, LEEK, Garlic, SHALLOT, Rocambole, Welsh Onion, SPINACH, White Beet, ASPARAGUS, SEA-KALE, ARTICHOKE, LETTUCE, CRESS, MUSTARD, Sorrel, Corn-salad, Endive, CELERY, PARSLEY, HORSE-RADISH, RHUBARB.

Sweet herbs are to be found in almost all gardens, as Thyme, Lavender, Sage, Spearmint, Balm, Marjoram, Savory, &c. The cultivation of the pumpkin, vegetable marrow, and all kinds of gourds, and of the melon and cucumber, is regarded as belonging to the kitchen-garden; which also contains the houses or pits employed for *forcing* both vegetables and fruits. And the hothouses in which fruits are grown for culinary use, are very generally placed in the kitchen-garden. The cultivation of mushrooms, whether in beds or otherwise, belongs to the kitchen-garden.

KITE (*Milvus*), a genus of *Falconidæ*, or a sub-family including Elanets, &c., of which only one species is a common native of Britain, and another is amongst its rarest visitants. The kites have much weaker bill and talons than the falcons and hawks, but the wings are much longer, and the tail is rather long and forked. Their legs are short. They are remarkable for their gracefulness of flight, and power of sailing and wheeling about, or gliding in the air. A Scotch and local English name of the COMMON KITE (*M. vulgaris*), GLEAD or GLED, is believed to be from the same root with *glide*. The common K. is found in almost all parts of Europe, the north and centre of Asia, and the north of Africa. It is fully two feet in length, from the tip of the bill to the tip of the tail, the plumage mostly brown, of various shades, in some parts mixed with gray. It feeds on reptiles, mice, moles, and other small quadrupeds, and the young of gallinaceous birds, searching for its prey on the

Kite (*Milvus vulgaris*).

ground, and often from no small elevation in the air. It sometimes catches fish. In former times, when it was much more plentiful in Britain than now, it was the scourge of poultry-yards, pouncing on young chickens. It was also the scavenger of London and other English towns, devouring the offal, as it still does in some of the towns of Eastern Europe, and performing its office fearlessly even in the midst of the people. This continued to be the case in London to the time of Henry VIII. The K.'s nest is usually in the fork of a tree in a thick wood. It is easily tamed.—A very rare British bird is the Swallow-tailed K. (*Nauclerus furcatus*), a smaller bird than the common K., abundant in many parts of North America.—The GOVINDA K. (*M. Govinda*) is common in India.—Other species are found in different parts of the world.

KITTIWAKE (*Larus tridactylus*, or *L. rissa*), a species of GULL (q. v.), interesting on account of its abundance in very northern regions, and its importance to their inhabitants. In addition to what is stated in the article GULL, it may be mentioned that the young of the K. has dark markings in its plumage which disappear in the adult, is known on some parts of the British coasts as the TARROCK, and was for some time regarded by naturalists as a distinct species; also that the flesh of the K. is much more pleasant than that of most gulls, and its eggs very good; that it lays usually three eggs, which are fully two inches in length. It is found plentifully in all the northern parts of the world, wherever the coast is high and rocky, migrating southwards in winter, and extending its range as far south as the Mediterranean and Madeira. It is found on the Caspian Sea.

Kittiwake (*Larus tridactylus*).

KITTO, DR JOHN, a most industrious and respectable writer on biblical subjects, was born at Plymouth, December 4, 1804. In his 12th year, he lost his power of hearing, in consequence of a fall from a height of 35 feet. His father's circumstances were at this time so wretched, that young K. was soon after sent to the workhouse. Here he learned the trade of shoemaking, and was also enabled to indulge that taste for reading which had marked him from his earliest years. In 1824, he went to Exeter to learn dentistry with a Mr Grove, who had known him in Plymouth, and who took a warm interest in the unfortunate youth. Mr Grove encouraged K. in his literary aspirations, and in 1825 he published *Essays and Letters by John Kitto*. In the same year, he was sent, by the kindness of various friends, to the Missionary College at Islington, to be trained for some useful employment abroad. In May 1829, he accompanied Mr Grove and family on a tour to the East, visiting in the course of his travels St Petersburg, Astrakhan, the Kalmuck Tartars, the Caucasus, Armenia, Persia, and Bagdad. He returned to England in 1833. The rest of his life was spent in the service of the booksellers, chiefly in that of Mr Charles Knight, by whom he was liberally treated. He died at Cannstadt, in Würtemberg, whither he had gone for the benefit of his health, November 25, 1854. His principal works are—*The Pictorial Bible* (1838; new edition by W. and R. Chambers, 1855), *Pictorial History of Palestine* (1839—1840), *History of Palestine* (1843), *The Lost Senses—Deafness and Blindness* (1845), *Journal of Sacred Literature* (1848—1853), and *Daily Bible Illustrations* (1849—1853). He also edited the *Cyclopædia of Biblical Literature* (published by A. and C. Black). K.'s biography has been written by Dr J. E. Ryland (1856); a later and better biography is that by Professor Eadie of Glasgow. In 1844, the university of Giessen conferred on him the title of D.D.

KIUNG-CHAU', chief city of the island of Hainan (q. v.).

KI'ZIL-KUM (Red Sand), a sandy desert in the north of Turkestan, lying between the Amu-Daria and Sir-Daria, and stretching from the Sea of Aral to Khokan, in lat. 41°—46° 30' N., and long. 60°—69° E. A continuation of this desert northwards across the Sir-Daria is called KARA-KUM (Black Sand) and forms portion of the Kirghis Steppe.

KIZLIA'R, a town in the south of Asiatic Russia, in the district of Terek, is situated about 40 miles from the mouth of the river Terek, in lat. 43° 53' N., long. 46° 43' E. It contains a fortress, many vineyards, tanneries, and silk-worm nurseries, and carries on an extensive trade in wine, brandy, and fish. A model vineyard and a school for instruction in wine-making have been established here. The climate is unhealthy. Pop. (1867) 7748.

KLA'GENFURT, a town of Austria, capital of the crownland of Carinthia, is situated on the river Glau, two miles east of the *Wörthsee*, with which it is connected by means of a canal, and about 80 miles north-north-east of Trieste. It is the seat of the Prince-bishop of Gurk, and has a library of 50,000 vols. K. has a white-lead factory—the largest in Austria—and manufactures woollen, silk, and cotton fabrics. An active transit trade is here carried on. Pop. (1869) 15,200. Here the Hungarian general Görgei has been confined since his surrender to the Russians at Világos in 1849.

KLAPKA, GYORGY (GEORGE), one of the most heroic and skilful generals of the Hungarian war, is the son of the burgomaster of Temesvar, and was born 7th April 1820. In 1838, he entered the Austrian army, and had attained the rank of lieutenant-colonel when the revolution of 1848 burst out. K. instantly placed himself at the service of the Hungarian government, and took a prominent part throughout the struggle. The plan of the Hungarian campaign in the opening of 1849, which was carried out with such great success, was K.'s work. In several of the battles, the fortune of the day was decided by the troops under his command. But the crowning glory of his patriotic career was his defence of Comorn (q. v.), at the close of the revolution. His famous sally on the 5th of August was perhaps the most splendid deed of arms in the whole war. The Austrian army besieging the fortress was utterly routed, losing 30 pieces of artillery, 3000 muskets, vast quantities of provisions, and about 2000 head of cattle. K. was prepared to carry the war into Austria or Styria, but the news of the surrender of Görgei, and the flight of Kossuth, paralysed his action. He held out, however, until the 27th September, when he capitulated to General Haynau, on condition that the garrison should retain their lives and liberties. K. then proceeded to England, but afterwards to Genoa. In 1859, he was requested by the Sardinian government to form a Hungarian Legion, to be used in the war against Austria, but the peace of Villafranca destroyed his hopes of active service. K. has written, among other works, *The National War in Hungary and Transylvania* (2 vols. Leip. 1851), one of the best and most authentic works on the subject; and *The War in the East*, &c. (Lond. 1855). K.'s judicious proclamation in 1862, when Garibaldi made a rash and unfortunate attempt on Rome, kept Hungarian fighters at home. In 1866, after the defeat of Austria at Koniggrätz, he endeavoured to effect a revolution in Hungary; but failed, and fled to Oderberg.

KLAPROTH, Heinrich Julius von, was the son of Martin Heinrich Klaproth, an eminent chemist, and was born at Berlin, October 11, 1783. He betook himself to the study of the Chinese language, when only a boy of fourteen. In 1801, he entered the university of Halle. Here he published his *Asiatischer Magazin*, which gave him a high reputation. Having gone to Russia in 1805, he was appointed interpreter to the Russian embassy to China. The embassy proceeding nearly 200 miles into Mongolia, was ordered by the Chinese emperor to return, but K. took the opportunity of exploring Siberia. He was soon after despatched on a scientific mission to the Caucasus: the results of his valuable explorations are contained in his *Reise in den Kaukasus und Georgien in den J.* 1807 *und* 1808 (2 vols. Halle, 1812—1814; French, with numerous additions, Paris, 1823). While in Russia, he received many honours. In 1812, he left the Russian service, and returned to Germany; but finally settled at Paris in 1815, where he died, 20th August 1835. K.'s literary activity, especially after 1815, was something prodigious; yet, strange to say, it was accompanied by an excessive love of pleasure, for the gratification of which Paris afforded him only too many facilities. His writings relate to the languages and history of the East, more particularly of China, and to the geography of the Russian empire; they are marked by immense learning and extraordinary acuteness, but unfortunately they also contain the most virulent attacks on other scholars. Among his works, we may mention *Geographisch-historische Beschreibung des Oestlichen Kaukasus* (Weim. 1814); *Beschreibung der Russ. Provinzen zwischen dem Kaspisee und Schwarzen Meere* (Berl. 1814); *Verzeichniss der Chines. und Mandschuischen Bücher und Manuscripte der Königl. Bibliothek in Berlin* (Paris, 1822); *Asia Polyglotta* (with tables, 1823; 2d edit., Paris, 1829, with a life of Buddha according to the Mongolian legends), a work in which the various Asiatic nations are classified according to the affinities of their languages, and the beginning of their authentic history determined; *Tableaux historiques de l'Asie depuis la Monarchie de Cyrus jusqu'à nos jours* (4 vols. Paris, 1824—1826, with 24 maps); *Mémoires relatifs à l'Asie* (Paris, 1834); *Collections d'Antiquités Égyptiennes* (Paris, 1829); *Examen Critique des Travaux de M. Champollion jeune sur les Hiéroglyphes* (Paris, 1832); *Notice d'une Mappemonde et d'une Cosmographie Chinoises publiées en Chine, l'une en* 1730, *l'autre en* 1793 (Paris, 1833).

KLA'TTAU, a town of Bohemia, in a fertile district, 68 miles south-west of Prague. It contains a castle and gymnasium, and carries on manufactures of woollen cloth and leather. Pop. (1869) 8060.

KLAU'SENBURG, a town of Austria, capital of the crownland of Transylvania, is situated on the Little Szamos, 80 miles east-south-east of Grosswardein. It is surrounded by old walls, and is divided into the old and the new town. Among its public buildings are a lyceum, a gymnasium, several hospitals and other institutions, benevolent and educational. Woollens, earthenware, and paper are manufactured. The trade of K. is not important. Pop. (1869) 26,382.

KLAU'STHAL, a celebrated mining-town of Hanover, on a bleak plateau of the Upper Harz, 25 miles north-east of Göttingen. Situated 1792 feet above sea-level, so that the potato is the chief crop that can be cultivated with success, the inhabitants find their principal employment in the mines and foundries. The ores raised are silver, lead, zinc, copper, and iron. 2000 workmen are employed in the mines, and 1000 in the foundries. In the mint, 14,000 thalers (equal to £2027) are coined weekly. Although the arrangements and appointments of the mines are very complete, yet their produce has greatly declined, and scarcely repays the management of government, into whose hands they have almost all fallen. Pop. (1871) 9138.

KLEBER, Jean Baptiste, a distinguished general of the French Republic, born 6th March 1753, at Strasburg, where his father was a garden-labourer. Having received a good education, he entered the Austrian army, but returned to France, and embracing the cause of the Revolution, rapidly rose to high military rank. He accompanied Bonaparte to Egypt as a general of division, was dangerously wounded at the capture of Alexandria, but recovered so as to take part in the expedition to Syria, and won the battle of Mount Tabor. When Bonaparte left Egypt, he intrusted the chief command there to K., who concluded a convention with Commodore Sidney Smith for its evacuation; but on Admiral Keith's refusal to ratify this convention, K. adopted the bold resolution of reconquering it, and destroyed the Turkish army at Heliopolis. During an attempt to conclude a treaty with the Turks, K. was assassinated by a Turkish fanatic at Cairo, 14th June 1800.

KLENZE, Leo Chevalier von, a distinguished German architect, was born in 1784, in the principality of Hildesheim, and having studied architecture in Berlin and Paris, was appointed architect to King Jerome of Westphalia in 1808; held a similar position at the court of Bavaria from 1815 to 1839, and in 1833 was raised to the rank of hereditary nobility in that kingdom. In 1834, he was sent to Athens, to superintend the reconstruction of that capital, and in 1839 went to St Petersburg, to execute some works for the Emperor of Russia. Many of the finest buildings recently erected on the continent of Europe are monuments of K.'s genius, such as the Glyptothek, the Pinakothek, the Walhalla, and many other structures in Munich, the Imperial Museum at St Petersburg, and several buildings in Athens. K. is the author of several works, chiefly on the subject of architecture. He died in 1864.

KLEPTOMA'NIA (Gr. *klept*, to steal). Among the ordinary phenomena of minds that are not regarded as insane or criminal are observed inordinate tendencies to acquire, to collect, to hoard. So long as such an impulse does not interfere with the rights and property of others, or involve a flagrant breach of law, it is readily admitted as an indication of disease, or as an absurdity and eccentricity which may fairly consign the individual to an asylum or to contempt, but concerns no one else. But whenever the amount of the object appropriated, or the circumstances under which it is purloined, bring the matter into a court of law, the act is treated as a theft, and punished. In many cases, however, such conduct is the obvious result of disease. The inclination to steal is a premonitory indication of many forms of mental disorder: it is a characteristic symptom of many others, where violence, or delusions, or incoherence, leave no doubt as to the source from which it springs. But there are other cases in which the morbid origin cannot be so clearly demonstrated—where the mind is clear and cogent, the morals pure, and where theft is the only proof of insanity. There is evidence, however, in favour of the opinion, that the propensity to acquire may become so irresistible, and the will so impotent, that the appropriation is involuntary, and the perpetrator irresponsible. The gratification of the impulse is found associated with physical changes and conditions which may be regarded as incompatible with the healthy discharge of the functions of the nervous system; but the connection is not invariable, and the best mode of establishing the reality of such a disease is to consider marked cases in relation to the character, interests, and previous deportment of the individual—to the nature of the articles taken—and to the motives which seem to have determined the action. A baronet of large fortune stole, while on the continent, pieces of old iron and of broken crockery, and in such quantities, that tons of these collections were presented to the custom-house officers. A clergyman of respectable bearing and great usefulness abstracted from book-shops and stalls hundreds of copies of the Bible, perhaps with the intention of distribution. A physician pocketed some small object whenever he entered the apartment of a patient; another member of this profession stole nothing but table-cloths. The incongruities in such narratives point to the existence of deep-seated unhealth. Although each case must be tested on its own merits, there are various features, common to a number of even doubtful cases, which should be embraced wherever a judgment is formed. The objects are often stolen ostentatiously, or without any adequate precautions to conceal the attempt; they are of no value in themselves, or useless to the thief; the act is solitary, independent, without motive, and promptly and spontaneously avowed, and, if overlooked, repeated. The article acquired is restored, or altogether disregarded; and although money is rarely taken, bright and coloured objects most generally excite cupidity. It is observed in extreme youth; it is associated with pregnancy; it is hereditary; and often follows affections of the brain, and those critical and crucial changes in disposition which are only explicable on the supposition of corresponding alterations in the organisation.—*A Manual of Psychological Medicine*, by Drs Bucknell and Tuke, pp. 224 *et seq.*; *Ann. Med. Psychol.*, t. v. p. 666 (1853).

KLIA'ZMA, a river of Russia, an affluent of the Oka, rises in the government of Moscow, and flows east through those of Vladimir and Nijni-Novgorod, joining the main stream near the town of Gorbatof, after a course of 327 miles, for the last 150 of which it is navigable. Passing through the most industrial governments of Russia, it is one of the principal commercial arteries of the empire.

KLI'NKET, a term in Fortification, signifying a small postern or gate in a palisade.

KLOPSTOCK, FRIEDRICH GOTTLIEB, a German poet, was born 2d July 1724, at Quedlinburg, and went to Jena in 1745, to study theology. He had already formed the resolution to write a great epic poem, and thought of Henry the Fowler as a good subject for one; and at Jena he composed the first cantos of his *Messiah*. In 1746, he passed to Leipsic, and there became acquainted with the editors of the *Bremische Beiträge*, in which the first three cantos of the *Messiah* appeared in 1748. They attracted great attention: the author was pronounced a religious poet of the highest order. He was now invited to Copenhagen, upon the recommendation of the minister Bernstorff, and introduced to the king, whom he accompanied on his travels. In 1771, K. settled in Hamburg, with a sinecure appointment and a pension from the Danish government, and subsequently received an honorary title and a pension from the Markgraf, afterwards Grand Duke, of Baden. In 1773, the last five cantos of his *Messiah* were published at Halle. He died 14th March 1803. K.'s name has (or rather perhaps *had*) a very high place in German literature. Whatever may be thought of the intrinsic value of his poetry, it cannot be denied that he exercised a very important and beneficial influence on the national taste. The greatest of his successors, Goethe, acknowledged this, though he also expressed the opinion, that K. had become rather obsolete, or at least that his conception of poetry had become so. When K. first began to write, the literature and social life of Germany were penetrated by French influences. A cold, correct, unimaginative spirit tyrannised over the thought and habits of the people. K. broke loose at once from this shallow despotism, and breathed the air of Freedom into German poetry. Odes, tragedies—in which he introduces Hermann (q. v.) the Cheruscian as a national hero—and biblical dramas, with some hymns, which still find a place in collections, constitute the remainder of K.'s poetry. His works were collected and published in 12 vols. (Leip. 1799—1817), in 18 vols. (1823—1829), in 9 vols. (1839). The *Messiah* has been translated both into verse and prose in English.

KNAPP, ALBERT, a German poet, author of many of the best modern German hymns, was a native of Würtemberg, and was born in 1798. He studied for the church, and became the principal clergyman in Stuttgart. K. breathed a new life into that long-neglected branch of poetry — the religious hymn. Many of his effusions are to be found in the *Christoterpe*, a periodical edited by him since 1833. His *Christliche Gedichte*, in 2 vols. (Stuttg. 1829; 3d edit., Basel, 1843), to which a third was added under the title of *Neuere Gedichte* (Stuttg. 1834), were published by his friends. His later hymns are contained in his *Gedichte* (Stuttg. 1843). K. was equally distinguished as a hymnologist. His *Evang. Liederschatz fur Kirche und Haus* (2 vols. 1837) is a valuable collection of Christian hymns of all ages, to which his *Christenlieder* (Stuttg. 1841) forms a splendid supplement. The *Bilder der Vorwelt* appeared in 1862. His *Hohenstaufen* (Stuttg. 1839) is a cycle of religious poems. He died in 1864.

KNA'PSACK, a bag of canvas or skin, containing a soldier's necessaries, and worn suspended by straps between his shoulders. Those used in the British army are ordinarily of black painted canvas; but some other nations, as the Swiss, make them of thick goat-skin, dressed with the hair on. The knapsack affords by far the easiest way of carrying light personal luggage during a march or walking-tour.

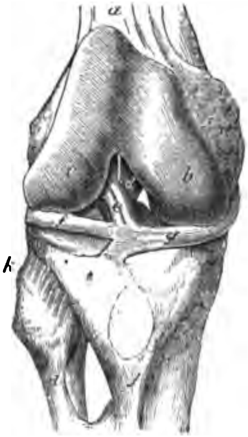
KNAPWEED. See CENTAUREA.

KNA'RESBOROUGH, a parliamentary borough and market-town of England, in the West Riding of Yorkshire, on the left bank of the Nidd, 18 miles west-north-west of York. St Robert's Cave, in the vicinity, is well known for the murder committed there by Eugene Aram in 1745. Manufactures of linen and cotton goods are carried on here. K. returned two members to the House of Commons till 1867. It now returns one. Pop. (1871) 5205.

KNAVESHIP, in the Law of Scotland, is a proportion of the grain given to the miller's servant who performs the work of the mill, such mill being an ancient mill to which a right of thirlage is attached. See THIRLAGE, INSUCKEN MULTURES.

KNEE, in Ship-building, an angular piece of wood or iron used to connect the deck-beams with the ribs of the vessel's sides. The knees are fastened on both vertically, above and below, and horizontally, whereby great stability is imparted to the whole framework of the ship.

KNEE-JOINT, THE, is the articulation between the femur or thigh-bone, above, and the tibia or shin-bone, below. A third bone, the patella, or knee-cap—one of the Sesamoid Bones (q. v.), and not a true bone of the skeleton—also enters into the structure of this joint anteriorly. The articular surfaces of these bones are covered with cartilage, lined by a synovial membrane or sac, which is the largest and most extensive in the body, and connected together by ligaments, some of which lie external to the joint, while others occupy its interior.



Internal view of the Right Knee-joint.
(From Gray's *Human Anatomy*.)

a, the femur; *b* and *c*, the internal and the external condyles; *d* and *e*, the two crucial ligaments; *f* and *g*, the external and internal semilunar cartilages; *k* and *i*, the upper part of the fibula; *j*, the upper part of the tibia.

The most important of the external ligaments are the anterior or *Ligamentum Patellæ*, which is in reality that portion of the *Quadriceps Extensor Cruris* which is continued from the knee-cap to the tubercle of the tibia (see figure); one internal, and two external lateral ligaments; a posterior ligament; and a capsular ligament, which surrounds the joint in the intervals left by the preceding ligaments. The positions of these ligaments are sufficiently indicated by their names. Of the internal ligaments, the two crucial, so called because they cross one another, are the most important. Their position is shewn in the figure. The external and internal semilunar cartilages are usually placed amongst the internal ligaments; they are two crescentic plates of cartilage. The outer part of each cartilage is thick; the inner free border thin. Each cartilage covers nearly the outer two-thirds of the corresponding articular surface of the tibia, and by its form deepens these surfaces for firmer articulation with the condyles of the femur.

The chief movements of this joint are those of a hinge-joint—namely, flexion and extension, but it is also capable of slight rotatory motion when the knee is half-flexed. During flexion, the articular surfaces of the tibia glide backwards upon the condyles of the femur; while in extension, they glide forwards. The whole range of motion of this joint, from extreme flexion to extreme extension, is about 150°. Judging from its articular surfaces, which have comparatively little adaptation for each other, it might be inferred that this was a weak and insecure joint; and yet it is very rarely dislocated. Its real strength depends on the large size of the articular ends of the bones, on the number and strength of the ligaments, and on the powerful muscles and fasciæ by which it is invested.

KNELLER, SIR GODFREY, an eminent portrait-painter, was born at Lübeck in 1648, and studied painting under Rembrandt and Ferdinand Bol. He at first chose historical subjects, but afterwards gave himself entirely to portrait-painting. In 1674, he went to London, and, on the death of Sir Peter Lely in 1680, was appointed court-painter to Charles II. In 1684, he visited Paris, at the invitation of Louis XIV., and painted portraits of the king and royal family. He retained his office at the English court during the reign of James II., and continued to fill it after the Revolution. In 1692, William III. bestowed on him the honour of knighthood, which he afterwards received also from the Emperor Joseph I.; and in 1715, George I. made him a baronet. He died in 1725, or, according to others, in 1726, and a monument was erected to him in Westminster Abbey, with a highly laudatory inscription by Pope. K.'s best-known productions are the 'Beauties of Hampton Court' (painted by order of William III.), and his portraits of the 'Kit-Cat Club.' He painted avowedly for the love of money, and hence never did justice to the talent he possessed, so that it is difficult for posterity to understand his reputation.

KNIGHT, CHARLES, an eminent English publisher and author, was born in 1791, at Windsor, where his father carried on the business of a bookseller. K. was brought up to the same profession, but early turned his attention to publishing. Among his first attempts in this department was *The Etonian*, a periodical supported by the Eton boys, and which—in spite of its juvenility—obtained a considerable reputation. He next started (1823) *Knight's Quarterly Magazine*, and continued it for some time in London, to which he removed in the following year. The whole of his honourable career was devoted to popular literature, of which he was one of the earliest and most accomplished advocates. He died March 9, 1873. Among the works which K. published or edited are the *Penny Magazine* (1832—1845), which was started only a month or two after *Chambers's Edinburgh Journal*, and at one time enjoyed a circulation of nearly 200,000 copies weekly; the *British Almanac*, and *Companion to the Almanac; Penny Cyclopædia* (30 vols. 1833—1856); *Library of Entertaining Knowledge*—the volume on the Elephant (1831) being written by himself; *Pictorial History of England; Pictorial Bible* (1838), now the property of Messrs Chambers; *Pictorial Book of Common Prayer* (1838); *London Pictorially Illustrated* (6 vols. 1841—1844); *Old England, a Pictorial Museum of National Antiquities* (2 vols. 1845); *Half-hours with the Best Authors* (4 vols. 1847—1848); *The*

Land we Live in (4 vols. 1848); *Cyclopædia of the Industry of all Nations* (1851); and *The English Cyclopædia* (22 vols. 1854—1861), which is based on the *Penny Cyclopædia*, but is a great advance even on that admirable work, and, in fact, forms one of the most complete and accurate cyclopædias in the world. K. has, in addition, won a highly respectable position as an author by his *Pictorial Shakspere*, which is accompanied by a 'Biography' and a 'History of Opinion, with Doubtful Plays,' &c. (8 vols. 1839—1841); library edition (12 vols. 1842—1844); national edition, with 'Biography' and 'Studies' (8 vols. 1851—1853), *Life of Caxton* (1844); *Plays and Poems, with Glossarial Notes* (7th ed. 1857); *Knowledge is Power* (1855); and above all, by his *Popular History of England, an Illustrated History of Society and Government from the Earliest Period to our own Times* (1856—1862). This work is probably the very best history of England that we possess—'*the* history,' according to the *Times*, 'for English youth.'

KNIGHTS (Saxon, *Cniht*, a servant or attendant), originally men-at-arms bound to the performance of certain duties, among others to attend their sovereign or feudal superior on horseback in time of war. The institution of knighthood, as conferred by investiture, and with certain oaths and ceremonies, arose gradually throughout Europe as an adjunct of the feudal system (see FEUDAL SYSTEM; CHIVALRY). The character of the knight was at once military and religious. The defence and recovery of the Holy Sepulchre, and the protection of pilgrims, were the objects to which, in the early times of the institution, he especially devoted himself. The system of knight-service, introduced into England by William the Conqueror, empowered the king, or even a superior lord who was a subject, to compel every holder of a certain extent of land, called a knight's fee, to become a member of the knightly order; his investiture being accounted proof that he possessed the requisite knightly arms, and was sufficiently trained in their use. The 'Statute of Knights,' of the first year of Edward II., regulating the causes that were to be held valid to excuse a man from knightly service, shews that in the 14th c. the knightly office was not always eagerly coveted; yet its social dignity was very considerable, for even dukes, if not admitted into the order, were obliged to yield precedence in any royal pageant or public ceremony. In time of war, each knight was bound to attend the king for forty days, computed from the day when the enemy arrived in the country. After the long war between France and England, it became the practice for the sovereign to receive money compensations from subjects who were unwilling to receive knighthood, a system out of which grew a series of grievances, leading eventually to the total abolition of knight-service in the reign of Charles II.

Knighthood, originally a military distinction, came, in the 16th c., to be occasionally conferred on civilians, as a reward for valuable services rendered to the crown or community. The first civil knight in England was Sir William Walworth, lord mayor of London, who won that distinction by slaying the rebel Wat Tyler in presence of the king. Since the abolition of knight-service, knighthood has been conferred without any regard to property, as a mark of the sovereign's esteem, or a reward for services of any kind, civil or military. In recent times, it has been bestowed at least as often on scholars, lawyers, artists, or citizens, as on soldiers, and in many cases for no weightier service than carrying a congratulatory address to court.

The ceremonies practised in conferring knighthood have varied at different periods. In general, fasting and bathing were in early times necessary preparatives. In the 11th c., the creation of a knight was preceded by solemn confession, and a midnight vigil in the church, and followed by the reception of the eucharist. The new knight offered his sword on the altar, to signify his devotion to the church, and determination to lead a holy life. The sword was redeemed in a sum of money, had a benediction pronounced over it, and was girded on by the highest ecclesiastic present. The title was conferred by binding the sword and spurs on the candidate, after which a blow was dealt him on the cheek or shoulder, as the last affront which he was to receive unrequited. He then took an oath to protect the distressed, maintain right against might, and never by word or deed to stain his character as a knight or a Christian. A knight might be degraded for the infringement of any part of his oath (an event of very rare occurrence), in which case his spurs were chopped off with a hatchet, his sword broken, his escutcheon reversed, and some religious observances were added, during which each piece of armour was taken off in succession, and cast from the recreant knight.

It has been said that knighthood could originally be conferred by any person of knightly condition, but if so, the right to bestow it was early restricted to persons of rank, and afterwards to the sovereign or his representative, as the commander of an army. In England, the sovereign now bestows knighthood by a verbal declaration, accompanied with a simple ceremony of imposition of the sword, and without any patent or written instrument. In some few instances, knighthood has been conferred by patent, when the persons knighted could not conveniently come into the presence of royalty, as in the case of governors of colonies, or other persons occupying prominent situations abroad. The lord-lieutenant of Ireland also occasionally but rarely exercises a delegated power of conferring knighthood. The monosyllable 'Sir' is prefixed to the Christian names of knights and baronets, and their wives have the legal designation of 'Dame,' which in common intercourse becomes 'Lady.'

Persons who are simply knights without belonging to any order, are called in England Knights *Bachelors*, a name probably corrupted from *bas chevalier*. Knighthood of this kind is now only conferred in Great Britain. A degree of knighthood called *Banneret* formerly existed in England and France, which was given on the field of battle in reward for the performance of some heroic act. For the mode in which that dignity was conferred, see BANNERET. No knight-banneret has been created in the field since the time of Charles I., when that honour was bestowed on one Sir John Smith, for rescuing the royal standard from the hands of the rebels. George III. twice conferred the title on occasion of a review, but the proceeding was considered irregular, and the rank of the knights not generally recognised.

The form of helmet which the requirements of the later heraldry have appropriated to knights, entitling them to place it over their arms, is full-faced, of steel, decorated with bars, and with the visor a little open. It is represented under the article HELMET.

KNIGHT'S FEE. See KNIGHTS.

KNIGHTS OF THE SHIRE, otherwise called in England Knights of Parliament. They were knights formerly chosen by the freeholders of every county to represent the county in parliament, and were originally inhabitants of the places for which they were chosen. See PARLIAMENT.

KNIGHT'S SERVICE, one of the ancient tenures in England (see KNIGHTS), which was abolished in the time of Charles II., and converted into Freehold (q. v.).

KNIGHTS TEMPLARS. See Templars.

KNIPPERDOLLING, Bernard, a noted leader of the fanatical Anabaptists of the 16th century. See Anabaptists.

KNITTING, an art allied to weaving, but of comparatively modern date. The time and place of its invention are disputed. Some historians insist upon Scotland having the honour, at a date somewhat before the year 1500; others assert that it came from Spain, in the time of Henry VIII.; but there is no proof that the silk stockings which were worn by that monarch were knitted, and in the absence of such proof, the weight of evidence remains in favour of Scotland. Knitting consists in using a single thread, and with it forming a continual series of loops across the whole fabric; the next row passes through these, and they in their turn receive another set, until the whole is completed. Knitting is only employed to make small articles, such as stockings, gloves, &c.; and as it furnishes an easy and amusing employment for the hands, without engaging the attention much, it forms a useful and desirable occupation for ladies and others who do not require knitted articles as necessaries, for the knitting-machines have now rendered it impossible for hand-work to compete with them in point of economy or beauty of workmanship. See Hosiery.

KNOT, an expression used in speaking of a ship's way through the water, and, as such, representing miles. The log-line is divided by knots into lengths, each of which is to a geographical mile as half a minute is to an hour—i. e., as 1 to 120. The log being cast overboard, note is carefully taken of how many of these knots run out in a half minute, and it follows that the vessel is passing through the water at the same number of geographical miles per hour. The proportion of a geographical to a statute mile being nearly that of 7 to 6 (see Mile), a vessel making 12 knots an hour, is in reality travelling at the rate of 14 statute miles.

KNOT, a twist or loop in a rope or cord, so made that the motion of one piece of the line over the other shall be stopped. The knot owes its power of passive resistance to the friction of the rope. The uses of knots are infinite; in the commonest occasions of life, one or two simple knots are indispensable; in building, mining, and almost every land occupation, knots of curious form are employed; while on shipboard, knots may be almost numbered by the dozen, and each is appropriated to a specific duty. The accompanying diagrams of some of the simpler knots may be generally useful. In these, the position of the rope or cord is shewn before tightening, so that the mode of formation may be more readily understood.

The simplest knot is the 'overhand' (fig. 1). Its use is to form a knob in a rope to stay it from slipping. By a slight alteration, the 'single sling,' or slip knot (fig. 2), is obtained, always in the middle of the rope. More complicated, but still more useful, is the 'double sling' (fig. 3), for suspending a beam or bar horizontally. The bowline knot (fig. 4) serves to give a tight grasp round a pole or beam, which would occupy the loop *a*, or, drawn close on the rope, it forms a large knob, to prevent the rope passing a hole. The sheepshank (fig. 5) affords a means of shortening a rope temporarily, without diminishing its power of rectilineal tension. All the foregoing have been at the double or middle parts of the rope: for the end of the cordage, fig. 6 shews an admirable slip-knot, which maintains its gripe until loosened by hand; *a* is a common overhand knot at the end of the string, to prevent it slipping through the loop *b*, when tightened.

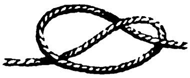


Fig. 1.

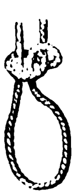


Fig. 2.

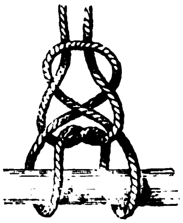


Fig. 3.

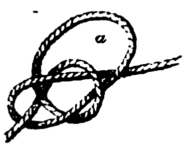


Fig. 4.

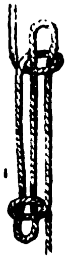


Fig. 5.

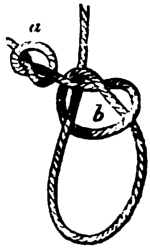


Fig. 6.

For modes of joining two ropes, the weaver's or fisherman's knot (fig. 7) may be adduced as strong and neat. The sailor's knot (fig. 8) has the advantage, when properly made, of resisting all separating strain on the two ropes, and at the same time of being loosened immediately by a pull at one of the short ends. For an interlacing of two doubled ropes, the 'Carrick bend' (fig. 9) has no superior; the point of junction cannot slip, and the moment the tension ceases, the two ropes are again free from each other. Knots have many technical names, such as bight, hitch, &c.

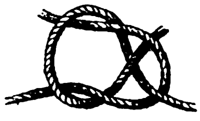


Fig. 7.

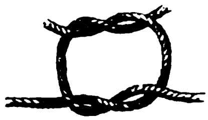


Fig. 8.

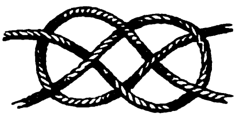
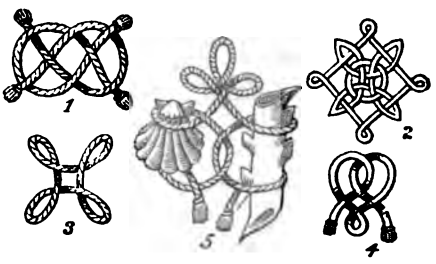


Fig. 9.

KNOT-GRASS. See Polygonum.

KNOTS of different kinds are borne by different families as heraldic badges, and are occasionally introduced as charges in shields. The forms of



Knots:
1, Wake and Ormonde knot; 2, Lacy knot; 3, Bowen knot; 4, Heneage's knot; 5, Dacre's badge.

some of them appear to be suggested by the initial letter of the name or title of the bearer. In the Wake and Ormonde knot (fig. 1), it is not difficult to trace a *W* and two *Os*. The Bourchier knot, as seen on the tomb of Archbishop Bourchier, at Canterbury, bears a resemblance to two *Bs*, and the Stafford knot to two *Ss*. The Lacy knot (fig. 2) contains within it a rebus on the four letters of the name Lacy.

KNOUT, a scourge composed of many thongs of skin, plaited, and interwoven with wire, which was till lately the favourite instrument of punishment in Russia for all classes and degrees of criminals. The offender was tied to two stakes, stripped, and received on the back the specified number of lashes; 100 or 120 were equivalent to sentence of death, but in many cases the victim died under the operation long before this number was completed. This punishment is at the present time inflicted only upon ordinary criminals, such as incendiaries or assassins. It is no longer in use in the army, except when a soldier is dismissed for ill conduct, in which case three to ten lashes are given, in order to disgrace the soldier, rather than punish him. The whipping is inflicted by a criminal, who prefers this office to exile to Siberia, and who is constantly kept in prison, except when his services are required. The nobility are legally exempt from the knout, but this privilege has not always been respected.

KNOWLEDGE. This term of common use is associated with the greatest problems and controversies of philosophy. The Perception of the External or Material World (see COMMON SENSE, PERCEPTION), the nature of Belief (see BELIEF), the ultimate analysis of a Proposition or Judgment (see JUDGMENT), are all involved in the discussion of what is meant by knowledge. Moreover, we may, in connection with this word, take up the consideration of Thought or Intelligence on the whole, in contrast to the feelings and volitions (see INTELLECT). In a still different phase of meaning, we may be led to consider the nature of Science or Philosophy, which is a species of knowledge distinguished by the two features of being *generalised*, as distinct from individual or particular facts, and being *verified* or attested by careful evidence, in contrast to the loose assertions that satisfy the ordinary run of mankind.

A distinction, considered by Sir W. Hamilton and others to be of great importance in metaphysical philosophy, is that of Immediate or Presentative, and Mediate or Representative Knowledge. The one is the knowledge or cognizance that we have of the modifications of our own minds, so to speak, without inferring anything beyond, as in our various sensations and emotions. When we are affected by cold or heat, hunger, thirst, odour, or sound, we are conscious of a something, which may be said to be wholly contained in our own minds; but when a present modification of the mind is looked upon not for its own sake, but as bodying forth something more than itself, as in memory, our knowledge is then said to be mediate. Thus, an actual sensation is immediate, but a recollection, or idea, or imagination is mediate and representative. Mr Mansel makes this distinction the basis of his division of the mind. 'Consciousness,' he says, 'in its relation to the person conscious, is of two kinds; or rather, is composed of two elements—the presentative, or intuitive; and the representative, or reflective. The phenomena of the former class may be distinguished by the general name of *Intuitions;* those of the latter, by that of *Thoughts.*'

It will appear from the above remarks that there is no question connected with knowledge that does not fall to be discussed under some other head; and as a general rule, it is best to take up the difficult problems of the philosophy of mind under those names that severally suggest each in its singleness, instead of confusing a multitude together.

KNOWLES, JAMES SHERIDAN, an English dramatist, was the son of James Knowles, an eminent teacher of elocution, and author of a *Dictionary of the English Language*. He was born at Cork in 1784. The family removed to London in 1792, and here young K. received his education. After holding for some time a commission in the army, he became an actor, and made his first appearance at the Crow Street Theatre, Dublin; but he never attained much eminence in this profession. Subsequently, he lived for several years in Belfast and Glasgow, as a teacher of elocution, and it was at this time he laid the foundation of his fame as a dramatist. His *Caius Gracchus* was first performed at Belfast in 1815. It was followed by *Virginius*, his most effective piece, afterwards recast for the London stage, where Macready took the principal part. He wrote thirteen other plays, but none of his productions exhibit great genius; they are, however, unquestionably the best 'acting plays' produced by an Englishman in modern times. About the year 1845, he relinquished the stage from religious scruples, and in 1852 joined the Baptist body. He latterly distinguished himself by his religious zeal. In 1851, he published a little controversial work, displaying considerable acuteness and ability, *The Idol Demolished by its own Priest*, in answer to Cardinal Wiseman's Lectures on Transubstantiation. K. died at Torquay, in Devonshire, in December 1862.

KNOWLTO'NIA, a genus of South African plants, of the natural order *Ranunculaceæ*, with flowers resembling those of *Adonis*, and succulent fruit. *K. vesicatoria*, which has bi-ternate leathery leaves, and flowers in few-flowered umbels, is remarkable for its acridity and blistering power. The bruised leaves are used at the Cape of Good Hope instead of cantharides; they raise a blister in half an hour, and it keeps open a long time. The sliced root seems to be still more powerful.

KNOX, JOHN, the great Scottish reformer, was born in the year 1505, in a suburb of Haddington called Gifford Gate, where a small field still goes by the name of 'Knox's Croft.' The social position of his parents is not very clearly ascertained. His own statement is, that 'his great-grandfather, gudeschir, and father served under the Earls of Bothwell.' He is supposed to have come of an old and respectable family, the Knoxes of Ranfurly, in Renfrewshire. He received his early education at the grammar-school of Haddington, and in the year 1521 went to the university of Glasgow. He was there a pupil under Major, and soon proved himself an apt and distinguished disputant in the scholastic theology. He was considered as likely to rival his master in the subtleties of the dialectic art. From the same teacher, he no doubt derived his first impulse to that freedom of political opinion and independence of thought that afterwards characterised him. He is said to have been ordained before the year 1530, about which time, or shortly afterwards, he went to St Andrews, and began to teach there. There is, however, at this stage of his life a gap of twelve years, or nearly so, which the most careful research has hitherto failed to fill up. His attachment to the Romish Church is supposed to have been shaken chiefly by the study of the Fathers, about 1535; but he did not openly profess himself a Protestant till about 1543. He was degraded from his orders, and being even in danger of assassination, took refuge with Douglas of Longniddry, and there remained till the end of 1545.

Cardinal Beaton was at this time in the height of his power: after seizing George Wishart at Ormiston, he had him brought to St Andrews, and burned there, in front of his castle, March 1546. K. first clearly appears upon the scene of the Reformation as the companion of Wishart. While the latter prosecuted his career as a preacher in Lothian, K. waited upon him, bearing before him, he tells us, a 'twa-handed sword.' He already coveted the post of danger, and full of enthusiasm, was ready to defend his zealous friend at the peril of his own life. After Wishart's seizure and death, he withdrew for a while again into retirement. He would fain have clung to the martyr, and shared his fate, but the latter would not have it so. 'Nay,' he said; 'return to your bairnes, and God bless you: ane is sufficient for a sacrifice.' Knox's 'bairnes' were his pupils, the sons of the Lairds of Longniddry and Ormiston. He continued in charge of them for some years, till the great event which ere long followed the martyrdom of Wishart opened up a more prominent career for him. On the morning of the 29th May 1546, Cardinal Beaton was murdered in his castle, from the windows of which he had contemplated the sufferings of the martyr. Taken possession of by the band of nobles and others who had successfully accomplished so audacious a design, the castle at St Andrews became the temporary stronghold of the Reforming interest. K. took refuge in it with his two pupils. Here his great gifts as a preacher were first discovered; and having found the secret of his influence, the parish church of St Andrews soon resounded with his indignant voice, denouncing the errors of popery. His career at this time, however, was soon cut short by the surrender of the fortress, and his imprisonment in the French galleys.

For two years he remained a prisoner, and underwent, in the course of this time, many privations. He was then liberated, and allowed to depart to England, where he resided for four years, from 1549 to the beginning of 1554, a time of great and fruitful activity to him. He was appointed one of Edward VI.'s chaplains, and lived on terms of intimate intercourse with Cranmer and others of the English reformers. He is supposed to have had considerable influence on the course of the English Reformation, especially in regard to the liberal changes introduced into the Service and Prayer Book of the Church of England, in the close of Edward's reign. He was much engaged in preaching, especially in the north, in Newcastle and Berwick; and at the latter place he fell in love, and married.

The accession of Mary drove him and others to the continent. He was reluctant to flee, but 'partly by advice and partly by tears,' he was compelled to consult his safety. He settled temporarily at Dieppe, whence we hear of him writing an *Admonition to the Professors of God's Faith in England.* He then went into Switzerland, and returning, settled for some time at Frankfurt-on-the-Maine, where he is notable in connection with what are known as the 'Frankfurt Troubles,' certain disputes as to the use of King Edward's Service-Book in the congregation of English Protestants there. Towards the end of 1555, he made a rapid visit to Scotland, where he did much to encourage the cause of the Reformation. Convinced, however, that the 'time of deliverance' was not yet come for his country, he retired once more to Geneva, where he settled as pastor of a congregation for nearly three years, which were among the quietest, and probably the happiest years of his life.

Recalled to Scotland in May 1559, he then entered upon his triumphant course as a reformer. Political necessities had driven the Queen-regent to temporise with the 'Lords of the Congregation,' or the reforming nobles. Having somewhat re-established her power, she wished to withdraw her concessions; but the reforming impulse had gathered a strength that could no longer be resisted. The heads of the party assembling at Dundee, under Erskine of Dun, proceeded to Perth. There the pent-up enthusiasm which had been long collecting was roused into furious action by a sermon of K. on the idolatry of the mass and of image-worship. A riot ensued. The 'rascal multitude,' as K. himself called them, broke all bounds, and destroyed the churches and monasteries. Similar disturbances followed at Stirling, Lindores, St Andrews, and elsewhere. The flame of religious revolution was kindled throughout the country, aggravating the civil war already raging. At length the assistance of Elizabeth and the death of the Queen-regent brought matters to a crisis; a truce was proclaimed, and a free parliament summoned to settle differences. The result of the parliament, which met in August 1560, was the overthrow of the old religion, and the establishment of the Reformed kirk in Scotland. In all this, K. was not only an active agent, but *the* agent above all others. The original *Confession of Faith* of the Reformed Kirk and the *First Book of Discipline* bear the impress of his mind. He was far from attaining all his wishes, especially as to the provision for the support of the church and of education throughout the country; he soon found that many of the nobles were far more zealous for destruction than for reformation; still, he accomplished a great and radical work, which was only destined to be consolidated after many years.

The arrival of the youthful Queen Mary, in the course of 1561, brought many forebodings to the Reformer; he apprehended great dangers to the Reformed cause from her character and her well-known devotion to the Romish Church. The Reformer's apprehensions scarcely permitted him to be a fair, certainly not a tolerant judge of Mary's conduct. Misunderstandings very soon sprung up between them, and he relates, with a somewhat harsh bitterness, his several interviews with her. At length he came to an open rupture with the queen's party, including Murray and Maitland, and many of his former friends. He took up an attitude of unyielding opposition to the court, and in his sermons and prayers, indulged freely in the expression of his feelings. The result was his temporary alienation from the more moderate Protestant party, who tried to govern the country in the queen's name. For a while, from 1563 to 1565, he retired into comparative privacy.

The rapid series of events which followed Mary's marriage with Darnley—the revolt of the dissatisfied nobles, with Murray at their head, the murder of Rizzio, and then the murder of Darnley (1567), the queen's marriage with Bothwell, her defeat and imprisonment, served once more to bring Knox into the field. He was reconciled with Murray, and strongly abetted him in all his schemes of policy during his regency. Further reforms were effected by the parliament which convened under his sway in the close of 1567. The sovereign was taken bound to be a Protestant, and some provision, although still an imperfect one, was made for the support of the Protestant clergy. K. seemed at length to see his great work accomplished, and is said to have entertained the idea of retiring to Geneva. But the bright prospect on which he gazed for a little was soon overcast—Murray's assassination, and the confusion and discord which sprung out of it, plunged the Reformer into profound grief. He once more became an object of suspicion and hostility to the dominant nobles, and misunderstandings even sprung up between him and some of his brethren in the General Assembly. He retired to St Andrews, for a while, to escape the danger of assassination with which he had been threatened. There, although suffering from extreme debility, he roused himself to preach once more, and in the parish church where he had begun his ministry, made his voice to be heard again with something of its old power. Assisted by his servant, the 'good, godly Richard Ballenden,' into the pulpit, 'he behoved to lean upon it at his first entry; but ere he was done with his sermon, he was so active and vigorous, that *he was lyke to ding the pulpit in blads and flie out of it*.'

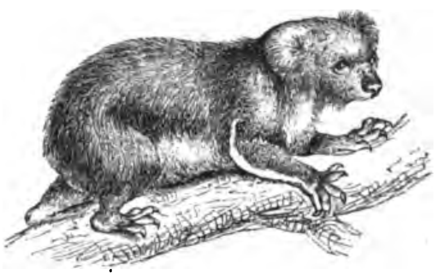
In the end of 1572, he returned to Edinburgh to die; his strength was exhausted; he was 'weary of the world,' he said; and on the 24th of November he quietly fell asleep.

K.'s character is distinguished by firmness and decision, and a plain, somewhat harsh sense of reality. He was a man of strong, and even stern convictions, and he felt no scruples, and recognised no dangers in carrying out his convictions. He was shrewd, penetrating, inevitable in his perceptions and purposes. No outward show, or conventional pretence, deceived him; he went straight to the heart of everything; and consistently with this clear and rough shrewdness of perception, his language is always plain, homely, and many will say harsh. He had learned, he himself says, 'to call wickedness by its own terms—a fig, a fig; a spade, a spade.' Above all, he was fearless; nothing daunted him; his spirit rose high in the midst of danger. The Earl of Morton said of him truly, as they laid him in the old churchyard of St Giles: 'He never feared the face of man.' In Scotland, K., no doubt, accomplished a great work. Whether the work would not have been better if it had been less violently done, if the spirit of love and moderation, as well as the spirit of power, had presided over it, is a question regarding which there may be much division. But even if we should take exception to some things he did or encouraged, we may admire the consistent boldness, the deep earnestness, and the self-denying, unflinching zeal of the great Reformer.

KNO'XVILLE, a city of Tennessee, United States of America, on the north bank of the Holston River, at the head of steam-boat navigation, 185 miles east of Nashville. It is the principal and central town of East Tennessee, on the East Tennessee, Georgia, and Virginia Railway. It is the site of the university of East Tennessee, the state Deaf and Dumb Asylum, and has 3 academies, 8 churches, 4 newspapers, and several flouring-mills and glass factories. Pop. (1870) 8662.

KNU'TSFORD, a small market-town of Cheshire, 23 miles east-north-east of the city of Chester. Pop. (1871) 3597. The name is said to be derived from King Canute, or Knut, having with his army forded the Bollin here.

KO'ALA (*Phascolarctos cinereus*), a marsupial quadruped, commonly referred to the family *Phalangistidæ*, and pretty nearly resembling the phalangers in dentition, but having the molar teeth much larger. The toes of the fore-feet are in two opposable groups, of two and three, a character not found in any other quadruped, but well adapted to grasping the branches of trees, on which the K. often hangs with its back undermost, like the sloth. There is scarcely any rudiment of a tail. The general form is not unlike that of a young bear. The female carries her young on her back, for a long time after it is capable of leaving her pouch.



Koala (*Phascolarctos cinereus*).

KO'BBE, a town of Central Africa. See DARFUR.

KOBOLDS. See GOBLINS AND BOGLES.

KOCH, KARL HEINRICH EMMANUEL, a celebrated traveller and naturalist, was born at Weimar in 1809. He studied at the universities of Würzburg and Jena, and in 1836, undertook a scientific journey to Southern Russia, completing his researches in a second journey, which he performed in 1843, this time visiting also Turkey, Armenia, Pontus, the Caspian Sea, and the range of the Caucasus. In 1839, he was appointed Professor of Botany in the university of Jena. The most important of his works are—*Monographia generis Veronicæ* (Würzburg, 1833); *Reise durch Russland nach dem Kaukasischen Isthmus* (Journey through Russia as far as the Isthmus of the Caucasus, Stuttgart, 1842—1843). His second journey supplied the materials for *Wanderungen im Oriente* (Wanderings in the East, Weimar, 1846—1847), the third volume of which was reprinted in 1854 under the title of *The Crimea and Odessa*. Besides these, he has written about nine other works on geography, botany, and topography.

KOCK, CHARLES PAUL DE, a French novelist, dramatist, and poet, born at Plassy, near Paris, in 1794, was the son of a Dutch banker who perished on the scaffold during the French Revolution. Originally intended for a mercantile career, he devoted himself to literature against the wishes of his relatives. His novels, though displaying no trace of real genius, acquired a very unenviable notoriety by the licentious freedom of their representations. K. composed upwards of fifty novels, besides a great number of vaudevilles and stories in verse. His earlier works are considered superior to his later ones. Among others, we may mention *Georgette, ou la Nièce du Tabellion; Gustave, ou le mauvais Sujet; Le Barbier de Paris; La Femme, le Mari et l'Amant; Mœurs Parisiennes*. He died in August 1871.—HENRI DE KOCK, son of the preceding, like Dumas *fils*, has unhappily followed his father's footsteps, if we may judge from the titles of some of his novels: *Le Roi des Etudiants et la Reine des Grisettes, Les Amants de ma Maîtresse, Lorettes et Gentilshommes*, &c.

KO'DIAK, an island to the south-east of the peninsula of Alaska (q. v.), contains the oldest settlement in Russian America, as distinguished at least from the Aleutian Archipelago. It is little better than an irregularly shaped mass of mountains, measuring 75 miles by 50. The chief value of K. consists in the tolerable harbour of St Paul, on its north coast.

KOHA'T, a town of the Punjab, stands in lat. 33° 32′ N., and long. 71° 27′ E., in a small but fertile and populous mountain-valley of the same name, which forms an administrative district. A few miles to the east of it are springs of naphtha, and rich and extensive deposits of sulphur. K. is traversed by two important routes—the route from Peshawur to Kala Bagh, and another by Bungush to Khorassan.

KOH-I-NÛR (Mountain of Light), the name of a large diamond now in the possession of Her Majesty Queen Victoria. According to Hindu legend, it was found in a Golconda mine, and its possessors have, with few exceptions, been the rulers of Hindustan. After belonging successively to the Bahmani, Khilji, Lodi, and Mogul kings, it came, in 1739, into the hands of Nadir Shah, who gave it its present designation. From him it went to the Abdâli monarchs of Afghanistan, the last of whom, Shah Sujah, gave it to Runjeet Singh, the ruler of the Punjab. On the abdication of the Maharajah Dhuleep Singh, and the annexation of the Punjab in 1849, it was surrendered to the sovereign of Great Britain. It is said to have weighed originally 900 carats, but, after being cut, was reduced to 279 carats. It was reduced by recutting to 186 carats, and in this state was shewn at the Great Exhibition of 1851; since which time it was again recut in 1852, and now weighs about 123 carats, and has been valued at £120,664. The Koh-i-nûr is rose-cut.

KOHL, JOHANN GEORG, an eminent German traveller and author, was born at Bremen, April 28, 1808; studied at Göttingen, Heidelberg, and Munich; and settled in Dresden, in 1838, from which place as a starting-point, he made excursions in all directions, visiting every important district of Europe, and on his return from each expedition, published his experience in a series of works. In 1854, he went to America, where he travelled for four years, and returned to Germany. His works on Europe are so numerous and well known that a full detail of them is unnecessary; suffice it to say, that he has described the countries of Austria (1842), Bavaria (1842), England (1842 and 1844), Russia (1846—1847), Denmark (1846 and 1847), Istria, Dalmatia, and Montenegro (1851), &c. The results of his American experience were published in *Travels in Canada* (1855), *Travels in the United States* (1857), and *Kitahi-Gami, or Tales from Lake Superior* (1860). Other works of K. are *The Two Oldest Maps of America, executed in the Years* 1527—1529 (1860); the *History of the Discovery of America* (1861), an English translation of which was published in 1862; *On the Way* (1866); and *History of the Gulf Stream and the Investigations regarding it from the Earliest Times* (1868).

KOHL-RABI, or, more properly, **KOHL-RÜBE** (Germ. Kale-turnip, similarly called *Chou Rave* by the French), a cultivated variety of the Kale or Cabbage (*Brassica oleracea*), distinguished by the swelling of the stem just above the ground, in a globular form, to the size of a man's fist, or larger, leaf-stalks springing from the swollen part, and adding to the peculiarity of its appearance. This is the part which is used, and its uses are similar to those of the turnip. In quality, it more nearly resembles the Swedish than the common turnip, and the use of it for feeding cows does not give their milk a disagreeable flavour, as when they are fed on turnips. K. is very hardy, its leaves, as well as its stem and root, enduring the most severe winters, although in Britain its cultivation has hitherto been chiefly in the south of England. It is a common field-crop in Sweden. In the cultivation of K., it is usual to sow it on seed-beds, and to transplant by dibbling into fields; but this is perhaps not the best mode. It ought, however, to be sown earlier than even Swedish turnip; and raised drills are unsuitable for it, owing to the effect of winds. It is more solid and more nutritious than any kind of turnip of the same size. There are numerous sub-varieties. K., like all the varieties of *Brassica oleracea*, delights in a strong rich soil and abundant manure.

KOKRA WOOD, or **COCUS WOOD**, the wood of an Indian tree, *Lepidostachys Roxburghii*, which belongs to a very small natural order, *Scepaceæ*, remarkably allied at once to *Euphorbiaceæ* and to *Amentaceæ*. K. W. is imported into Britain in logs of six or eight inches in diameter, having the heart-wood of a rich deep brown colour and very hard. It is much used in the manufacture of flutes and other musical instruments. The Kokra-tree has leathery, alternate leaves.

KO'LA, a place of scarcely 800 inhabitants, but worthy of notice as the most northern town of European Russia, and except Wardöe, in Norway, the most northern in Europe. It is situated between the Kola and its tributary, the Tuloma, not far from the Icy Sea, and has a secure and capacious harbour. The inhabitants are Russians, Lapps, and Finns, and are chiefly occupied with walrus, whale, and cod fishery.

KOLA NUT. See COLA NUT.

KOLAPU'R, the chief, or rather the only town of a protected state of the same name within the presidency of Bombay, 130 miles to the south of Poona. The population has not even been estimated. The raj, or state, is estimated to contain 3445 square miles and 500,000 inhabitants, composed of Mahrattas and Ramusis. Since 1844, when the East India Company virtually took possession, K. has considerably advanced in prosperity.

KOLIAZI'N, or **KALASIN**, a town in the government of Tver, European Russia, situated on the right of the Volga, carries on an extensive trade in corn, tallow, and linen. Pop. (1867) 7630.

KOLLÁR, JOHN, one of the most conspicuous Slavic poets and scholars, was born, in 1793, at Moschowze, in the north-west of Hungary, studied at Presburg and Jena, and in 1819 became pastor of a Protestant congregation at Pesth. His first work was a volume of songs and poems entitled *Basne* (Poems, Prague, 1821); this was followed by his *Slawy Dcera* (The Daughter of Glory, Buda, 1824; 3d ed., Pesth, 1832), regarded by his countrymen as his greatest work; and *Rozprawy o Imenach* (Treatises on the Name and Antiquities of the Slavic People and their Ramifications, Buda, 1830). K.'s fame, however, rests more on his being one of the earliest and most zealous advocates of Panslavism (q. v.). The work in which this tendency first appears was written in German, and is entitled *Ueber die literarische Wechselseitigkeit zwischen den Stämmen und Mundarten der Slav. Nation* (Pesth, 1831). The revolution in Hungary compelled him to abandon his country. He withdrew to Vienna, where he was made Professor of Archæology in 1849. He died January 29, 1852.

KÖLLIKER, ALBRECHT, a German physiologist, was born in 1817, and is at present Professor of Anatomy and Physiology in the university of Würzburg. He is principally distinguished by his labours in the department of microscopic anatomy, and on the development of the embryo; but his contributions to natural history generally are by no means unimportant. Among his principal works must be named his *Mikroskopische Anatomie; Handbuch der*

Gewebelehre des Menschen (which has been translated for the Sydenham Society by Busk and Huxley, under the title of *A Manual of Human Histology*, in two volumes); *Die Siphonophora oder Schwimmpolypen von Messina;* and *Entwickelungsgeschichte des Menschen u. d. höheren Thiere*. In association with Von Siebold, he is also the editor of *Zeitschrift für wissenschaftliche Zoologie*, the most important scientific natural-history journal of Germany.

KOLLI'N, or **NEU-KOLIN**, a town of Bohemia, on the Elbe, about 35 miles east of Prague, with a pop. of (1867) 9460, is noted for the great battle fought, June 18, 1757, in its vicinity, between 60,000 Austrians under Marshal Daun, and 32,000 Prussians under Frederick II. The latter were defeated in spite of the obstinate valour of their monarch, who charged at the head of his cavalry seven times in succession.

KOLOME'A, a town of Austrian Galicia, is situated on the Pruth, at the base of the Carpathian Mountains, 112 miles south-south-east of Lemberg. It is a very old town, and formerly carried on an extensive trade. Pottery is still largely manufactured. Pop. 13,400, half of whom are Jews.

KOLO'MNA, a district town of Great Russia, in the government of Moscow, is situated 62 miles south-east of the city of that name, on the river Moskva. It contains (1867) 19,890 inhabitants. There are communications by water between it and Nijni-Novgorod; and a railway passes the town in the direct line through Riazan, from Moscow to the sea of Azov, which has very greatly increased the trade of the district. Weaving, silk-spinning, and cotton-printing are carried on, with manufactures of cotton and leather.

KOLYMA', a river in Eastern Siberia, flowing from the Stanovoy Mountains, among which it takes its rise in lat. 61° 5′ N. After a north-east course of 1000 miles, it falls into the Arctic Ocean in lat. 69° 40′ N.

KOLYVA'N, a town in the government of Tomsk, in Siberia, situated on the river Ob, lat. 55° 21′ N., and long. 82° 46′ E., is remarkable for the extensive quarries of jasper in its neighbourhood. There is also a large manufactory of jasper ornaments, which belongs to the Russian government. Pop. (1867) 3382.

KOLZOW, Alexei Vassilievich, a Russian poet, prematurely cut off in the early bloom of his genius, most of whose songs are among the choicest pearls of Russian poetry, was the son of a cattle-dealer, and was born in Voronesh in 1809. After a merely rudimentary education, he was employed by his father in feeding cattle on the steppes in summer, and in winter in attending the markets. His familiarity with the scenes of the steppes appears in all his poetry. His love of poetry was early developed, and the talent displayed in some of his earlier effusions, obtained for him the patronage of some of the most zealous cultivators of Russian literature. He was just about to settle in St Petersburg, and to devote himself exclusively to literary pursuits, when he suddenly died, in 1842. A complete edition of his poems, with a biography of the author, was published by Belinsky in 1846.

KONG, a name applied to a mountain-range, a district, and a town, all of which are situated northward from the coast district, in the west of Northern Africa.—The mountains extend from west to east at the distance of about 200 miles from the shore of the Gulf of Guinea, and are said to be an offset from the high table-land of Senegambia. Little is known regarding them. The highest known summits reach an elevation of only 2500 feet.—Regarding the K. district, all we know is, that it is remarkable for the industry of its inhabitants, and for the gold-trade which is there carried on.—The town of K., in lat. 8° 53′ N., and long. 3° 30′ W., is situated among hills 540 miles south of Timbúktu. It is a large town, consisting entirely of clay-houses, and is the centre of numerous converging caravan routes. The inhabitants, who are chiefly Mandingoes, and of the Mohammedan religion, manufacture cotton-cloths extensively.

KO'NIEH, a large town of Asiatic Turkey, capital of the province of Karaman, situated in a rich, well-watered plain, in lat. 37° 54′ N., and long. 32° 40′ E. It is surrounded by walls from two to three miles in circuit, built from the ruins of ancient Seljuk edifices, and surmounted by square towers. Its numerous minarets, and its mosques and other public buildings, give it an imposing appearance, but like most of the towns of Asia Minor, it is now in a sadly ruinous condition. Many interesting remains of Saracenic architecture, however, are still to be met with. K. is the chief emporium for the products of the interior. Carpets and coloured morocco leather are manufactured, and cotton, wool, and skins are exported to Smyrna. Pop., including the suburbs, 50,000.

K., the ancient *Iconium*, was famous in ancient times as the capital of Lycaonia. From 1087 to 1299, it was the seat of a Seljuk sultanate. On December 20, 1832, a battle was fought here, in which Ibrahim Pasha completely defeated the Turkish army.

KÖNIG, Friedrich, the inventor of the steam-press, was the son of a respectable citizen of Eisleben, and was born there, 17th April 1775. He became a printer, and was also for a short time a bookseller, but was unsuccessful in this business. He eagerly prosecuted literary and scientific studies. Having devoted himself to the invention of means of printing by machinery, he applied in vain for the necessary pecuniary assistance in various quarters, his schemes being rejected as impracticable; but at last Thomas Bensley, a printer in London, came forward to his support, a company was formed, and a patent was obtained on 29th March 1810, for a press which printed like the hand-press by two flat plates, and in 1811 it was first used to print part of the *Annual Register*. A second patent was obtained on 30th October 1811 for a cylinder-press, a third in 1813 for improvements upon it. This improved machine was soon adopted by the proprietors of the *Times*. In the latter part of his life, K. was a partner in a company for making steam printing-presses at Oberzell, near Würzburg, in Bavaria. He died 17th January 1833.

KÖ'NIGGRÄTZ, a town and fortress of Bohemia, on the left bank of the Elbe, at the confluence of the Adler with that river, 64 miles east-north-east of Prague. It is the seat of a bishop, and has a beautiful cathedral. The immediate neighbourhood can in any emergency be covered with water. Cloth, musical instruments, shoes, and wax-candles are the staple articles of manufacture. This town has become famous in history on account of the signal victory gained by the Prussians over the Austrians in 1866. Pop. (1869) 5515.

KÖ'NIGINHOF, a small manufacturing town of Bohemia, on the left bank of the Elbe, 16 miles north of Königgrätz. Linen-weaving, tanning, and manufactures of hats and sugar, are the principal branches of industry. Pop. (1869) 6222.

KÖ'NIGSBERG, a small town of Prussia, in the province of Brandenburg, on the Rörike, 45 miles north of Frankfurt-on-the-Oder. Tanning and distilling are the chief branches of industry. Pop.

(1871) 5335. Numerous other places in Germany bear this name.

KÖNIGSBERG, an important town and fortress of Prussia, in the province of East Prussia, is situated on both banks of the Pregel, and on an island in that river, four miles from its entrance into the Frisches Haff. It consists of the Old Town and the Löbenicht on the north bank (the latter of which, in its seven-storied and gabled houses, and steep side-lanes, still presents a completely Hanseatic appearance), the Kneiphof on the island (also one of the oldest parts), and numerous suburbs. The Pregel is here crossed by seven bridges. The origin of the town dates from the erection of a castle by Ottokar, king of Bohemia, in 1257. K. became a member of the Hanseatic League in 1365, and was the residence of the grand-master of the Teutonic Order from 1457 to 1528. In 1701, Frederick, Elector of Brandenburg, was crowned here, with the title of Frederick I., King of Prussia. Its chief buildings are the cathedral, containing the tomb of Kant; the university, founded in 1544, and attended now by about 350 students; the united Royal and University Library, with 160,000 volumes; and the observatory. There are also three gymnasia, with numerous other educational and benevolent institutions. Important manufactures of woollens, silk, leather, and tobacco are carried on. Wine, fruits, coal, salt, and sugar are imported; grain is the chief article of export. K. occupies the fourth rank among Prussian towns in respect of population. Pop. (1871) 112,123.

KONRAD or **CONRAD I.**, king of the Germans (a title identical with the subsequent one of 'Emperor of Germany'), was the son of Konrad of Fritzlar, Count of Franconia, and the nephew of the Emperor Arnulf. On the extinction of the direct line of the Carlovingians, the Germans resolved to make the sovereign dignity elective, and preferring to choose one who was related to the late imperial family, offered the crown to Otho the Illustrious, Duke of Saxony, who refused it, but recommended K., who was accordingly elected in 911. The new monarch gradually re-established the imperial authority over most of the German princes, carried on an unsuccessful war with France, and at last fell mortally wounded at Quedlinburg (918), in a battle with the Hungarians, who had repeatedly invaded his dominions. He lies buried at Fulda. On his deathbed, he enjoined his brother Eberhard to carry the imperial insignia to his mortal enemy, Duke Henry of Saxony, son of Otho the Illustrious, with whom he had been continually at war since 912 A. D., and accompanied the gift with the chivalrous message, 'that he wished to render to the son what he had received from the father.' K.'s reign was a remarkable epoch in the history of Germany; sovereignty by hereditary right was introduced into the German duchies and markgrafdoms; the minor lords of the soil became vassals, not to the king, as formerly, but to their dukes; and finally, the crown-lands in each duchy were taken possession of by the dukes themselves, who thus totally destroyed the sovereign's local jurisdiction.

KONRAD II., king of the Germans, and Roman emperor, was elected after the extinction of the Saxon imperial family in 1024. He was the son of Henry Duke of Franconia, and is by many considered as the founder of the Franconian dynasty. Immediately after his election, he commenced a tour through Germany, to administer justice and acquaint himself with, and, if necessary, to ameliorate, the condition of his subjects. With a view to this last, he instituted the *God's Truce* (q. v.). In 1026, he crossed the Alps, chastised the rebellious Italians, was crowned at Milan as king of Italy, and he and his wife Gisela were anointed emperor and empress of the Romans by the pope. He was soon recalled to Germany to put down four formidable revolts, in which he succeeded so well, that by 1033 peace was restored. In 1032, he had succeeded to the kingdom of Burgundy, which he annexed to the empire. In 1036, a rebellion in Italy again compelled him to cross the Alps; but his efforts to restore his authority were this time unsuccessful, and he was forced to grant various privileges to his Italian subjects. Shortly after his return, he died at Utrecht, 4th June 1039. K. was one of the most remarkable of the earlier monarchs of Germany. He repressed the more obnoxious features of the feudal system, and by conferring the great duchies of Bavaria, Swabia, and Carinthia on his son, reduced the dangerous power of the great dukes of the empire.

KONRAD III., king of the Germans, the founder of the Hohenstaufen (q. v.) dynasty, was the son of Frederick of Swabia, and was born in 1093. While under 20 years of age, K., with his elder brother Frederick, had bravely supported Henry V. against his numerous enemies, and in return, that monarch granted K. the investiture of the duchy of Franconia. He subsequently contested the crown of Italy with the Emperor Lothaire of Saxony, but was compelled to resign his pretensions. On the death of Lothaire, the princes of Germany, fearing the increasing preponderance of the Guelf party, and attracted by his brilliant courage, moderation, and goodness, offered K. the crown, and he was accordingly formally elected at Aix-la-Chapelle, 21st February 1138. He was immediately involved in a quarrel with Henry the Proud, Duke of Bavaria and Saxony, and head of the Guelf party in Germany; and the struggle was continued under Henry's son and successor, Henry the Lion (q. v.). While Germany was thus convulsed, the state of Italy was not a whit more peaceable. The several belligerents besought K.'s assistance, but he well knew the natural inconstancy of the Italians, and determined to stand aloof. Soon after this, St Bernard of Clairvaux commenced to preach a new crusade, and K., seized with the general infatuation, set out for Palestine at the head of a large army (see CRUSADES) in company with his old enemy, Guelf of Bavaria. Guelf returned to Germany before K., and with his nephew, Henry the Lion, immediately renewed the attempt to gain possession of Bavaria, but their army being defeated at Flochberg, they were compelled to sue for peace. K. was now called upon to aid the Duke of Poland against his rebellious subjects, and the pope and the northern Italians against Roger of Sicily; but while preparing for this latter expedition, he was poisoned, 15th February 1152, at Bamberg. K. was largely endowed with the virtues necessary for a great monarch, and though himself unlearned, was a warm patron of science and letters. His marriage with a Greek princess was symbolised by the two-headed eagle which figured on the arms of the Emperor of Germany, and now appears on the arms of the sovereign of Austria, as heir to the German emperors.

KONRAD VON WÜRZBURG, one of the most celebrated poets of the middle ages, died at Basel in 1287. K. is fertile in imagination, learned, and—although marking the decline of medieval High-German poetry by his prolix and artificial style—probably the most perfect master of German versification that had appeared up to his own day. His last poem, which he left in an unfinished condition, has for its subject *The Trojan War*, and is printed (in part) in Müller's *Sammlung altdeutscher Gedichte.* But K. appears to most advantage in his smaller narrative poems, of which the best is *Engelhard* (reprinted by Haupt at Leipsic in 1844, from an old and scarce impression). Next to this may be ranked his *Otto mit dem Bart* (reprinted by Hahn at Quedlinb. and Leip. 1838); *Der Welt Lohn* (by Roth, Fkr. 1843); *The Legends of Sylvester* (by W. Grimm, Gött. 1841) and of *Alexius* (by Massmann, Quedlinb. and Leip. 1843); *Die Goldene Schmiede* (by W. Grimm, Berl. 1840). His songs and proverbs are to be found in Hagen's *Minnesinger*.

KONRADIN OF SWABIA, the last descendant of the imperial House of Hohenstaufen (q. v.), was the son of Konrad IV., and was born in 1252, two years before his father's death. Innocent IV. immediately seized upon the young prince's Italian possessions, on the plea *that the son of a prince who dies excommunicated has no hereditary rights;* and the other enemies of the House of Hohenstaufen rejoiced to follow the pope's example. K. was not left, however, totally friendless. His uncle Manfred took up arms in his behalf, drove the pope from Naples and Sicily, and in order to consolidate his nephew's authority, declared himself king till the young prince came of age. The pope's inveterate hatred of the Hohenstaufens induced him to offer the crown of the Two Sicilies to Charles of Anjou, a consummate warrior and able politician. Charles immediately invaded Italy, met his antagonist in the plain of Grandella, where the defeat and death of Manfred, in 1266, gave him undisturbed possession of the kingdom. But the Neapolitans, detesting their new master, sent deputies to Bavaria to invite K., then in his 16th year, to come and assert his hereditary rights. K. accordingly made his appearance in Italy at the head of 10,000 men, and being joined by the Neapolitans in large numbers, gained several victories over the French, but was finally defeated, and along with his relative, Frederick of Austria, taken prisoner near Tagliacozzo, 22d August 1268. The two unfortunate princes were, with the consent of the pope, executed in the market-place of Naples on the 20th October.* A few minutes before his execution, K., on the scaffold, took off his glove, and threw it into the midst of the crowd, as a gage of vengeance, requesting that it might be carried to his heir, Peter of Aragon. This duty was undertaken by the Chevalier de Waldburg, who, after many hair-breadth escapes, succeeded in fulfilling his prince's last command. See SICILIAN VESPERS.

Koodoo (*Antilope strepsiceros*).

KOO'DOO (*Antilope strepsiceros*, or *Strepsiceros koodoo*), one of the largest species of antelope. The general form is not so light and elegant as that of many of the antelopes. The height is about four feet, and the length fully eight feet, exclusive of the tail, which is moderately long, and terminates in a tuft like that of an ox. The male is furnished with great horns, nearly four feet long, and beautifully twisted in a wide spiral of two turns and a half, very thick at the base, and there wrinkled and ringed. The female is smaller than the male, and hornless. The general colour is grayish brown, with a narrow white stripe along the middle of the back, and eight or ten similar stripes proceeding from it down the sides. The K. lives in small families of four or five, inhabiting chiefly the wooded parts of South Africa. It is easily domesticated, and is one of the animals which, probably, man has not yet done enough to reduce to his service.

KOO'MRAH (*Equus hippagrus*), an alleged distinct species of the family *Equidæ*, a native of North Africa, and inhabiting mountain woods. It is ten or ten and a half hands high; with a broad deep head; no forelock, but long woolly hair down to the eyes; long black mane; tail more like that of a horse than of an ass; the colour a uniform reddish bay, without mark or streak. Colonel Hamilton Smith supposes that it may be the *Boryes* of Herodotus, and *Hippagrus* of Oppian.

KOO'RIA MOO'RIA ISLANDS, a group of six islands, on the south coast of Arabia, are situated about 21 miles from the coast, about lat. 17° 33′ N., and long. 56° 6′ E. The surface of these islands is sterile, and the only one which is inhabited supports only from 20 to 30 fishermen. They were ceded to England in 1854. Guano of an inferior quality is obtained from them.

KO'PEK, a Russian money of account, the $\frac{1}{100}$th part of a Rouble (q. v.), and equivalent to 1¼ farthings of sterling money.

KO'RÂN (Arab., from *karaa*, to read), [= Hebr. *Mikra*, the written Book, or that which can and ought to be read:—the Old Testament, in contradistinction to *Mishnah*, or the Code of the Oral Law], *The Reading*, by way of eminence; a term first applied to every single portion of Mohammed's 'Revelations;' at a later period, used for a greater number of these; and finally for their whole body, gathered together into the one book, which forms the religious, social, civil, commercial, military, and legal code of Islam. The Koran is also known under the name of *Forkan* (Chald. Salvation, not from Hebr. *Perek*, Division, as erroneously supposed); further, of Al-Moshaf (*The* Volume), or Al-Kitab (*The* Book, in the sense of 'Bible'), or Al-Dhikr ('the Reminder,' or 'the Admonition'). The Koran is, according to the Moslem creed, coeval with God, uncreated, eternal. Its first transcript was written from the beginning in rays of light upon a gigantic tablet resting by the throne of the Almighty; and upon this tablet are also found the divine decrees relating to things past and future. A copy of it, in a book bound in white silk, jewels, and gold, was brought down to the lowest heaven by the angel Gabriel, in the blissful and mysterious night of Al-Khadr, in the month of Ramadân. Portions of it were, during a space of twenty-three years, communicated to Mohammed, both at Mecca and Medina, either by Gabriel in human shape, 'with the sound of bells,' or through inspirations from the Holy Ghost 'in the Prophet's breast,' or by God himself, 'veiled and unveiled, in waking or in the dreams of night.' Traditions vary with respect to the length of the individual portions revealed at a time, between single letters, verses, and entire chapters or Surahs (from Hebr. *shurah*, line). The first revelation forms, in the present arrangement of the book, verses 1—5 of surah xcvi., and begins with the words: 'Read [preach], in the name of thy Lord, who has created all things!'

Mohammed dictated his inspirations to a scribe, not, indeed, in broken verses, but in finished chapters, and from this copy the followers of the Prophet procured other copies—unless they preferred learning the oracles by heart from the master's own mouth. The original fragments were, without any attempt at a chronological or other arrangement, promiscuously thrown into a box, and a certain number were entirely lost. A year after the death of Mohammed, the scattered portions were, at the instance of Abu Bekr, collected by Zaid Ibn Thâbit of Medina, 'from date-leaves and tablets of white stone, bones, and parchment-leaves, and the breasts of men,' and faithfully copied, without the slightest attempt at moulding them into shape or sequence, together with all the variants, the repetitions, and the gaps. This volume was intrusted to the keeping of Hafsa, one of the Prophet's wives, the daughter of Omar. A second redaction was instituted in the thirtieth year of the Hedjrah, by Calif Othman, not for the sake of arranging and correcting the text, but in order to restore its unity: many different readings being current among the believers. He ordered new copies to be made from the original fragments, in which all the variants were to be expunged, without, however, any further alteration, such as the suppression of certain passages, &c., being introduced; and the old copies were all consigned to the flames. With respect to the succession of the single chapters—114 in number—no attempt was made at establishing continuity, but they were placed side by side according to their respective lengths; so that, immediately after the introductory fattah or exordium, follows the longest chapter, and the others are ranged after it in decreasing size. They are not numbered in the manuscripts, but bear distinctive, often strange-sounding headings, as: the Cow, Congealed Blood, the Fig, the Star, the Towers, Saba, the Poets, &c., taken from a particular matter or person treated of in the respective chapters. Every chapter or surah begins with the introductory formula: 'In the name of God, the Merciful, the Compassionate.' It is further stated at the beginning whether the surah was revealed at Mecca or at Medina. Every chapter is subdivided into smaller portions (*Ayath*, Hebr. *Oth*, sign, letter), varying in the ancient 'seven editions' or primitive copies [of Medina (two), Mecca, Kufa, Basra, Syria, and the 'Vulgar Edition']—reduced by Nöldeke to four editions—between 6000 and 6036. The number of words in the whole book is 77,639, and an enumeration of the letters shews an amount of 323,015 of these. Other —encyclical—divisions of the book are: into thirty ajzâ and into sixty ahzâb, for the use of devotional readings in and out of the mosque. Twenty-nine Surahs commence with certain letters of the alphabet, supposed to be of mystical purport.

The contents of the Koran as the basis of Mohammedanism will be considered under that head, while for questions more closely connected with authorship and chronology, we must refer to MOHAMMED. Briefly, it may be stated here, that the chief doctrine laid down in it is the unity of God, and the existence of but one true religion, with changeable ceremonies. When mankind turned from it at different times, God sent prophets to lead them back to truth: Moses, Christ, and Mohammed being the most distinguished. Both punishments for the sinner and rewards for the pious are depicted with great diffuseness, and exemplified chiefly by stories taken from the Bible, the Apocryphal writings, and the Midrash. Special laws and directions, admonitions to moral and divine virtues, more particularly to a complete and unconditional resignation to God's will (see ISLAM), legends, principally relating to the patriarchs, and, almost without exception, borrowed from the Jewish writings (known to Mohammed by oral communication only, a circumstance which accounts for their often odd confusion), form the bulk of the book, which throughout bears the most palpable traces of Jewish influence. Thus, of ideas and notions taken bodily, with their Arabicised designations, from Judaism, we may mention—Koran = Mikrah (Reading); Forkan (Salvation); the introductory formula, Bismillah (in the name of God); Torah (Book of Law); Gan Eden (Paradise); Gehinnom (Hell); Haber (Master); Darash (to search the Scriptures); Rabbi (Teacher); Sabbath (Day of Rest); Shechinah (Majesty of God); Mishnah (Repetition, or Oral Law), &c. The general tendency and aim of the Koran is found pretty clearly indicated in the beginning of the second chapter: 'This is the book in which there is no doubt; a guidance for the pious, who believe in the *mysteries of faith*, who perform their *prayers*, give *alms* from what we have bestowed upon them, who believe in the *revelation* which we made unto thee, which was sent down to the *prophets before thee*, and who believe in *the future life*, &c.' To unite the three principal religious forms which he found in his time and country—viz., Judaism, Christianity, and Heathenism—into one, was Mohammed's ideal, and the Koran, properly read, discloses constantly the alternate flatteries and threats aimed at each of the three parties. No less are certain abrogations on the part of the Prophet himself, of special passages in the Koran, due to the vacillating relation in which he at first stood to the different creeds, and the concessions first made, and then revoked. Witness the 'Kiblah,' or the place where the believer was to turn in his prayer, first being Jerusalem; fasting, being at first instituted in the ancient manner; forbearance to idolaters forming one of the original precepts, &c.

The language of the Koran is of surpassing elegance and purity, so much so, that it has become the ideal of Arabic classicality, and no human pen is supposed to be capable of producing anything similar:—a circumstance adduced by Mohammed himself as a clear proof of his mission. The style varies considerably; sometimes concise and bold, sublime and majestic, impassionate, fluent, and harmonious; it at other times becomes verbose, sententious, obscure, tame, and prosy; and on this difference modern investigators have endeavoured to form a chronological arrangement of the Koran, wherever other dates fail. But none of these attempts can ever be successful. Full manhood, approaching age, and declining vigour, are not things so easily traced in the writings of a man like Mohammed. The Koran is written in prose, yet the two or more links of which generally a sentence is composed, rhyme with each other, a peculiarity of speech used by the ancient soothsayers (Kuhhân = Cohen) of Arabia:—only that Mohammed used his own discretion in remodelling its form, and freeing it from conventional fetters; and thus the rhyme of the Koran became an entirely distinctive rhyme. Refrains are introduced in some surahs; and plays upon words are not disdained.

The outward reverence in which the Koran is held throughout Mohammedanism, is exceedingly great. It is never held below the girdle, never touched without previous purification; and an injunction to that effect is generally found on the cover which overlaps the boards, according to Eastern binding. It is consulted on weighty matters;

sentences from it are inscribed on banners, doors, &c. Great lavishness is also displayed upon the material and the binding of the sacred volume. The copies for the wealthy are sometimes written in gold, and the covers blaze with gold and precious stones. Nothing also is more hateful in the eyes of a Moslem than to see the book in the hands of an unbeliever.

The Koran has been commented upon so often that the names of the commentators alone would fill volumes. Thus, the library of Tripoli, in Syria, is reported to have once contained no less than 20,000 different commentaries. The most renowned are those of Samachshari (died 539 H.), Beidhavi (died 685 or 716 H.), Mahalli (died 870 H.), and Soyuti (died 911 H.). The principal editions are those of Hinkelmann (Hamburg, 1694), Maracci (Padua, 1698), Flügel (3d ed. 1838), besides many editions (of small critical value) printed in St Petersburg, Kasan, Teheran, Calcutta, Cawnpore, Serampore, and the many newly-erected Indian presses. The first, but very imperfect, Latin version of the Koran was made by Robertus Retensis, an Englishman, in 1143 (ed. Basle, 1543). The principal translations are those of Maracci, into Latin (1698); Sale (first ed. 1734) and Rodwell (1862), into English; Savary (1783), Garcin de Tassy (1829), Kasimirski (1840), into French; Megerlin (1772), Wahl (1828), Ullmann (1840), into German; besides the great number of Persian, Turkish, Malay, Hindustanee, and other translations made for the benefit of the various eastern Moslems. Of concordances to the Koran may be mentioned that of Flügel (Leip. 1842), and the Noojoom-ool-Foorkan (Calcutta, 1811). Of authorities whose works may be consulted on the Koran, we will chiefly name Maracci, Sale, Savary, Wahl, Geiger, Amari, Sprenger, Muir, Weil, Nöldeke.

KORDOFA'N, or the White Land, a province of the Egyptian territories in the Sudan, is bounded on the E. by the White Nile, which separates it from Sennaar, and is separated on the W. from Darfur by a strip of desert. It extends in lat. from 10° to 15° 20′ N., and the area of its more or less cultivated portion has been estimated at 12,000 square miles, and its population at 400,000. The province is traversed by no rivers; wells, however, abound, water being found almost everywhere, at a comparatively small depth. In the south, the surface is undulating, and the soil argillaceous and productive; and here dourra and maize are grown. In the north and west, the surface is an elevated plateau, and the soil sandy, but peculiarly fitted for the cultivation of millet, which is the staple article of food. The employments of the people are chiefly agricultural. In the south, horned cattle and horses are extensively reared, but in the north and west, the nomad inhabitants depend for support entirely upon their large herds of camels, which are hired out for the transport of produce and merchandise. The chief trees are acacias, yielding gum-arabic. Iron ore is obtained and wrought in the country. Slavery, which had formerly been general, and had formed an important branch of trade in K., was abolished in 1857 by Said Pasha, the Egyptian viceroy. The people are Mohammedans.

The inhabitants are partly Arabs, partly a mixed Arab and negro race. The capital is Lobeid or Il-Obeid (q. v.). In 1770, Adlân, king of Sennaar, made a conquest of K., and about six years after, the Sultan of Darfur overran the province, and annexed it to his territories. Under the sultan, the inhabitants were but lightly taxed; trade was opened up with the Sudan and Arabia; and the markets of Il-Obeid and Bara, the chief towns, were stored with the produce of Arabia, India, and Abyssinia. This period of prosperity, however, was brought to a close by the invasion of K., in 1821, by an Egyptian army. Since then K. has remained a province of the Turkish empire, under the viceroy of Egypt.

KÖRNER, Theodor, a patriotic German poet, was born at Dresden, 23d September 1791, and after the publication of a collection of immature verses in 1810, betook himself to the university of Leipsic. Here the young author, who had no aptitude for serious and solid studies, was led into several irregularities, which necessitated his leaving the university. After a short residence in Berlin, he went to Vienna, and began to write for the stage. His *Der Grüne Domino* (The Green Domino), *Die Braut* (The Bride), and *Der Nachtwächter* (The Night-watchman), are among the best German comedies. His two most important dramas, *Zriny* and *Rosamunde*, though destitute of that sagacity of thought and knowledge of mankind which are essential to the permanent success of such works, are full of noble enthusiasm. The uprising of the German nation against the despotism of Napoleon, inspired K. with patriotic ardour. He joined the army of liberation, and displayed heroic courage in many encounters. The songs which he now wrote—several of them in the camp—and published under the title of *Leier und Schwert* (Lyre and Sword), stirred his countrymen mightily. Their chief power, however, probably lies in their impassioned nationality; foreigners at least fail to recognise in them much more, yet the Germans regard them with a kind of sacred admiration that forbids criticism. The most famous of these pieces is his *Schwert-Lied* (Sword-Song). K. was killed in battle near Rosenberg, 26th August 1813. A collected edition of his works (*Sämmtliche Werke*, 1 vol. Berl. 1834; 4 vols. 1842, 4th edit. 1853) was published by Streckfuss. A biography of the poet, written by his father, has been translated into English, 'with selections from his poems, tales, and dramas,' by G. F. Richardson (Lond. 2 vols. 1845).

KÖRÖ'S, Nagy, or **GREAT KÖRÖS**, an important market-town of Hungary, in the county of Pesth, is situated in a sandy district, 49 miles south-east of the city of that name. Black cattle and sheep are here extensively reared, and an excellent red wine is grown. Pop. (1869) 20,091—Kiss Körös, or Little Körös, is a small town, situated 38 miles south-west of the foregoing, and also engaged in the production of wine. Pop. (1869) 6510.

KOSCIUSKO, Tadeusz, a great Polish general and patriot, born about the middle of last century, in the province of Minsk, Western Russia, was descended from an ancient and noble, but not wealthy Lithuanian family. He became a captain in the Polish army, went to America, and served in the War of Independence. He returned to Poland in 1786, with the rank of general of brigade. In the campaign of 1792, he held a position at Dubjenka for five days with 4000 men against 16,000 Russians, although he had had only twenty-four hours to fortify it, and finally withdrew his troops without much loss. This brilliant feat of arms laid the foundation of his military reputation. When King Stanislaus submitted to the will of the Empress Catharine, K. resigned his command, and retired to Leipsic; but returned in 1794, and put himself at the head of the national movement in Cracow, and afterwards in Warsaw. With 20,000 regular troops, and 40,000 ill-armed peasants, he resisted for months the united Russian and Prussian army of 150,000 men. He was proof also against the most tempting proposals on the part of the Prussian king. He was at last overpowered by superior numbers in the battle of Maciejowice, 10th October 1794, and fell from his horse, covered with wounds, and uttering the words '*Finis Poloniæ.*' He was kept a prisoner till after the accession of the Emperor Paul, who restored him to liberty, gave him an estate with 1500 peasants, and handed to him his sword, which K. declined to receive, saying: 'I have no more need of a sword, as I have no longer a country.' He afterwards resigned the estate, and sent back from London the money which he had received from the emperor. He spent the remainder of his life chiefly in France, and his chief enjoyment was in agricultural pursuits. When Napoleon, in 1806, formed a plan for the restoration of Poland, K. felt himself restrained from taking an active part in it by his promise to the Emperor Paul. The address to the Poles, published in his name in the *Moniteur*, was a fabrication. In 1814, he wrote to the Emperor Alexander, entreating him to grant an amnesty to the Poles in foreign countries, and to make himself constitutional king of Poland. He released from servitude, in 1817, the peasants on his own estate in Poland. His death took place on 15th October 1817, in consequence of his horse falling over a precipice. His remains were removed to Cracow by the Emperor Alexander, and were laid side by side with those of John Sobieski. See Falkenstein's *K. nach seinen häuslichen und öffentlichen Leben* (2d edit. Leip. 1834).

KÖSLI'N, a manufacturing town of Prussia, in the province of Pomerania, on the Mühlenbach, 7 miles from the Baltic Sea, and 85 miles north-east from Stettin. There are iron-foundries, and manufactures of tobacco, paper, &c. Pop. (1871) 13,360.

KOSSUTH, LAJOS (LOUIS), the leader of the Hungarian revolution, was born in 1802 at Monok, in the county of Zemplin, in Hungary. His family is of noble rank, but his parents were poor. He studied law at the Protestant college of Sarospatak, and practised first in his native county, and afterwards in Pesth. In 1832, he commenced his political career at the diet of Presburg as editor of a liberal paper, which, owing to the state of the law, was not printed, but transcribed and circulated. The subsequent publication of a lithographed paper led, in May 1837, to K.'s imprisonment. He was liberated in 1840, and became again the editor of a paper, in which he advocated views too extreme for many of the liberal party amongst the nobles, but which took strong hold of the people in general, especially of the youth of the country. In November 1847, he was sent by the county of Pesth as deputy to the diet, and soon distinguished himself as a speaker, and became the leader of the opposition. He advocated the emancipation of the peasants, the elevation of the citizen class, the freedom of the press, &c., and after the French revolution of 1848, openly demanded an independent government for Hungary, and constitutional government in the Austrian hereditary territories. To his speeches must in great part be ascribed not only the Hungarian revolution, but the insurrection in Vienna in March 1848. On the dissolution of the ministry in September 1848, he found himself at the head of the Committee of National Defence, and now prosecuted with extraordinary energy the measures necessary for carrying on the war. To put an end to all the hopes and schemes of the moderate party, he induced the National Assembly at Debreczin, in April 1849, to declare the independence of Hungary, and that the Hapsburg dynasty had forfeited the throne. He was now appointed provisional governor of Hungary; but being disappointed in his hopes for the intervention of the Western Powers, and finding the national cause jeopardised by the arrival of Russia on the scene of action, he endeavoured to arouse the people to a more desperate effort. The attempt was vain. Finding that the dissensions between himself and Görgei (q. v.) were damaging the national cause, he resigned his dictatorship in favour of the latter. After the defeat at Temesvar on 9th August 1849, he found himself compelled to abandon his position, and to flee into Turkey, where, however, he was made a prisoner; but though his extradition was demanded both by Austria and Russia, the Porte, true to the principle of hospitality, resisted all their demands. In September 1851 he was liberated, and the government of France refusing him a passage through their territory, he sailed in an American frigate to England, where he was received with every demonstration of public respect and sympathy. In December of the same year he landed in the United States, where he met with a most enthusiastic reception. He returned in June 1852 to England, and there he chiefly resided, until the Italian war broke out against Austria, when almost the whole of the Hungarian emigrants left for Italy with Kossuth. He now (1875) resides in Turin.

KOSTRO'MA, capital of the government of that name, in European Russia, is situated near the junction of the Kostroma with the Volga, and 564 miles from St Petersburg. It was founded in the middle of the 12th c., and suffered much from the invasions, first of the Tartars, afterwards of the Poles. K. has considerable manufactures, chiefly of linen, and trades in corn, tallow, timber, linseed oil, and leather. Pop. (1867) 23,453.

KOSTROMA, a government of Great Russia, is bounded on the W. by the government of Jaroslav, and on the E. by the district of Kazan. Area, 30,834 square miles; pop. (1867) 1,101,099. The surface is generally flat, marshy, interspersed with lakes, and, especially in the north and east, with extensive and dense forests. The greater part of the soil is uncultivated. The chief rivers are the Volga, with its tributaries the Kostroma, the Unja, and the Vetluga. The climate is severe. Agriculture is the principal occupation of the inhabitants, and grain is produced in sufficient quantity for local consumption. Flax and hemp are extensively cultivated; mats, pitch, tar, and potash are largely manufactured and exported; and there is a flourishing trade in timber.

KO'TAH, the chief town of a protected state of the same name, is situated in Rajpootana, in lat. 25° 10′ N., and long. 75° 52′ E. It is on the right bank of the Chumbul, and is fortified with a rampart and a ditch. The town is tolerably wealthy, being, moreover, of considerable size, and of some architectural pretensions. In 1857, notwithstanding the fidelity of the rajah to the British government, K. fell under the power of the mutineers, remaining in their possession until 30th March 1858, when it was stormed by General Roberts. The principality contains 4400 square miles, with an estimated population of 440,000.

KOTZEBUE, AUGUST FRIEDRICH FERDINAND VON, a most prolific German dramatist, was born at Weimar on 3d May 1761, and after a checkered life, spent first in Russia, and afterwards in Austria and Germany, was assassinated at Mannheim, 23d March 1819, on account of his hostility to the liberal movement. Among his dramatic performances (the chief merit of which consists in their superior knowledge of stage-effect), may be mentioned *Die Indianer in England* (The Indians in England), *Menschenhass und Reue* (Misanthropy and Repentance)

—the latter, under the title of *The Stranger*, being well known on the English boards—*Die beiden Klingsberg* (The Two Klingsbergs), *Die Spanier in Peru*, &c. K. wrote no fewer than ninety-eight dramas, which have been collected in editions of 28 (Leip. 1797—1823) and of 44 vols. (1827—1829). Several of them have been translated into English.

KOU'BA, a town in the south of Asiatic Russia, on the eastern slope of the Caucasus, in the government of Baku, 55 miles south-south-east of the town of that name, lat. 41° 22′ N., long. 48° 31′ E. Agriculture, fishing, the rearing of silkworms, and trade with Astrakhan and Persia, chiefly employ the inhabitants. Pop. (1867) 11,247. It was annexed to Russia in 1806.

KOUBA'N, a river in the south of Russia, rises on the declivity of Mount Elburz, and flows first north, then west, separating the governments of Stavropol and the Cossacks of the Black Sea from Circassia. It is about 400 miles in length, exclusive of its windings, and it falls partly into the Black Sea, partly into the Sea of Azof.

KOUSNE'TZK, a town of Russia, on the northern border of the government of Saratov, 110 miles north-north-east of the town of that name. Pop. (1867) 13,954, who are employed chiefly in bee-keeping and in woollen manufactures.

KO'VNO, capital of the government of the same name, in European Russia, near the confluence of the Vilia and the Niemen, was founded in the 10th c., and was the scene of many bloody conflicts between the Teutonic Knights and the Poles during the 14th and 15th centuries. Its commerce, notwithstanding its advantages of situation—being not only near the confluence of two navigable rivers, but also on the great railway from St Petersburg to Berlin—is very insignificant. Pop. (1867) 34,612.

KOVNO, a government of West Russia, lies immediately south of the province of Courland, and is bounded on the south-west by Prussia and Poland. Area, 16,115 square miles, not more than one-third of which is cultivated, and about one-third under wood. Flax and honey are important products. Pop. (1867) 1,131,248. The surface is flat and marshy, and there are numerous lakes. The chief rivers are the Niemen, with its tributaries the Vilia, Neveja, and Doubissa. Plica Polonica (q. v.) is common among the peasantry. Previous to 1843, this government formed a part of that of Wilna.

KOZEI'LSK, a district town of Great Russia, in the government of Kaluga, and 40 miles south-west of the town of that name, stands on the right bank of the river Jisdra. Pop. (1867) 7224. It carries on a great trade in hemp, and an extensive manufacture of sailcloth. K. is famous in history for the brave but unsuccessful resistance made here to Batu-Khan of Kiptchak.

KOZLO'F, a town of Russia, in the government of Tambov, is advantageously situated on the Voronetz, in lat. 52° 53′ N., long. 40° 31′ E. It was founded by the Czar Michael Fedorovitch as a stronghold against the Tartars. It is a flourishing town, has numerous woollen, linen, and other factories, and a pop. of (1867) 24,616, who are employed largely in agriculture, and in horse and sheep breeding.

KRAJO'VA, a town of Wallachia, in Little Wallachia, near the eastern bank of the Schyl, 120 miles west of Bucharest. It is the residence of many rich bojars (nobles), carries on considerable commerce, and has a pop. of 25,000.

KRA'KEN, a fabulous animal, first described by Pontoppidan in his *Natural History of Norway*, and from time to time said to have been seen in the Norwegian seas. Enormous magnitude is ascribed to it; it is said to rise from the sea like an island, to stretch out mast-like arms, by which ships are readily drawn down, and, when it sinks again into the deep, to cause a whirlpool, in which large vessels are involved to their destruction. The fable of the K. has considerable analogy to the more recent stories of the Great Sea Serpent (q. v.). It is not, however, to be summarily rejected as mere unmingled fable. There may, perhaps, be some foundation for it in the occasional appearance of huge cephalopods, to the general characters of which the description given of its form and monstrous arms sufficiently agrees, great exaggeration as to size being of course allowed for. Large as are some of the cephalopods known to exist in some seas, there are reasons for supposing that creatures of this kind do exist much larger than any that have been accurately described; and stories, similar to the Norwegian ones recorded by Pontoppidan and others, are current in different parts of the world. Such is the story told by Pliny concerning a vast animal with prodigious arms which impeded the navigation of the Strait of Gibraltar. See *Chambers's Edinburgh Journal*, first series, xi. 226.

KRAME'RIA. See Rattany Root.

KRASNOIA'RSK, chief town of the Siberian government of Yeniseisk, is situated on the great road from Europe to East Siberia, at a distance of 3197 miles from St Petersburg. It contained, in 1867, 11,238 inhabitants, chiefly Cossacks, some of whom possess numerous herds of cattle and horses. There is a considerable trade in furs, and there are about thirty tan-yards and other factories.

KRAZINSKI, Count Valerian, a scion of an illustrious Polish family that had early adopted the Protestant religion, was born about 1780. Being possessed of great natural abilities, which were improved and matured by a thorough education, he was appointed one of the chief officials in the bureau of Public Instruction for Poland. He strenuously exerted himself to promote education among the various classes of dissenters, and, with a view to this, introduced, at great expense to himself, the process of stereotyping. When the Poles rebelled in 1830, and set up an independent government, K. was sent as their representative to London, where, from 1831, he remained as an exile for twenty years, and then removed to Edinburgh, where he died, 22d December 1855. Being a man of extensive learning, and possessing a profound knowledge of the history and literature of the Slavonic nations, his works are of considerable authority. The chief are—*The Rise, Progress, and Decline of the Reformation in Poland* (Lond. 2 vols. 1839—1840), *Lectures on the Religious History of the Slavonic Nations* (Lond. 1849), *Montenegro and the Slavonians in Turkey* (Edin. 1853), together with some translations, religious works, and political pamphlets on the subject of Poland.

KREASOTE. See Creasote.

KREATINE. See Creatine.

KRE'FELD, an important manufacturing town of Rhenish Prussia, twelve miles north-west of Düsseldorf. It owes its importance to the settlement here, in the 17th and 18th centuries, of numerous refugees, who were driven from the neighbouring countries by religious persecution, and who established here the silk and velvet manufactures for which K. is now the most noted town in Prussia. In 1870, the quantity of silk produced was estimated at 1,100,000 lbs., and the value of the fabrics exported was upwards of £3,000,000. The number of hands employed in these manufactures is very great. K. also carries on manufactures of woollen cloth and yarn, cotton goods, machinery, and chemicals. Pop. (1871) 57,128, three-fourths of whom are Roman Catholics.

KREMENCHU'G, a district town of Little Russia, in the government of Poltava, on the left bank of the Dnieper, ninety miles above Ekaterinoslav. It was founded in the 16th c. by Segismundus-Augustus, king of Poland, as a barrier against the Tartars. During the reign of Catharine II., it was the chief town of New Russia, and it is now the seat of great industrial and commercial enterprise, containing 34 factories, chiefly for melting tallow and for rope-making. Pop. (1867) 20,251.

KREMENE'TZ, a district town of West Russia, in the government of Volyn (Volhynia), is situated 130 miles west of Jitomir, and about 20 miles from the frontier of Austrian Galicia. It had, in 1867, 10,963 inhabitants, and seven annual fairs are held here, but, owing to the want of river-communication, the commerce is limited.

KRE'MNITZ, a town of Hungary, in the county of Bars, in a deep gloomy valley, twelve miles west-south-west of Neusohl. It is famous for its gold and silver mines, which, however, are less productive now than formerly. Pop. (1869) 8442, who are almost entirely of German origin.

KREMS, a town of Lower Austria, in a picturesque district on the Danube, at the confluence of the Krems with that river, 38 miles west-north-west of Vienna. It manufactures mustard and powder, and trades in wine. Pop. (1869) 6114.

KREU'ZER—from the cross (*kreuz*) formerly conspicuous upon it—a small copper coin current in Southern Germany, the 60th part of the gulden or Florin (q. v.).

KREU'ZNACH, a town in the province of Rhenish Prussia, on the Nahe, a few miles from its junction with the Rhine, and 38 miles south-south-east of Coblentz. It has crooked narrow streets, and old-fashioned houses, with a pop. in 1871, of 12,874. It dates its existence from about the 9th century. It is chiefly notable, however, for its salt springs, which were discovered in 1478, and which, containing iodine and bromine, are serviceable in many diseases. It is therefore much frequented. The springs range from 45¼° to 84° F.

KRIMMITSCHAU', a town of Saxony, about 37 miles south of Leipsic, on the railway between that place and Hof. It is a busy manufacturing town, the industrial products being woollen yarn, woollen and cotton fabrics, buttons, needles, &c. Pop. (1871) 15,280.

KRI'SHNA, the eighth Avatâra or incarnation of the Hindu god Vishnu. See VISHNU.

KROLOWE'Z, a town of Little Russia, in the government of Tchernigov, is situated 100 miles east of the town of that name. A famous annual market is held here. Pop. (1867) 8198.

KRO'SSEN, a walled town of Prussia, on the left bank of the Oder, 32 miles south-east of Frankfurt. There are manufactures of woollen, linen, leather, and earthenware. Pop. (1871) 6977.

KRÜDENER, JULIANA VON, a religious visionary and enthusiast, daughter of Baron von Vietinghoff, was born at Riga in 1766. When she was but 14, she married the Baron von Krüdener, a Livonian nobleman, who held the post of Russian ambassador at Venice. Her married life, however, was unhappy, and after the birth of a son and daughter, she was divorced from her husband. The succeeding incidents of her stormy career are supposed to form the groundwork of the novel of *Valerie*, which she published in 1803. After many adventures, M. von K. came to Berlin, where she was admitted to the close intimacy of the queen, Louisa, of all whose projects M. von K. was the confidante and sharer. The shock occasioned by the death of this princess is said to have disturbed the balance of M. von K.'s mind; and from that date she became a zealous disciple of the celebrated pietist, Jung Stelling, and ultimately gave herself up to religious mysticism in its most exaggerated form. From Berlin she moved to Paris, where she appeared as a prophetess, and the herald of a new religious era; and she attracted such notice by the fulfilment of certain of her predictions of public events, as of the fall of Napoleon, his return from Elba, and the final crisis of Waterloo, as to obtain access to the Emperor Alexander, and eventually to acquire much influence over him. Her gigantic schemes for the elevation of the social and moral condition of the world, caused her to appear a dangerous character in the eyes of persons in authority, and she was obliged to withdraw from France and other countries in succession. In consequence, she retired to one of her paternal estates near Riga, where she entered into relations with the Herrnhüter or Moravian Brethren; but her restless disposition soon carried her into fresh enterprises, the latest of which was the formation of a great correctional establishment in the Crimea for the reformation of criminals and persons of evil life. In the midst of her efforts for this object, she died at Kara-su-bazar, December 13, 1824. Besides the novel already named, her only other work was a pamphlet entitled *Le Camp des Vertus* (Paris, 1815); but many curious details of her conversation and opinions are preserved in Krug's *Conversations with Madame von Krüdener*, published at Leipsic in 1818.

KRU'MAU, a small town of Bohemia, on the Moldau, 14 miles south-south-west of Budweis. Its castle, a fine structure placed on a rock, contains five separate courts, and is surmounted by numerous towers and pinnacles. There is some manufacturing industry. Pop. 5170.

KRUMMACHER, FRIEDRICH WILHELM, the son of F. A. Krummacher, a clergyman who distinguished himself by his zeal for old Lutheranism, and also as an opponent of the Rationalists. Some of his works, particularly his discourses on the history of *Elijah the Tishbite*, have not only acquired a great popularity in Germany, but, by means of translations, in Britain and America. Along with this may be named his discourses on the Life of Elisha. In 1843, he was called as preacher to a German Reformed congregation in New York, but returned to Bremen in 1847, and subsequently held the office of chaplain of the Prussian court at Potsdam. K. was considered a most eloquent preacher. He died Dec. 10, 1868.

KRU'MMHORN (Ital. *cormorne*) is the name of a very old wind-instrument made of wood, the under part of which is bent outwards in a circular arc.—Krummhorn is also the name of an organ-stop, found in almost all German organs, and generally of eight feet pitch. The pipes are made of tin, the body or sounding part being cylindrical, and partly shut at the upper end. The Italian name of *cormorne* has been corrupted by English organ-builders into *cremona*, which is the same stop in English organs. The sound of the krummhorn as an organ-stop is soft and quiet; but it is defective in not keeping in tune so well as other reed-stops.

KSHATRIYA, the second or military caste in the social system of the Brahmanical Hindus. See CASTE.

KÛBLAI KHAN (called by the Chinese CHI-TSOU), more properly KHÛBILAI KHAN, the Khagan, or Grand Khan of the Mongols, and Emperor of China, was the grandson of Genghis Khan through his fourth son, Tuly Khan. Being ordered by his brother Mangû, then Khagan of the Mongols, to subjugate the Corea and China, K., availing himself of an application made by Si-Tsong of the Song dynasty to aid him in expelling the Mantchûs, entered China (1260) with an immense army, drove out these Tartars (or *Kin* dynasty), and took possession of North China. K., who was an able and energetic prince, adopted the Chinese mode of civilisation, and endeared himself to his subjects by his attention to men of letters, and the honours which he bestowed on the memory of their former renowned monarchs. In 1279, he completed the ruin of the Song dynasty by invading and subduing Southern China, and founding a new dynasty—that of the Yuen (the first foreign race of kings that ever ruled in China). From 1259, K. had been the Khagan of the Mongols, so that his dominions now extended from the Frozen Ocean to the Strait of Malacca, and from the Corea to Asia Minor—an extent of territory the like of which had never before, and has never since, been governed by any one monarch. He was also the last grand khan whose right of suzerainty was recognised over all the countries conquered by the Mongol arms. His court was attended by the learned men of India, Persia, Transoxiana, and some even from Europe, among whom is found the celebrated Marco Polo. Towards the close of his life, he sent an expedition against Japan, but it totally failed. Irritated by this disaster, he indemnified himself by the conquest of Mantchuria and other neighbouring districts; but soon after died at Pekin in 1294. The grand dukes of Russia were among his tributaries.

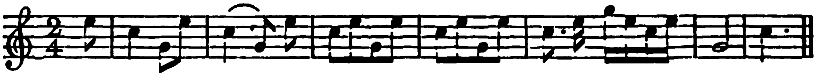
KUEN LUN, the name of a mountain-range in Central Asia. See TURKESTAN.

KU'FIC COINS is the name of the earliest Mohammedan coins, inscribed with the Kufic or ancient Arabic character (see the following article). According to Makrizi, the first were struck in the 18th year of the Hedjrah (638 A. D.), under Calif Omar, who, wishing to make Islam entirely independent of foreign, chiefly Byzantine and Persian, influence, even in the province of money, caused 'Mohammedan' coins to be struck, in the shape of those Persian and Byzantine ones which had been circulating among his subjects till then, and he caused them to be inscribed with Koranic passages. According to other Arabic writers, however (Al-Makin, Soyuti, Ibn Koteiba, &c.), the earliest Kufic money dates from the time of Calif Abd Al-Malek (76 H. = 695 A. D.), a period much more probable, considering that no Kufic coins have hitherto been discovered anterior to 77 H. They were first of gold and silver, the former being *dinars* (corrupted from denarius—a name, moreover, wrongly applied), of the value of about 10*s.* 8*d.*; the latter, *dirhems* (drachma), worth about 5¼*d.* Not before 116 H. were copper coins, *fels* (follis? obolus?), introduced, and the material for them was taken by the order of Calif Walíd from a colossal bronze statue of an idol. Figures, human or otherwise, are rarely met with on these coins. The legend generally runs either around the margin, or is enclosed by a ring. The oldest dinar—of 77 H.—is preserved in the Milan Museum (formerly Cav. Millingen's collection). Next comes the Stockholm Academy, with a dinar of 79 H. The oldest dirhem found as yet, dated 82 H., is likewise in Milan, in the Museo di Stefano di Mainoni. One of the richest collections of Kufic coins is in the Stockholm Academy: owing chiefly to the great numbers found on the shores of the Baltic, brought thither probably by Mohammedan traders in the middle ages. Not before the 7th c. H. were the Kufic characters superseded by the modern Neshki, upon coins; while for books, &c., they had long fallen into disuse. The best authorities on this subject are Makrizi, Adler, the Tychsens, Reiske, De Sacy, Castilioni, Cataneo, Frähn, Lindberg, Pietraszewski.

KUFIC WRITING, an ancient form of Arabic characters, which came into use shortly before Mohammed, and was chiefly current among the inhabitants of Northern Arabia, while those of the south-western parts employed the Himjaritic or Mosnad (clipped) character. The Kufic is taken from the old Syriac character (Estrangelo), and is said to have been first introduced by Moramer or Morar ben Morra of Anbar. The first copies of the Koran were written in it, and Kufa, a city in Irak-Arabi (Pashalic of Bagdad), being the one which contained the most expert and numerous copyists, the writing itself was called after it. The alphabet was arranged like the Hebrew and Syriac (whence its designation, *ABGaD HeVeS*), and this order, although now superseded by another, is still used for numerical purposes. The Kufic character, of a somewhat clumsy and ungainly shape, began to fall into disuse after about 1000 A.D.; Ebn Morla of Bagdad (d. 938 A.D.) having invented the current or so-called Neshki (*nashak*, to copy) character, which was still further improved by Ebn Bawwab (d. 1031), and which now—deservedly, as one of the prettiest and easiest—reigns supreme in East and West. It is only in MSS. of the Koran, and in title-pages, that the Kufic is still employed. A peculiar kind of the Kufic is the so-called Karmatian—of a somewhat more slender shape—in which several inscriptions have been met with both in Arabia, and in Dauphiny, Sicily, &c., and which is also found on a coronation-mantle preserved in Nuremberg. The Kufic is written with a style, while for the Neshki, slit reeds are employed. Different kinds of the latter character (in which the alphabet is arranged according to the outward similarity of the letters) are the Moresque or Maghreb (Western), the Diváni (Royal—only employed for decrees, &c.), the Tâlík (chiefly used in Persian), the Thsoletki (threefold or very large character), Jakuthi, Riháni, &c.

KUGLER, FRANZ THEODOR, a German historian of art, was born at Stettin, January 19, 1808, and studied at the university of Berlin. After the completion of a very diversified course of study, he devoted himself to the study of the fine arts. In 1833, he became a professor in Berlin, where he died, March 16, 1858. His most valuable works are a *Handbuch der Geschichte der Malerei, &c.* (Manual of the History of Painting from the Time of Constantine the Great to the Present Day, 1837), which has been translated into English—the part relating to Italian art by Sir Charles and Lady Eastlake, and that relating to the German, Spanish, French, Dutch, and Flemish schools, under the editorship of Sir Edmund Head; and a *Handbuch der Kunstgeschichte* (Manual of the History of Art, &c., 1842). He is also favourably known as a poet and as the author of several dramas.

KUH-HORN, sometimes called ALPHORN, is a wind-instrument much used by the herdsmen in the mountainous countries of Germany. It consists of a tube about three feet long, and a little bent, and gradually widening out into a kind of bell, like a bassoon. It is made of wood, or of the bark of the willow, wrought together, and bound by a pitched cord. The sound of the kuh-horn is produced by a mouth-piece like that of a trombone. It has generally only five notes, but extending over nearly two octaves—viz., C, G, C, E, G. With these five notes, the herdsmen often play most interesting melodies, which, among the mountains, have an indescribable charm. The following is a specimen:



KU'ILENBURG. See Culenborg.

KUKAWA, an important town of Central Africa, capital of Bornu, is situated in a level district on the western shore of Lake Tsad, in lat. 12° 55′ N., and long. 13° 26′ W. It consists of two distinct towns, each surrounded by its own wall, and separated by a space of about half a mile. A great fair or market is held here weekly. The principal articles offered for sale are corn, dried fish, oxen, horses, camels, slaves, cloth, beads, earthenware. Upwards of 100 camels are sometimes sold here in one day. From 12,000 to 15,000 people are often crowded together in the market-place.

KU'LA, a town of Austria, in the Servian Woiwodschaft, on the Franzens or Bacs Canal, 26 miles north-west of Neusatz. Pop. (1869) 7887.

KU'LDJA, also called Ili, or Eelee, an important town in the Chinese frontier territory of Djungaria, in lat. 43° 55′ N., and in long. 80° 58′ E., on the right bank of the Ili, a considerable river, which, rising in the Tian-Shan Mountains, flows westward into Lake Balkhash, after a course of about 300 miles. A large market is held at K., and it is the residence of a dignitary called the Kee Roy, or Tsian-Tiung. Pop. 70,000.

KULM, a small village of Bohemia, 16 miles north-north-west of Leitmeritz, was the scene of two bloody conflicts between the French and allies on the 29th and 30th August 1813. The French, numbering 30,000 men, were commanded by General Vandamme; the Russians, during the first day's conflict, were 17,000, and were commanded by General Ostermann-Tolstoi. During the night, the latter were heavily reinforced, and on the second day Barclay de Tolly assumed the command with 60,000 troops. The result was the complete wreck of the French army, which lost in these two days little short of 20,000 men, while the allies did not lose half of that number.

KUMAO'N is a district of British India, in the North-west Province of the same name, in lat. 29°—31° N., and long. 78°—81° E. It lies chiefly on the south slope of the Himalaya, comprising upwards of thirty summits in that range, which vary in altitude from about 18,000 feet to nearly 26,000. With the exception of a belt on its southern frontier, which is from 2 miles to 15 miles broad, the whole country is one mass of mountains and forests. It contains mines of gold, copper, and lead, which, however, have never yet been profitably worked. Throughout the southern belt above mentioned, it produces, generally in two crops a year, wheat, barley, oats, millet, pease, beans, &c., with rice, cotton, indigo, sugar, ginger, turmeric, &c. More lately, too, K. has become the rival in India of Assam for the cultivation of the tea-plant. The climate is unhealthy. Area, 6000 sq. miles; pop. (1871) 432,888. The principal towns are Almorah, Mandi, and Kasipoor. The province of K. has an area of 11,500 sq. m., and a pop. (1871) of 743,170.

KUMÂRASAMBHAVA is the name of one of the most celebrated poems of the Hindus. Its reputed author is Kâlidâsa (see Kâlidâsa), and its subject is the legendary history connected with the birth of Kumâra, or Kârttikeya, the Hindu god of war. See Kârttikeya. It consists of 22 cantos, but only 8 have hitherto been published in the original Sanscrit. The first 7 have been elegantly rendered in English verse by Mr R. T. H. Griffith, at present Principal of the Benares Government College.

KUMBU'K (*Pentaptera tomentosa*), a tree of the natural order *Combretaceæ*, a native of the East Indies. It is a noble tree, and produces durable timber. Sir James E. Tennent describes a K. tree in Ceylon, 45 feet in circumference close to the ground, and 21 feet at 12 feet above the ground, which serves as a landmark for boatmen, towering high above forests of cocoa-palm, and discernible at a distance of 20 miles. The bark of the K. yields a black dye, and contains so much lime, that its ashes are commonly used as lime for chewing with betel.

KU'MISS, an intoxicating beverage much esteemed by the Kalmucks. It is made from the soured and fermented milk of mares. It has an acidulous taste. A spirit is obtained from it by distillation.

KÜMMEL. See Liqueur.

KUMQUAT (*Citrus Japonica*), a small species of orange, a native of China and Japan, and much cultivated in these countries. It has been introduced into Australia. It endures more frost than any other of the genus, and will probably prove a valuable acquisition to many parts of Europe and America. The plant is a shrub sometimes six feet high, but in cultivation it is not allowed to exceed the height of a gooseberry-bush. The fruit is oval, and about the size of a large gooseberry; the rind is sweet, and the juice acid. It is very delicious and refreshing. The Chinese make an excellent sweetmeat by preserving it in sugar.

KU'NERSDORF, a village of Brandenburg, in Prussia, nearly 4½ miles north-east of Frankfurt-on-the-Oder, was the scene of one of the most remarkable battles of the Seven Years' War, fought on the 12th August 1759, in which Frederick the Great was completely defeated by a combined attack of Russians under Soltikof, and Austrians under Laudon. The loss on the Prussian side was 26,000 men, with almost all their artillery and baggage, while their opponents lost 24,000 men.

KUNGU'R, a town in the south of the government of Perm, European Russia, and 1416 miles from St Petersburg, is renowned for its tanneries, in which the best quality of Russia leather is produced. In the neighbouring district are several large ironworks. Pop. (1867) 11,971.

KUNIGU'NDÉ, St, wife of the Emperor Henry II., was the daughter of Count Siegfried of Luxemburg. Her husband, Duke Henry of Bavaria, was crowned king of the Germans in 1002, and emperor in 1014. Her reputation having been unjustly assailed, she vindicated herself by walking barefooted over hot ploughshares. After the death of her husband in 1024, she retired into the convent of Kaufungen, near Cassel, which she had founded, spent the remainder of her days in pious works, and died on 3d March 1040. Pope Innocent III. gave her a place amongst the saints in 1200.

KU'PFERSCHIEFER, one of the series of strata which make up the Permian rocks. It consists of beds of dark shale with copper ore (hence the name), and containing beautifully preserved fish, of species nearly allied to those of the Coal Measures.

KU'RA, or **KUR** (anc. Cyrus), the principal river of the Caucasus, rises in the Sahanlu chain, and after a south-eastern course of 535 miles, falls into the Caspian Sea by several shallow channels, about 60 miles north of the Persian boundary. Its chief tributaries are the Aras (anc. *Araxes*), the Alazan, and the Yora. The K. has so rapid a course, and changes its channel so frequently, that to bridge it is almost impossible.

KURDISTA'N ('the Country of the Kurds'), an extensive region of Western Asia, running north-west and south-east, between lat. 34°—40° N. and long. 36°—48° E., bounded on the N.E. side by Armenia, Azerbijan, and Irak-Ajemi, and on the S.W. by the Tigris and Aljezira, belongs to the Turkish and Persian monarchies, chiefly to the former, and contains about 100,000 square miles, with a population amounting, according to Chesney's estimate, to 3,000,000—doubtless a very great exaggeration, though we have no means of disproving it. The country, with the exception of the tract bordering on the Tigris, is very mountainous, some of the peaks being nearly 13,000 feet above the sea-level; these mountain-ranges divide the surface of the country into fertile valleys and extensive table-lands. The southern part is for the most part low and flat, parched in summer, and verdant during the wet season. The country is traversed by the Euphrates, Tigris, Zab-Ala, Zab-Asfal, and Diyala or Shirvan, and contains several lakes, the chief of which are Van and Urumiah. Four-fifths of the inhabitants are Kurds (anc. *Carduchi* and *Gordyaei*), a race partly nomad and partly agricultural, who occupy themselves chiefly, however, with the breeding of cattle, sheep, goats, and horses. A great trade is carried on with Turkey and Persia, especially in horses, the Kurdish breed being so famed for its spirit and endurance, as to be almost exclusively employed by the Turkish and Persian cavalry. The settled portion of the population consists of Kurds, Turks, and Persians, who are engaged in agricultural employments. A remarkable product of this country is a substance found on the leaves of the tamarisk and other shrubs, which closely corresponds to the description given of 'manna' in the Old Testament, and is supposed to result, like oak-galls, from the puncture of the leaf by an insect. The country is deficient in mineral wealth. The inhabitants, with the exception of the Nestorians (q. v.), who inhabit the valley of the Tigris, profess a debased form of Mohammedanism. The chief towns in Turkish K. are Bitlis (q. v.), Van, Urumia, Mardin (anc. *Mardein*), Mush, Korkuk, Diarbekir, Malatia, and Marash. The Persian portion of K. does not form a distinct province, but is included in Azerbijan, Ardelan, and Irak-Ajemi.

KU'RILE ISLANDS, a line of islands in the North Pacific Ocean, extend between the south extremity of Kamtchatka and the Japanese island of Yesso. They are under the government of the Russo-American Company, and are 22 in number, 19 of them belonging to Russia. Area of the islands possessed by Russia, 3843 square miles; pop. between 200 and 300. Since 1781, no tribute has been collected here. The K. I. are all volcanic. The vegetation is poor; the principal productions being the furs of foxes, wolves, seals, and beavers. Navigation near the islands is difficult.

KU'RISCHÉS HAFF, an extensive lagoon, separated from the Baltic Sea by a ridge of sand from one to two miles in width. It extends nearly sixty miles along the coast of East Prussia from Labiau to Memel, where it enters the Baltic by the 'Memel Deeps,' a channel about 1000 feet wide, and 12 feet deep. Its greatest breadth at the southern extremity is about 28 miles, but its average breadth is not above 14 miles. The waters of the K. H. are fresh. Its depth is very variable, and hence its navigation, accomplished by means of large flat boats, is both difficult and dangerous. The belt of land is called the 'Kurische Neerung,' and has a few villages upon it.

KURNU'L, the chief town of a district of the same name, in the presidency of Madras, in lat. 15° 50' N., and long. 78° 5' E. Pop. estimated at 20,000. The district itself—separated on the north by the Krishna from the Nizam's dominions—contains 7470 square miles, and in 1871 had a population of 956,068. The country possesses considerable works for the purposes of irrigation.

KÛRRACHI', the only port in Sinde for sea-going ships, lies about twelve miles north-west of the most westerly mouth of the Indus, in lat. 24° 51' N., and long. 67° 2' E. It was taken by the British in 1839, and has since advanced with rapid strides in the path of improvement. Pop. about 30,000. As the mouth of the Indus is barred by sand-banks, K. is virtually the terminus for the traffic on that river. The anchorage is exposed, but harbour works, docks, and other improvements are in progress. It is connected by the Sinde Railway with Hyderabad, thence, by means of the Indus Steam Flotilla Company's vessels, with Sakar and Mûltan, and from the latter place by the Punjab Railway, with Lahore, Amritsir, Peshawur, &c. Since January 1860, it has had direct communication, by submarine telegraph, with Muscat and Alexandria. The exports of K. are camels, fish, hides, tallow, ghee, oil, bark, salt, indigo, cotton, and grain; and the imports, metals, hardware, silk, cotton, and woollen goods. K. has an active inland trade with Cashmere, Turkestan, Afghanistan, and Tibet. It contains an English church and school.

KURSK, one of the governments in the south of Great Russia, lying south of Orel, contains 17,373 square miles, the most of which is arable. The province is watered by feeders of the Dnieper and of the Don. The soil being very fertile, large crops of corn are raised, and even in scanty years, K. can supply the neighbouring provinces. The pop. in 1867, was 1,866,859, of whom the greater part are employed in farm-tillage, though a large number devote themselves to cattle-breeding and orchard-gardening. The principal manufactures are spirits, leather, soap, and saltpetre, and the products are largely exported. Hemp and horses also form important items in the export trade of the province.

KURSK, the chief town of the government of that name, on the right bank of the Seim, a branch of the Dezna, dates from the 9th c. It suffered considerably from the ravages of the Tartars and Poles, but is still a flourishing town, numbering (1867) 28,921 inhabitants, and carrying on a considerable trade in tallow-melting, rope-making, and tanning. K. is also celebrated for its orchards, the fruit of which is in great request. Near the town, a fair is held in July, when more than £1,000,000 worth of commodities are disposed of, the chief being manufactured silk and woollen fabrics, sugar, tea, horses, &c.

KURU, a name of great celebrity in the ancient or legendary history of India. See MAHÂBHÂRATA.

KU'STENLAND (i. e., *Coast Districts*, Ital. *Litorale*), a crown-land of Austria, consisting of the county of Görz and Gradiska, markgrafdom of

Istria, and the town of Trieste with its territory. It lies between the crown-land of Carniola on the north-east and the Gulf of Venice on the south-west. Area, 3048 sq. m.; pop. (1869) 600,525. Together with the crown-lands of Carinthia and Carniola, it constituted in former times the kingdom of Illyria. The surface is mountainous. The chief rivers are the Isonzo and the Quieto. The soil in general is fruitful; figs ripen without almost any cultivation, and wine is extensively made. In the mountainous districts in the north and north-east the breeding of cattle is the chief branch of industry. Commerce is extensively carried on at the various seaports.

KÜSTRI'N, a town of Prussia, and a fortress of the third rank, is situated in the midst of extensive morasses, at the confluence of the Warthe with the Oder, twenty miles north of Frankfurt. Pop. (1871) 10,122.

KUTAI'EH, KUTAHIA, or **KUTAYA** (the ancient *Cotiæum*), an important town of Asiatic Turkey, in Anatolia, capital of the eyalet in which it is situated, stands seventy miles south-east of Brusa, on the Pursuk, a tributary of the Sakaria—the ancient Sangarius. It is said to have a good trade, and a population of about 50,000.

KUTAI'S. See Transcaucasia.

KU'TTENBERG, a mining town of Bohemia, about forty miles east-south-east of Prague. Here, in 1237, silver was found, and the silver-mines were first worked. The first silver *groschen* were struck here in 1300. The silver-mines have not been worked for about 300 years, the chief mineral products of the district being now copper and lead. Cotton-spinning, cotton-printing, and bleaching, are also carried on. Pop. (1869) 12,747.

KUTUSOW, Michael Laurionowitsch Golenitschew, Prince of Smolenskoi, a Russian field-marshal, born in 1745, early entered the Russian army, and in 1787 was appointed governor-general of the Crimea. He distinguished himself in the Turkish war, and after various other services, was appointed in 1805 to the command of the first *corps d'armée* against the French. On 18th and 19th November of that year, he was victorious over Marshal Mortier at Dürenstein. He was second in command of the allied army, of which the Emperor Alexander himself was commander-in-chief, at Austerlitz. In 1811—1812, he commanded the Russian army in the war against the Turks, and notwithstanding his advanced age, he succeeded Barclay de Tolly in 1812, as commander-in-chief of the army against the French, and obtained a great victory over Davout and Ney at Smolensk. He carried on the campaign to its successful termination; but his strength was exhausted, and he died at Bunzlau, 28th April 1813.

KUVERA, the Hindu Plutus, or god of wealth. He owes his name—which literally means 'having a wretched (*ku*) body (*vera*)'—to the deformities with which he is invested by Hindu mythology. He is represented as having three heads, three legs, and but eight teeth; his eyes are green, and in the place of one he has a yellow mark; he wears an earring, but only in one ear; and though he is properly of a black colour, his belly is whitened by a leprous taint. He is seated in a car (*pushpaka*), which is drawn by hobgoblins. His residence, *Alakâ*, is situated in the mines of Mount Kailâsa, and he is attended by the Yakshas, Mâyus, Kinnaras, and other imps, anxiously guarding the entrance to his garden, Chaitraratha, the abode of all riches. Nine treasures—apparently precious gems—are especially intrusted to his care.—His wife is a hobgoblin, *Yakshî*, or *Yakshinî*, and their children are two sons and a daughter. As one of the divinities that preside over the regions, he is considered also to be the protector of the north.

KYANISING, the most efficacious method of preserving ships from Dry Rot (q. v.), by injecting into the pores of the wood a solution of corrosive sublimate, was invented by John H. Kyan, who was born in Dublin, November 27, 1774, and died in 1850.

KYLE, a district of Ayrshire (q. v.).

KY'RIÉ ELEI'SON (Gr. *Kyrie eleison*, Lord have mercy), a form of prayer which occurs in all the ancient Greek liturgies, and is retained in the Roman Catholic mass. It follows immediately after the Introit, and forms the introduction to the hymn of praise, 'Gloria in excelsis Deo' (Glory to God on high). The retention of the Greek language in this prayer, is one of many evidences of the predominance of the Greek element in the early Roman Church (Milman's *Latin Christianity*, i. 10). The same peculiarity occurs in a few others of the Roman services, especially those of the Holy Week.

KYTHU'L, the chief town of the Indian district of the same name, about 1000 miles to the north-west of Calcutta, in lat. 29° 49′ N., and long. 76° 28′ E. It is substantially built of brick, having a lofty palace, which looks down from a beautiful grove on a spacious sheet of water. It was only in 1843 that the territory fell to the English East India Company, having lapsed through the failure of heirs. It then comprised more than 500 villages, with a revenue of £44,000.

L

L THE twelfth letter of our alphabet, was called *Lamed*, i. e., 'ox-goad,' by the Hebrews, doubtless from its resemblance to that implement—a resemblance still traceable in the Phœnician. L. belongs to the order of consonants called Liquids, and has the closest affinity to R. In some languages, there is only one sign for both, as in Pehlwi; and in others, the one or the other sound is altogether wanting. Hence the numerous substitutions of the one sound for the other in the Aryan languages. Thus, Eng. *plum*, Ger. *pflaume*, from Lat. *prunus;* Eng. *pilgrim*, Lat. *peregrinus;* Gr. or Lat. *epistola*, Fr. *épître;* the Swiss peasants pronounce *Kirche*, *Kilche;* and the Lat. termination *-alis* becomes, after *l*, *-aris*—as, materi-*alis*, famili-*aris*. L is also interchangeable with *n*—as, Gr. *pneumon*, Lat. *pulmo;* and, rather strangely, with *D* (q. v.). In certain combinations, the *l* of Latin words has become *i* in Italian—as, *planus*, *piano;* *Florentia*, *Firenze*. In Eng. *l* is often mute, as in *calm*, *yolk*, *should*. In the Scottish dialect, it is mostly mute in the end of words—as, *fa'*, *fu'*, *a'*, for *fall*, *full*, *all*. Similar to this is the frequent melting of *l* into *u* in modern French—thus, *à le* has become *au;* *chevals*, *chevaux*.

LA. See SOLMISATION.

LAA'LAND, or **LOLLAND** (i. e., *low land*), a Danish island in the Baltic, at the southern entrance to the Great Belt. Area, 452 sq. m.; pop. with Falster (1870) 90,706. The surface is remarkably flat, and the soil exceedingly fruitful. Forests of beech and oak cover upwards of 50 square miles. The chief town is Nakskov, with a pop. of 3375, a good harbour, and considerable trade. At Aatholm, near the Nysted Fiord, there is the largest, and in exotic plants the richest, private garden in the whole of Denmark.

LA'BARUM (derivation uncertain), the famous standard of the Roman emperor Constantine, designed to commemorate the miraculous vision of the cross in the sky, which is said to have appeared to him on his way to attack Maxentius, and to have been the moving cause of his conversion to Christianity. It was a long pike or lance, with a short transverse bar of wood attached near its extremity, so as to form something like a cross. On the point of the lance was a golden crown sparkling with gems, and in its centre the mysterious monogram of the cross and the initial letters of the name of Christ, with the occasional addition of the Greek letters Α and Ω. From the cross-beam depended a square purple banner, decorated with precious stones, and surrounded by a rich border of gold embroidery. The cross was substituted for the eagle, which had formerly been depicted on the Roman standards, and there were sometimes other emblems of the Saviour. In the space between the crown and the cross were heads of the emperor and his family, and sometimes a figure of Christ woven in gold.

LABEL. See DRIPSTONE.

LABEL (Fr. *lambeau*, a strip or shred), the ribbon pendent at the sides of a mitre or coronet.

LABEL, LAMBEL, or **FILE**, in Heraldry, the mark of cadency which distinguishes the eldest son in his father's lifetime, familiar to us from its entering into the composition of the arms of the Prince of Wales and other members of the royal family. It consists of a horizontal stripe or fillet, with three points depending from it (fig. 1). When the mark of cadency itself is designated a *file*, its points are called *labels*. It is said that the eldest son's eldest son should wear a label of five points in his grandfather's lifetime, and, similarly, the great-grandson a label of seven points, two points being added for each generation. The label extended originally quite across the shield, and sometimes occupied the upper, though now it is always placed in the lower part of the chief: the points, at first rectangular, assumed in later times the form called pattée, dove-tailed, or wedge-shaped; and more recently, the label ceased to be connected with the edges of the shield. Edward I., in his father's lifetime, bore the arms of England within a label not of three, but of five points azure, joined to the head of the shield, and interlaced with the tail of the uppermost lion (fig. 2); Edward II., when Prince of Wales, used indifferently the label of three or of five points, as also did Edward III.; but from the time of the Black Prince downwards, the eldest son of the king of England has invariably differenced his arms with a label of three points argent, and the practice has been for the younger sons also to bear labels, which are sometimes of other colours and more points, and differenced by being charged with fleurs-de-lis, castles, torteaux, hearts, crosses, &c., as directed by the sovereign by sign-manual registered in the College of Arms. The practice of differencing by the label which is thus *in viridi observantia* in our own and other royal families, is less used by subjects. Like other marks of cadency, labels are sometimes borne as permanent distinctions by a particular branch of a family.

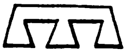


Fig. 1.

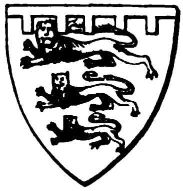


Fig. 2.

LABIA'TÆ (*Lamiaceæ* of Lindley), a natural order of exogenous plants, containing almost 2500 known species, mostly natives of temperate climates. They are herbaceous, or more rarely half-shrubby, and have 4-cornered stems and opposite branches; and opposite leaves, without stipules, abounding in receptacles of volatile oil. The flowers are often in cymes or heads, or in whorls; sometimes solitary. The calyx is inferior, with five or ten teeth, or

2-lipped. The corolla is hypogynous, 2-lipped, the lower lip 3-lobed. The stamens are four, two long and two short, or by abortion only two, inserted into the corolla. The ovary is deeply 4-lobed, seated in a fleshy disk, each lobe containing a single ovule; there is a single style with a bifid stigma. The fruit consists of 1—4 *achenia*, enclosed within the persistent calyx.—A general characteristic of this order is an aromatic fragrance, which in many species is very agreeable, and makes them favourites in our gardens. Some are weeds with an unpleasant odour. Many are natives of Britain. Some are used in medicine, and others in cookery for flavouring. Mint, Marjoram, Rosemary, Lavender, Sage, Basil, Savory, Thyme, Horehound, Balm, Patchouli, Germander, and Dead Nettle, are examples of this order.

LA'BORATORY, ROYAL, an extensive military manufacturing department in Woolwich Arsenal. Although it has existed for many years, it was only in 1855 that the present very large establishment was organised. Here are foundries for the casting of shot, shell, grape, &c.; apparatus for the manufacture of percussion-caps, which are formed —hundreds at a time—out of the copper sheet; presses where rifle-bullets are squeezed into shape; fuses in all stages of manufacture; and a thousand other instances of combined ingenuity and power. Conspicuous among the mechanism may be mentioned the making of paper for cartridges, and subsequently the making and filling of the cartridges themselves. Government liberally grants permission (through the War Office) to inspect the factory. The cost of the Laboratory varies considerably, according to the accumulation of stores. In addition to the Royal Laboratory, there are also laboratories—though on a comparatively small scale—at Portsmouth and Devonport.

LABOUR, in Political Economy, a term so dependent for its meaning on the circumstances in which it is used, that any scientific definition of it would lead to misunderstanding. The best service, in fact, towards rendering it intelligible, is to clear away some attempts that have been made to subject it to scientific analysis and definition. It has been separated into productive and unproductive, but no such division can be fixed. A turner who puts a piece of wood on his lathe and makes a top is of course a productive labourer. The same quality cannot be denied to the man who beams a web for the loom; but if he shares in the production of the cloth, so does the overseer who walks about and adjusts the industrial arrangements of the manufactory. Having included him, we cannot well say that the policeman, who keeps order in the district, and enables its manufactures to go on, should be excluded. Again, the man who contributes to make a book, of course appears as a productive labourer; but what the author contributes is not matter, but intellect; and it would be difficult to maintain that he ceases to be productive if he deliver such matter in an oration or a sermon. We can hardly count the distiller, who makes a glass of whisky, a productive labourer, and exclude the musician, who produces another and less dangerous excitement. It is equally impossible to draw the line between bodily and intellectual labour, since there is scarcely a work to which man can put his hand which does not require some amount of thought. A distinction between capital and labour has often been attempted to be established with very fallacious and dangerous results. Capital in active operation infers that its owner labours. If the capital is not laboured, the owner must be content to let it lie at ordinary interest. If he want profit from it, he must labour, and often severely. In a large manufactory, where the proprietor is supposed to be a gentleman at large, drawing his fortune from the sweat of the brow of his fellow-men, he is often the most anxious and the hardest-worked man in the whole establishment.

LABOURERS. The only peculiar laws affecting labourers are where they come within the description of 'servants in husbandry, artificers, calico-printers, handicraftsmen, miners, colliers, keelmen, pitmen, glassmen, potters, labourers, or other persons'—the word 'labourer' applying to a description of employment which, though comprehensive, is difficult to be defined. There must be a contract of service of some kind. The peculiarity consists in a summary remedy being provided for and against them before justices of the peace, who may compel them to serve out the time they contracted for, under a penalty of fine or imprisonment, and on the other hand, may order the masters to pay the wages. See SERVANTS. Labourers' wages are prohibited from being paid in kind or with goods, by the Truck Act (q. v.).

END OF VOL. V.

Edinburgh:
Printed by W. and R. Chambers.